iPermie

How to permaculture your urban lifestyle

by Bob Waldrop

iPermie!

How to permaculture your urban lifestyle: a good-life design guide for Millennials, Boomers, and Generation X.

Strategies, tools, and techniques to help you navigate the cardinal threats of peak oil, climate instability, economic irrationality, and political criminality. An Almanac of Useful Information and Permaculture Self-Study Guide.

By Bob Waldrop

The World will be saved by Beauty! (Dostoevsky)

To learn more about Bob's legacy, visit: https://www.citynewsokc.com/community/oklahomans-mourn-the-loss-of-environmentalist-and-spiritualist-bob-waldrop/article_f3475dfb-0493-50db-b569-8388325ea3b7.html, https://archive.ph/laBeu, and http://bettertimes.net/bobwaldrop.htm.

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iPermie Section Table of Contents

These links go to the tables of contents listing the chapters for each of the 14 sections.

In 2008 for the first time in human history, the world's population became more urban than rural. At present 3.6 billion people (of a total of seven billion) live in urban centres1. By 2030 this figure is predicted to increase to almost five billion, with urban growth concentrated in Africa and Asia. *Nyeleni Food Sovereignty Newsletter*

Foreword, by Vinay Gupta
On becoming a free citizen of a fair world.
The end of oppression and exploitation of other people, nations, and species.
iPermie proposes radical change, because exploitation is the norm, and fairness an exception.
This book is your travel guide to a better future.

iPermie: The Introduction
Hope. Succession. Empowerment. Praxis. Community. City. Good-life design.

Section 0 Basics - 42 chapters
How to hack a plan for your life with permaculture so that you can experience more beauty, health, happiness, freedom, cooperation, and security – with less work, consumption, conflict, injustice, waste, and danger. A discussion of the basics of permaculture design. Introduces the ethics, principles, strategies, techniques, and tools of permaculture design.

Section 1 Invisible Structures -- 19 chapters
How to make a world where it is easier to care for people, care for the planet, and have a care for the future. The application of permaculture design to organizations, politics, economic systems, civil society.

Section 2 Food -- 46 chapters
Food first! It's the easiest and tastiest place to start and does a huge amount of good for you, your planet, and your future.

Section 3 Energy -- 26 chapters
Energy is fundamental. Debunks the present wave of optimistic energy propaganda. Surveys your options and alternatives.

Section 4 Shelter -- 10 chapters
How to organize your living situation to create comfort, security, and hospitality -- no matter what the future throws at you.

Section 5 Water – 10 chapters
Water will be as big an issue in the future as oil, perhaps more so. In many areas, that future is already here. How to be water-wise and build a future of hope.

Section 6 Geography, Access, Transportation -- 9 chapters
Neighborhoods, watersheds, ecoregions, and biogeographical provinces. The geographies of your life dictate many of your ecological choices. The importance of organizing the locations and destinations of your life in light of ecological reality.

Section 7 Community -- 8 chapters
No woman or man is an island. Community makes or breaks our ecological futures. More on growing a world where it is easier to make good decisions.

Section 8 Economics -- 19 chapters
Moving beyond the economics of scarcity to embrace abundance. Practical economics as if people, the planet, and the future matter.

Section 9 Constancy, Persistence, Resilience -- 27 chapters
Protecting yourself, all you love, and the communities where you live from the increasingly risky futures that are the consequences of the bad decisions made by billions of people over long periods of time.

Section 10 Health -- 12 chapters
Your personal health is your most important area of design.

Section 11 Education -- 6 chapters
There is a difference between "going to school" and "getting an education."

Section 12 Family -- 5 chapters
Families are fundamental, uniting us across generations to care for people, care for the planet, and have a care for the future.

Section 13 Putting this together -- 9 chapters
Making your plans into realities. Finding a critical mass for positive change.

iPermie: The Epilog.
A word to the generations.

Stay in Touch

Foreword

by Vinay Gupta

Graeber's Debt gave Occupy an analysis. iPermie gives Occupy a plan.
Vinay Gupta

For years, we've waited for the practical guide.

Actually transforming your life to be less vulnerable, and less a part of the problem, is difficult.

A lot of us get caught up in the maze of spending 5 or 10 years trying to understand what is happening in the world, and working through successive phases of engagement: personal, then political, then communitarian, then personal again as we try and fail to find a leverage point from which to fix the world.

Bob stayed home, and built. He went through the process of orienting, of finding out what mattered in his life, and found a way to be in his community and in his person that made sense to him, with the big picture on the outside matching the action on the ground. He squared global awareness and local activity, and he built.

iPermie reminds me of *Synergetics*, Buckminster Fuller's magnum opus. Like *Synergetics*, iPermie frames a novel way of looking at the world and your place within it. Unlike *Synergetics*, *iPermie* is accessible to common-and-garden humans: the radical rethink it proposes feels natural and rightly ordered, rather than proposing a world of dihedral angles and interlocking prisms. But it is the same scope**, the radical root-and-branch redesign of the world that's held in mind,** the difference being that a person of **modest means and due discipline can actually implement** *iPermie*.

If society is ready to hear what Bob has to say, there will be real changes. Every generation of diggers and dreamers wonders if the time has come, if now is the time for the sword to be beaten into a ploughshare, and for the shovel and honest labour to displace the internal combustion engine, and all the war, warming and lies that go with it. I think there is strong evidence that the tide has turned, and the time is now. Let me talk about two examples.

Detroit hit the end of the road as Motor City, as the great car-export capital of the world. While urban blight ravaged some areas, graceful reinvention took hold in others, as farms and collectives and communitarians came back, dug in and started to use the opportunity of the city (cheap real estate and few other options) to live and then showcase their values - in action! It's too early to say where that municipal transformation will go, whether it will fizzle-and-bust or whether it'll be the seed for a New America, but the point is that there is hope from the Green Ideal

in an environment where - literally - all else has failed.

Then there is the grave matter of Sandy where we saw, in no uncertain terms, how quickly seven million urbanites in the world's premier city could be left shuddering cold apes in lightless caves. Nature does not often give us such a warning, but we are coming to blows with the ecosystem without a doubt, and the wrath of the sea has always been among humanity's primal fears with good reason. King Canute ordered his throne put on the shoreline to prove to his courtiers and subjects that he was not a god, that the tide would rise, and there was nothing he could do about it. Our current generation of potentates expect to be out of office by the time the water reaches the White House, but it is still rising, whether they are on the shoreline to meet it or not. In an increasingly trying age, with increasingly large gaps left by the State and its services, facing what is likely to be a century of paying for 20th century excess, we can only look to each-other and to the soil for support.

It is not that civilization is finished, but the boom of the 20th century, where military victory and cheap oil hoist America shoulder-high above a still-starving planet, is over. **We must all rejoin the real world,** and that means knowing who grows our food personally, not relying on a faceless machine to connect us to them, and triple the price on the way through for the privilege.

The book is huge: a thousand page door-stopper that starts at first principles and covers everything that I am aware of, from first political principles through to detailed instructions on sourdough culture. The price you pay for completeness is comprehensibility - if you start at the beginning and read to the end in a few sessions, you won't be able to integrate what you've seen. Rather, I recommend reading the first few chapters, the framing, the overview, the vision and then letting your interest and the table of contents guide you, gradually opening up perspective in new areas as you go. Implement small steps ***- start with bread,*** if you don't bake already, or perhaps the ever-present garden. Do a little, read more, do a little more. Weave together learning and activity. Read with friends, share projects, build communities. Practice, and put plans into practice. It is not a book to sit on a shelf for a rainy day, it's a book to plant like a seed in your life, to water, care for and grow until something very different is created: life whole, with the grain.

I don't know how long we have before the sweeping changes which are engulfing our civilization will bite hard enough to bring tears. If you are under 25, you've seen your future mortgaged away to pay off banks and usurious student loans as rentiers in real estate and education attempt to ensure their middle ages will be fat and happy. If you are old, you witness the crumbling of health insurance and (in socialist countries) the decline of the welfare state. **The center cannot hold**, because in truth it was never a whole center, never a real wholeness - our system, our civilization is the last dregs of imperialism trying to hold on to unwarranted privilege and military power at a time when neither is sustainable. We cannot afford a space program, but somehow there's always more money for weapons. When that machine stops, and each nation has to live on its own income, rather than enslaving its neighbours through free trade at gunpoint, there will be changes to the way we live which go right to the heart of things, make no mistake.

But that change is not the end of civilization, only the end of exploitation. What Bob is teaching you to do is to be a free citizen of a fair world, where we live by the sweat of our own brow, rather than through the oppression and exploitation of other nations, other people, and other species. It is a radical change because exploitation is the norm, and fairness an expensive exception, but as the whip hand of capitalism weakens, in a fairer world, we will all have to pay our way.

This, then, is the path: free citizens of a fairer world, one day at a time, together.

There's no better travel guide than this book, and I recommend it whole-heartedly.

Vinay Gupta, UK
20 November 2012

iPermie: the Introduction

Have you ever seen the dawn? Not a dawn groggy with lack of sleep or hectic with mindless obligations and you about to rush off on an early adventure or business, but full of deep silence and absolute clarity of perception? A dawning which you truly observe, degree by degree. It is the most amazing moment of birth. And more than anything it can spur you to action. Have a burning day. -- *Vera Nazarian, The Perpetual Calendar of Inspiration*

From the halls of power to
the fortress tower,
not a stone will be left on stone.
Let the king beware for your justice tears
ev'ry tyrant from his throne.
The hungry poor shall weep no more,
for the food they can never earn;
There are tables spread, ev'ry mouth be
fed,for the world is about to turn.
My heart shall sing of the day you bring.
Let the fires of your justice burn.
Wipe away all tears,
for the dawn draws near,
and the world is about to turn!
From Canticle of the Turning, by Rory Cooney, tune: Star of the County Down

iPermie is a work of love and sorrow.

It flows from love for people, love for the planet, and love for the future. It is informed by sorrow for people, sorrow for the planet, and sorrow for the future.

My original plan was to write 30,000 words. When I got there, I hadn't finished the basics, there was a lot of love, and a lot of sorrow, left to write. So I kept on keeping on. From the beginning, my imperative was for a comprehensive, holistic view of the signs of these times. I hope I have laid out, as best I could, a path forward that can be accessed by anyone with the will to do some thinking, observing, and planning. Money is mostly optional.This book is not a litany of scary stories. It has a few -- everyone likes a little adrenalin rush now and then -- but that's not the theme.

This book is about **hope** – it's about how we can create self-fulfilling prophecies of a better world, where we care for people, care for the planet, and have a care for the future.

It's hard to do this in the present world, because everything has been designed, from the ground up, to consume, pollute, and waste on the most grand scale possible. It simply isn't possible for everyone to make the best decisions all the time.

That shouldn't stop us from making better decisions, or from making good decisions, or to avoid making bad decisions.

This is the permaculture principle of **succession** at work. We start small, or we don't start at all. We take beginning baby steps, or we never learn to walk. Indeed, before we can walk, we must learn to crawl, and before we can crawl, we must master turning over. This book is about those basic first steps and also about the mature best steps that must come for all sooner or later. It is about incremental change for the good and watching out for

the big score. It is about creating a world where it is easier to make good, better, and best choices and to avoid making bad choices.

This book is about **empowerment**. Far too many of us feel powerless in the fact of the gigantic forces at work in this world. We don't understand the power we retain within and we certainly don't want to trust ourselves. This book will help you understand that everything that you need is already within you. Sure, you may need some details, skills, and etc., but you already have the most important things you need for the future. We begin our journey as you and I learn to trust ourselves. I know, it's a radical concept. You can do it.

Like anything else, it may take some **praxis.** That's not a misspelled word, it's a concept so important it has to be mentioned in this introduction. Praxis is *action coupled with reflection.* We act, then we reflect on what we did. Our next action grows out of our previous action with more reflection afterwards. Feedback is more than a squeal in the sound system.

This book is best approached in the context of the **community** and for many of its modern readers, that will be the biggest challenge of all. But the plain truth of the matter is that we are not going to make it into the future that is coming at us in our little independent households of one to three point two people. No one was able to survive that way in the past and it won't be true in the future either. Community will make or break our response to these challenging times. We can design new forms of ecovillages nestled within the modern metropolis and live in them, reinhabiting our urban areas on behalf of ourselves, the planet, and the future.

This book's point of reference is **the City.** The majority of the world's peoples now live in cities. If half of everyone now in a city decided to abandon it for a rural area, the result would be a major worldwide ecological catastrophe. Cities offer many opportunities for sustainable and frugal living, a claim which will become more understandable as this book progresses.

To date, most permaculture work has been identified with particular sites, typically in rural or peri-urban areas. That's fine and important work but going forward we need to pay more attention to how we can live sustainably in the city. That context demands much work with invisible structures – which is permie-speak for organizations, systems, businesses, governments, etc. – that will help us to live more sustainably in the city. If you live in a high rise apartment building, you won't be able to raise all your own food. So structures such as local food cooperatives and farmers markets are basic building blocks of living sustainably in a city.

I have a particular concern **for people of low to moderate incomes**. Our household is not wealthy but even so we have managed to do quite a bit to reduce our impact upon the ecology where we live. Thus, there is a definite focus throughout the iPermie text on what people can do to care for the earth, care for people, and have a care for the future without spending big piles of cash they probably don't have. Indeed, besides the sustainability aspects, iPermie could be considered a manual of "champagne living on a beer budget," which is to say, "How to have a great life without spending big piles of cash and going deeply into debt."

Permaculture, as a **design system**, works every bit as well for people in cities as it does for those in rural areas. It is not

primarily about growing food or using perennial plants in landscapes. It is about designing ways to live in accordance with the permaculture ethics, so that we care for people, care for the planet, and have a care for the future as we design and embrace voluntary limits on consumption and ensure that surplus circulates and does not centralize or concentrate.

This book, and its 14 sections, 285 chapters, and 388,000 words, is your **good-life design guide** that will help you create your own self-fulfilling prophecy of hope, beauty, and wisdom.

Don't be dismayed by the length of iPermie or a first impression of its complexity.

Take this one chapter at a time, reflect on what you have read, and imagine how you could put it into praxis in your own life. We begin close to home, at our own individual doorsteps and go forward from there.

The direction you choose to face
determines whether you're standing
at the end or the beginning of a road. --
Richelle E. Goodrich

Bob Waldrop
Oklahoma City, Oklahoma
January 6, 2013

Section 0:The Basics of Permaculture

"Observe Nature thoughtfully rather than labor thoughtlessly."
– Masanobu Fukuoka, One Straw Revolution

"Is it all worth it? If we do our best to heal the Earth and make our place in her a sustainable one, is there a good chance that we will succeed?…to my mind that's the wrong question. Even if we could answer it – and we can never know anything about the future for certain, it would beg the question How do I want to live my life? So my answer to the question . . . is that I want to be part of the solution rather than part of the problem". *– Patrick Whitefield, Earth Care Manual'*

Section List of Chapters

00011 Permaculture in 37 words
Short and most succinct commentary.

00021 Hacking permaculture in 350 words
The 378,000 words of this book are commentary on this chapter.\

00031 Warnings
It's not as if this is a risk-free endeavor.

00041 Necessary Beginning Info
Getting a good start helps later on. iPermie! jargon and more.

00051 The invitation of permaculture
The work will be worth the result. How to become intentional about your life and why this is important. A preview of the design process – Observe, Study, Evaluate, Design, Implement (OSEDI). What we know. What we don't know. What we can't know. The importance of wisdom. Why we praxis.

00061 About iPermie!
How this book is organized and some suggestions on using it as a tool to learn permaculture design and hack a plan for your life.

00071 Design your personal permaculture learning experience
We learn design by doing design and here's your first assignment.

00081 Learning Community
Why a learning community is important and helpful and how you can find or start one.

00091 Why is this necessary?
You probably know the answer to this already but a little review never hurt anyone.

00101 Four housemen of the modern apocalypse
Here there be scary stories.

00111 Why you should care
Your only choices are to design your own life or have someone else design your life for you. Will you take the red or the blue pill?

00121 Prerequisites of Permaculture
Long and thoughtful observation. Trust yourself. Embrace a holistic way of seeing the world. Respect creation.

00131 How to permaculture your urban lifestyle
Urban areas are the modern permaculture frontier and will make or break the

temporal future of humanity and this planet.

00141 How to permaculture your college lifestyle
You can do more permaculture on campus than you think possible if you design carefully and organize your fellow students for action. How to permaculturally occupy your campus.

00151 Vision of the Future
A fictional look at a city informed by permaculture ethics, principles, strategies, tools, and techniques. iPermie says: "Let's make this a real place."

00161 Lifestyle Inventory: How and Why
Here's a plan for long and thoughtful observation of the situation. It's not the only observation plan but if you don't do this method, you need to develop your own.

00171 Maps and your Lifestyle Inventory
The map may not be the actual territory, but maps sure are useful in permaculture design.

00181 Life Inventory Questions
A detailed list of questions to answer that adds up to a thorough observation of your life.

00191 Your design choices: accidental or intentional
More on your design choices. Replicating natural processes with human systems.

00201 A design for your life
What is a permaculture design? While much of permaculture design work to date has been for individual landscape sites (houses, farms, etc.), the iPermie focus is to design a plan for your *life*. Aspects, components, and sections of a design report.

00211 Permaculture Ethics
Care for people, care for the planet, care for the future (by being aware of limits and ensuring that surplus circulates in the community).

00221 Principles of Permaculture
We avoid reinventing wheels and flat tires by careful observation of what works and what doesn't work. Lists of general principles. No, there isn't one list of permaculture principles, there are many. Nature is diverse. Did you think permaculture, which aims to mimic nature, would not itself be diverse?

00231 Concepts in Design
Self regulation and sustainability. Sources of work and pollution. Resources as energy storages. Entropy, chaos, disorder, diversity.

00241 Patterns in Design
One thing always leads to another. You can never do just one thing. Energy always follows the patterns set for it. You can't get a good end from a bad pattern. Types of patterns. Patterns in motion. Boundaries and edge effects. Timing is everything. A language of patterns. Lots of deep thinking here.

00251 Design Methods
Ten techniques to use for permaculture design. Use all of them or none of them or some combination thereof. The benefits of a comprehensive, holistic approach to design.

00261 Design Toolbox
More tools to help you do permaculture design.

00271 Needs and yields chart
One of the more important tools used in permaculture design.

00271.1 Needs and yields spreadsheet
Download this spreadsheet at http://www.ipermie.net .

00281 Zones and Sectors
A place for everything and everything in its place. Fire, sun, wind, weather, climate, grid energies, fetched energies, invisible energies, and more.

00291 Permaculture wisdom sayings
Traditions received from our elders.

00301 Classic city-scapes
Features common to urban areas everywhere.

00301.1 Arid landscapes
The features, opportunities, and problems of arid landscapes. Download at http://www.ipermie.net .

00301.2 Humid landscapes
The features, opportunities, and problems of humid landscapes. Download at http://www.ipermie.net .

00301.3 Island landscapes
The features, opportunities, and problems of island landscapes. Download at http://www.ipermie.net.

00311 Entropy and Affinity
Since everything is always falling apart, you might as well take advantage of the process. Same thing for affinity except that it's about the tendency of things (and people) to clump together.

00321 Diversity
All about the importance of a diversity of beneficial connections in your life.

00331 Appropriate Scale
Should you build a nuclear reactor to power your house? Choosing the right size strategy, tool, technique, or element for the situation. Why this is critical.

00341 A Permaculture Fable
Appropriate Scale, Entropy, Affinity, and Diversity went into a pub owned by Permaculture Designer. A story about the Trouble with Entropies.

00351 Type 1 errors and their necessary avoidance.
Avoid anything that causes more work than it's worth or that puts you or anyone else at risk.

00361 Systems thinking and permaculture
This is the *really big* picture. Why it is necessary and why it is hard. Practice is required! As is praxis!

00371 A hierarchy of goods, betters, bests
A guide to making choices. Appropriate next steps. Solving problems with succession.

00381 The Process of Permaculture Design
Draws everything thus far in iPermie together into one continuous design narrative. Bonus information: the spiral of intervention and lists of testing questions.

00391 Extension fact sheets
A place to get good information, in person, in writing, and online. But discernment is necessary.

00401 Additional resources
Books to help you along the road. For website links, visit http://www.ipermie.net.

00411 Design challenges
Three challenges to get your started on your road towards permaculture design.

00421 About Bob Waldrop
Who is this guy who wrote and compiled all this information? A beginning answer. More is revealed as you read the text.

00431 Acknowledgements
Persons and places who were part of my iPermie journey.

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00011 Permaculture in 37 words.

As you learn to design your life using permaculture principles,
and live according to permaculture ethics,
you will experience more beauty, health, happiness, freedom,
security, and cooperation, with less work, consumption, injustice,
conflict, stress, danger, and waste.

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00021 Hacking Permaculture in 350 words

Commit! Accept personal responsibility to live your life so that you –

– Care for people,

– Care for the planet,

– Care for the future

See all you can see! Open your eyes to observe your situation and know reality. Trust yourself and your ability to make judgments based on your observations. Embrace a holistic vision that views everything as part of the whole. Respect all people and creatures as unique manifestations of Creation. Adapt, do not dominate.

Refuse! Stop hurting yourself, other people, and the planet's living ecologies. Withdraw your support from subjugation and ruination. Stop feeding the economic domination system.

Design or be designed! You need a plan! Permaculture helps you design that plan – a practical and ethical guide for your life that tells your story, a living document evolving as your life unfolds.

Six critical design principles.

– Everything connects to everything!

– Everything serves multiple purposes!

– Every important need comes from multiple functions!

– Prefer natural methods and solutions. Embrace the small and slow.

– Focus on the journey, not the destination. Find the seeds of the future in the present.

– Use less stuff! Live as if what you do matters, because it does.

Solidarity – Participation – Cooperation! Organize your relationships and communities with diverse beneficial connections so it is easier to do the right thing.

Resist! Oppose all people and systems who do not care for people, do not care for the planet, and do not have a care for the future.

Walk your talk. What you do with your life matters – to you, to those who care for you, and to the planet. Through permaculture, you can design your life so that you experience more beauty, health, freedom, happiness, and cooperation, with less work, consumption, conflict, injustice, and waste. Your works of justice, sustainability, peace, and beauty, as they propagate across the planet, may ultimately free peoples from oppression, make justice possible, end tyranny, halt genocide, and restore and renew ecological systems. This authenticity of life and action is a source of wisdom and peace.

Regenerate! Renew! Reproduce! Permaculture is in this for the long term.

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00031 Warnings.

I hope we shall take warning from the example of England and crush in its birth the aristocracy of our moneyed corporations which dare already to challenge our Government to trial, and bid defiance to the laws of our country. – *Thomas Jefferson*

One timely cry of warning can save nine of surprise. – *Joshua Thompson*

"It is not because things are difficult that we do not dare, it is because we do not dare that they are difficult." – *Seneca*

Using permaculture design may be hazardous to your complacency, ignorance, gluttony, greed and indifference

Permaculture in general, and iPermie in particular, will not help you become rich, famous, or sexy, although any of these may happen incidentally to your use of permaculture design. All persons associated with iPermie disclaim any responsibility for these consequences.

Using permaculture design may cause you to develop wisdom, beauty, justice, authenticity, and generosity.

If you don't want these things in your life, don't study permaculture.

When used as directed, iPermie will help you design and live your life so that you –

– minimize work and maximize happiness;

– minimize consumption and maximize health;

– minimize waste and maximize beauty;

– minimize injustice and maximize freedom;

-- minimize danger and maximize security;

– minimize conflict and maximize cooperation.

In other words, by hacking a plan for your life with iPermie, you can experience more beauty, health, happiness, freedom, security, and cooperation – with less work, consumption, conflict, injustice, danger, and waste.

If cooperation, beauty, happiness, freedom, and health do not interest you, stop reading now.

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00041 More necessary In-The-Permaculture-Beginning info.

All are guilty of the good they didn't do. – *Unknown*

"It does not matter how slowly you go, so long as you do not stop." – *Confucius*

An idea can only become a reality once it is broken down into organized, actionable elements."
– *Scott Belsky, Making Ideas Happen: Overcoming the Obstacles Between Vision and* Reality

iPermie will teach you how to hack permaculture design principles so you can design and live an urban life without destroying the planet in the process.

It doesn't work with your phone. It works with your brain.

It is about walking the talk with the three permaculture ethics –

– care for people,

– care for the planet,

– care for the future by designing limits on personal and communal behaviors and ensuring that surplus circulates and does not concentrate or centralize.

A Change for the better.

Unless you already live a sustainable life, your participation in permaculture will result in changes in the way you live. iPermie is here to help you choose those changes by developing a good-life plan for the rest of your life that incorporates the permaculture ethics as guides for how to live and make choices.

We've all been programmed by a system of gluttony, greed, and violence to consume, waste, excrete, and consume some more, without any particular reflection of the consequences of our behavior for others or this planet's ecological systems. A corrupt political and economic system loots the population to benefit the elites, while marginalizing and ignoring real threats to the common good:

– Peak oil,

– Climate instability,

– Political criminality, and

– Economic irrationality

Wishing and waving magic fairy wands will not make these all-too-real problems go away.

The good news is that it is not too late to turn things around if we can learn to make better choices. First we stop digging the hole. Then we figure a way out of the hole. As more people learn these self-evident truths, it becomes possible to make the necessary political and economic changes that can stop our onrushing slide to the ash heap of history.

iPermie is a method of Occupying your lifestyle on behalf of the people and the planet. It is a legal, peaceful, and effective method of non-violent resistance to the corrupt and violent aristocratic elites who dominate our economy, culture, and society.

How to Use iPermie!

iPermie works with any device that can display PDF files or an ebook, when used by a human being with a brain who can read the English language. It can be printed and used in hard-copy format. (If you print a copy, you owe the earth a tree.) It is a method of cooperative

learning where the reader is as much a part of the process as the author.

If you study the materials, and work through the assignments and design challenges and ideas of iPermie, you will learn the information and develop the skills you need to design a way that you can successfully adapt to the four cardinal threats of –

– peak oil,
– climate instability,
– economic irrationality, and
– political criminality.

iPermie accomplishes this goal by teaching you permaculture design principles, strategies, techniques, and tools so that you can hack a permaculture design for your life.

iPermie is for –

– people in urban areas,
– students
– anyone without access to land for growing food or with access to only small amounts of land.

What iPermie Isn't.

iPermie is not gardening class. Permaculture designs may include gardens. They may include decisions to plant perennial herbs and plants as well as fruit and nut trees. But permaculture is much more than gardening class.

iPermie is not a greenwash system that will enable you to continue to consume, waste, and excrete without a care for the consequences. When used as directed, iPermie can bring about fundamental changes in the way you live. If you don't want to change your life, stop reading these documents immediately.

iPermie is not a permaculture design course. iPermie is a permaculture hack! Working your way through iPermie will not earn you a certificate as an apprentice permaculture designer.

If your intent is to do permaculture design work for others, or to teach permaculture design courses, you should take a permaculture design course from a competent permaculture teacher (although iPermie will be a useful intro to the subject for you.)

This is not gardening class.

Permaculture is a design system.

Good ideas, best practices, and reskilling information provide details that are helpful for preparing and implementing permaculture design.

They should not be confused with permaculture.

If someone has land and wants to produce food, a permaculture design might include some perennial food-producing plants like fruit and nut trees. Such a garden is not a "permaculture" garden – it is a perennial garden. While it may be the result of a permaculture design process, a garden is still a garden, it is not a permaculture garden.

Implementing a permaculture design is not permaculture. Such work involves carpentry, community organizing, cooking, gardening, etc. The word "permaculture" relates to the design, not the implementation activities.

Well, technically speaking jargon-wise anyway. It's hard to resist falling into such verbal shortcuts. The point is that we don't want to limit our concept of permaculture to growing perennial plants. That's one part of a very wonderful whole system.

iPermie is about permaculture design. It includes a considerable amount of good ideas, best practices, and reskilling information. Such information rounds out the iPermie permaculture presentation and assists you in your design work.

Document numbering system

Each chapter or document of iPermie has a 5-digit number. The first two digits refer to the section – 0 through 13:

-- 00 Basics

-- 01 Invisible Structures

-- 02 Food

-- 03 Energy

-- 04 Shelter

-- 05 Water

-- 06 Geography, Access, Transportation

-- 07 Community

-- 08 Economics

-- 09 Resilience

-- 10 Health

-- 11 Education

-- 12 Family

-- 13 Putting this together

The next two digits refer to the number of the document within the section. The numbers are sequential. Read them in their numeric order within the section.

The final digit refers to the version of this book. This is the first version, identified as 1, so all the document numbers end with 1. If I revise a document or the entire work, that version of those documents will be identified as with a final 2.

Therefore . . . first document of the first section would be 01011.

-- 01 = first section,
-- 01 = first document in the section,
-- 1 = version of the book.

Besides the number, the title includes a word or phrase describes the document.

JARGON of iPermie

This is not an exhaustive glossary of terms used in permaculture. It is a short list of the common terms used in iPermie.

Appropriate Scale. Elements and functions should be appropriate to size and scale.

Bill Mollison. Cofounder with David Holmgren of the design system of permaculture. Author of The Permaculture Design Manual.

Community Base Map. A detailed map of your community that shows the places important to your life – your home, job, school, favored places of entertainment and shopping, etc.

David Holmgren. Cofounder with Bill Mollison of the design system of permaculture.

Distributive Justice. Justice in the distribution of and access to material goods.

Diversity. In permaculture, diversity refers to the diversity of interconnections on a site, not just a list of numeric diversity. E.g., compiling a list of the plants on a site illustrates numeric diversity. Looking for and describing the connections among those plants, how they function together and support each other and other elements/functions of the site, is an exploration of permaculture diversity.

Elements. Any individual item in a design. Trees, kitchen equipment, a side walk, a garden, a compost pile, vermiculture project, etc., all these are elements.

Energy Storages. Energy stored for use later, and/or energy embodied with useful stuff/kit/gear, and/or storage of consumables such as food, water, or other supplies.

Entropy. Everything will eventually fall apart. Without exception. Often spontaneously and when least expected. Get used to it. Plan for it. Take advantage of it.

Excess Consumption System Design. The present system in general use worldwide, which encourages thoughtless consumption and discourages, and sometimes penalizes, examination of alternatives and adoption of alternative paradigms of living.

Foodshed. The geographic area from which you get your food.

Functions. Systems or activities on a site or in a life. Things that need to be done. Things that you want and need done. Nutrient management is a function. Resource cycling is a function. Nitrogen fixing is a function, an aspect of nutrient management. Eating is a function.

Guild. A gathering of mutually beneficial plants, systems, communities, etc. is referred to in permaculture as a guild.

Household Base Map, A detailed map of your house or apartment, and the plot of land/geography on which it sits.

Invisible Structures. Organizations, governments, bureaucracies, businesses. Structures and systems in human cultural, economic, religious, and political systems.

Instrumental Value. An object, person, or system with instrumental value is useful to something or someone else.

Life Inventory. A detailed observation of your life that establishes the base line of the beginning of your permaculture journey. As you update your records, it charts important milestones.

Permaculture. Permaculture is a discipline used to design more sustainable human lifestyles and systems that care for people, care for the planet, and have a care for the future by incorporating voluntary limits and justly distributing surplus.

Permaculture Design Manual. The "Bible" of the permaculture design movement. Written by Bill Mollison, it lays out the ethics, principles, strategies and etc. of permaculture.

Peri-urban. Territory that adjourns an urban area, between the suburbs and the countryside.

Plucking Plants. Cut and come again plants. If you harvest some of the plant, it will grow more. Swiss chard and many other greens are examples of plucking plants.

Praxis. Action coupled with contemplation and reflection and observation of feedback.

Prep. Anything that will help you in the event of a disaster or catastrophe can be referred to as a "prep," which is a contraction of "preparation." So storing food and water is a "prep," as is a hurricane evacuation plan, or a shelter in case of a tornado.

Sectors. This is a way of describing and analyzing the external flows of energies and resources onto, through, and out of, a particular place and time, or how they impact an individual person in a certain geography and time. The identity of these sectors is specific to the site or individual/household that is the subject of the design.

Sink. A place where resources disappear.

Systems. A collection of elements that function together for a purpose.

Succession. This is a variation on the theme, "first things first, second things second." The principle derives from observations of what happens to destroyed or damaged ecologies. The first plants to colonize the destroyed or damaged area are known as pioneer plants. These grow rapidly and seed prolifically. They provide support for a new generation of plants that comes in. This process continues, and over time, a destroyed ecology can become a mature forest by a series of stages. Succession is a common strategy in permaculture design.

Types of Resource Use (Permaculture Design Manual, p 16)

-- *Resources which increase by modest use.* A cut and come again plant like chard. When you use a bit, it grows more.

-- *Resources unaffected by use.* Many people can look at a beautiful view of the landscape, without diminishing the view. Water in a flowing stream used to power a turbine or mill is unaffected by its use to run the equipment.

-- *Resources which disappear or degrade if not used.* If you don't harvest the wheat, it dissipates.

Resources which are reduced by use. Fossil fuels are a pre-eminent example of this.

Resources which pollute or destroy if used. Fossil fuels are another example, as are herbicides and pesticides.

Zones. A method used in permaculture design to locate elements based on the frequency of maintenance/use by the inhabitants.

Usual Disclaimers

I am not in the business of offering engineering, architectural, psychological, psychiatric, or medical professional services. If you need these services, contact qualified personnel.

Every person is unique and may have special issues or challenges that contraindicate any particular suggestion or recommendation in iPermie. For example, if you are allergic to wheat, don't follow any recommendation to use whole wheat flour. Each person must read these materials in light of her or his own unique circumstances and situations and limitations and be prudent in what they choose to do or not do as a result of their use of iPermie.

Always take appropriate precautions when handling fuels, fire, or electricity.

Always follow recommended science-based procedures when doing food preservation.

The sites and resources referenced herein have a variety of cultural, political, religious, medical, or scientific world views in their backgrounds. The listing of any sites or references here should not be considered as my endorsement of any world views they may embrace. I chose the various iPermie information resources based on their potential contributions to those studying the related subjects, not for the purpose of advancing a political, cultural, religious, medical, or scientific world view. Well, I want to advance a "culture of permaculture" so maybe that's an exception but that's my personal bias. Let readers beware!

Some sites and resources listed herein are commercial sites. Listing them here does not constitute an endorsement of any commercial products or services available at such sites, unless explicitly mentioned in the texts. I have not been paid by any site or product for listing them here. This is an ad-free zone. As with all things commercial, "let the buyer beware."

– Your mileage may vary.

– Caveat Emptor.

– Illegitimi non carborundum.

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00051 The Invitation of Permaculture

The difference between what we do and what we are capable of doing would suffice to solve most of the world's problems. – *Mahatma Gandh*i

The invitation of permaculture is to –

– become intentional in your ways and manners of living,

– be engaged with and aware of your surroundings – your community, your family, your ecosystem – and

– commit to incorporate into your life ethics that care for the Earth, care for people, and care for the future by being aware of limits and putting surplus into circulation.

At first glance, it seems complicated, but that's true of most skills or fields of knowledge when we initially encounter them.

Nothing in permaculture design is completely outside of your field of reference or experience. What is unique is the way that permaculture studies the process of developing human systems and structures and proposes a way that lay people, without university degrees, can become intentional about the designs of their lives, their activities, and the systems and structures that are part of their lives.

Everything you actually need to know about permaculture is within the 350 words of *00021 Hacking Permaculture*. The other 380,000 words of iPermie are simply commentary on the themes presented in those first 350 words.

The unique contribution to humanity of Bill Mollison, David Holmgren, Dan Hemenway, Scott Pittman, Toby Hemenway, and other permaculture thinkers and teachers is to find, collect, recover, remember, synthesize, and then present cultural and ecological knowledge so that we can learn to make better decisions about how we live together on this planet.

These times require a conscious decision to invest the effort it takes to incorporate the permaculture ethics into your life. Once you make that commitment, many previously confusing situations will be clarified for you because your priorities fall into their proper order. With the ethics of people, earth, and future care first, then follows the application of those ethics to the real world situations in which you live, move, and have your being. A lifetime of permaculture learning, experience, dreaming and risk-taking opens up before you with opportunities you never before thought possible.

This will be a ***transformative experience*** for you and all you love.

Even if they never read a word about permaculture, the changes you make in your life because of your study of permaculture design will propagate waves of beauty and compassion and hope outwards from you like ripples flowing from the drop of a pebble into a pool of water.

"Hah," you're probably thinking, "that will be the day" and will think I am letting my rhetoric run away with my imagination. And I certainly confess to using a certain amount of exaggeration in my writing. Even allowing for my sometimes florid style, the statements simply report the experience of many people who study permaculture. When you find this happening to yourself, just remember that you heard it here first. Be warned – if you don't want hope and beauty and compassion in your life, stop reading right now, because . . .

> . . . Permaculture helps you design your life so you can experience more beauty, health, happiness, freedom, security, and cooperation, with less work, consumption, injustice, danger, conflict, and waste.

Through permaculture design, we can work together to increase the safety, security, well-being, and happiness of our families and communities.

Permaculture tells us to "start at your doorstep" so your own life and being is the place for you to begin.

We humans have an irresistible urge to categorize. That sometimes has its issues, but it can be a way of learning to recognize opportunities. As you look at yourself, you can perhaps recognize four aspects of your being that come together to make "you the human person."

– mind (rationality, cognition)

– soul (spirit, beliefs, your personal agenda and sense of mission)

– doing (your hands, your feet, physical actions involving your body)

– feelings (intuition, heart, affective interior movements, emotions)

Permaculture is ***holistic***. It's about mind, soul, doing, and feelings! You bring together and involve your entire being in your permaculture learning plan.

What we know and don't know.

There are certain things that we know.

We could say that there is a "sum of the total knowledge of humanity." However big and mighty we think that might be, it pales before the "sum of the total unknown knowledge."

We are one planet, in a small star system, on the outskirts of one galaxy, in a universe with perhaps as many as one hundred billion galaxies.

There is a lot out there that we do not know.

Throughout history, one approach to that great "cloud of unknowing" has been wisdom and intuition.

Most of our learning experiences focus on knowledge and data. Wisdom and experience are harder to get at. There isn't a Wisdom-Wiki that we can access online when we need to find some wisdom.

> "Most wisdom cannot be supported by just data. It involves working with the unknown – most of what is – not only the limited known; it must involve intuition, gut feelings, etc.; our over-emphasis on 'evidence-based decision making' undermines this, with predictable outcomes." Dr. *Stuart Hill*

Dr. Stuart Hill is an Australian social ecologist with a deep knowledge and understanding of permaculture. After the attacks of September 11, 2001, a reporter asked for a comment. He said --

> "All those who have it figured out, from whatever angle, are the problem; if the world is going to change, it will be by enough of us being willing not to know, so that a new kind of knowing might emerge."

Read more of his wisdom at http://www.stuartbhill.com/ .

Knowledge and learning could be compared to a spiral, which begins with unknowing and proceeds to learning and on to knowing. Spirals are common features in permaculture designs because they are a common natural pattern. Much more will be said about this in chapters to come.

From learning comes knowledge and from knowledge comes action.

Afterwards, we immediately spiral back to a reflection on what just happened:

– What do we know?

– What do we not know?

– What are we doing?

This gives us an opportunity for more learning with proceeds to more knowledge. And so it comes to pass that the process repeats, over and over and over again.

This is **praxis –** which is **action coupled with thoughtful reflection and feedback.** It is an essential aspect of hacking a permaculture design for your life.

We will learn to use principles, strategies, techniques, and certain concepts, methods, processes, and patterns of design. These things are real and important building blocks of permaculture and it will be helpful for you to understand them.

But they aren't everything when it comes to permaculture design.

Cognition and rationality are important. So are wisdom and intuition. We won't understand permaculture design unless we can act-with-reflection (praxis) upon a full and complete (holistic) vision that brings practical evolutions to our lives, our households, and our communities.

Learning permaculture design is ultimately a matter of experiencing wisdom. As we develop our ability to understand and work with both the unknown and the known, our wisdom increases.

So it comes to pass that the invitation of permaculture is to open the door upon an **ethical lifestyle** that in its wisdom cares for people, cares for the planet, and has a care for the future -- by being aware of limits and putting surplus into circulation.

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00061 About iPermie

In permaculture, we don't get what we want, we get what we design. – *Unknown*

Please do not panic! I know this doesn't look like Angry Birds or World at War: Zombies.

iPermie requires reading. It looks complicated. There are certainly lots of words. More than 383,000! War and Peace has 565,000.

My advice: don't worry, be happy. You will do fine if you take this one page at a time and don't get in a hurry.

iPermie is not an academic class where you must make a good grade. It's iPermie! Everyone can have fun while learning to apply permaculture design to their lives. That's our goal.

Join the conversation.

By purchasing iPermie, you get access to the conversation if you want to sign up for it at talk@ipermie.net. That's the place to ask questions, share experiences, and contribute to the knowledge base. It's moderated solely to prevent spam.

Get the spreadsheets and other independent documents.

The iPermie spreadsheets are in Open Office Calc (Spreadsheet) format, which you can download for free from www.openoffice.org/ . They will help you organize information, keep track of data, establish your baseline, and understand your progress.

You can download the spreadsheets and special PDFs relating to iPermie! at www.ipermie.net.

The 14 iPermie Sections

– 0 Basics
– 1 Invisible Structures
– 2 Food
– 3 Energy
– 4 Shelter
– 5 Water
– 6 Access, Geography, Transportation
– 7 Community
– 8 Economics
– 9 Resilience
– 10 Health
– 11 Education
-- 12 Family
– 13 Putting it all together

These sections do not describe discrete and separate categories, since the functions of these sections overlap and are interdependent and interconnected. We humans can't resist making lists and establishing categories but we should remember that the list and the category structure is not the reality. It is a description – an *interpretation* – of reality. In that regard, lists and category structures are like maps.

The iPermie section structure serves the purpose of breaking the large amount of information into manageable chunks so you can learn permaculture design.

Getting Started

1. Read the Basics section first.

2. Read the Invisible Structures section second.

3. If you are in college, read the Education section third.

4. Read the final section (13), which ties everything together.

5. After that, the sections can be read in any order, although it is best to read the chapters in their numeric order within the section.

Don't forget to get involved with an existing permaculture learning community or start one with your own friends, family, or people you find on Craig's List, Facebook, or wherever you go looking for people for your learning community. In most areas, you will have to start your own learning community.

Don't skip documents with concepts that are hard for you to understand. A better choice is to stick with it until you do understand it. Discuss it with others. Ask questions on line. Do your homework. Keep at it until the information makes sense and then go on to the next concept.

Design Challenges

iPermie has design challenges.

One way to learn design is to actually do design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has at least one small project that will help you to develop design skills. None of these design challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

Your first challenge is to **design your personal permaculture learning experience**. Your second challenge is to **design a permaculture learning community**. You can find more information about these challenges in documents 00071 and 00081.

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00071 Design your personal permaculture learning experience.

Clever people know how to solve problems. Wise people avoid them. – *Einstein*

iPermie is a wave of knowledge, information, and experience coming your way.

It is a **good-life design guide** for Millennials, Boomers, and Generation X.

It will help you **navigate the cardinal threats** of peak oil, climate instability, economic irrationality, and political criminality.

iPermie is an **almanac of useful information**, packed with best practices, reskilling info, and good ideas for social change.

The question is: Is it a rising tide to lift you up – or a tsunami to swamp you down?

If you receive and channel that wave's energy to benefit you and your friends, family, household, community, and the earth for generations to come, it will be for you a rising tide of beauty and wisdom.

But if you get bogged down with information overload and crash your interior servers so that nothing gets done, it's a tsunami of failure bringing little good to anyone.

Permaculture is about designing more sustainable human habitations, lifestyles and systems that care for the planet, care for people, and have a care for the future by being aware of limits and keeping surplus in circulation.

Therefore . . . your first assignment is to d**esign a method to use iPermie to learn permaculture** in a way that benefits you and all you love. In permaculture, you learn design by doing design. You can get some design practice as you design how you will use iPermie to learn what you need to know.

The Process of Design

As iPermie unfolds, I describe the permaculture design process in great detail over several chapters. This starts right now with this preview of the coming design attractions.

The permaculture **design process has five steps –**

– Observation
– Study and Evaluation
– Design
– Implementation

iPermie uses the acronym **OSEDI** to help us remember this process.

Observation.

You know yourself better than anyone else. You begin at the beginning with a detailed observation of YOU yourself yourself. This may sound easy, but it isn't. Don't discount the difficulty of observing yourself.

Begin with goals. What are your goals in studying permaculture? What do you want to get out of this permaculture education process?

Set short, medium, and long term goals. **"**I want to work my way through iPermie in 14 months." "In the next month, I want to finish section 0." "Before I go to bed tonight, I will read 00081."

Set some more longer term, more challenging goals, such as "end my dependence on the international food system within five years."

Or . . . "Within ten years, organize the geographies of my life so that I can live without a private vehicle.

What **functions** are necessary for these purposes? This is a slightly different question than the identification of goals. A goal could be a statement that you intend to finish the iPermie process in two years. A function is something that is necessary for this goal to be achieved.

For example, you may list "Reading iPermie materials" as one of your functions in support of your goals. You can further refine it: Will you try to read a certain amount every day or every week? Will you make that decision by yourself or with others in your permaculture learning community. And so that process goes, until you have a list of all of the critical functions involved with learning permaculture. You don't have to have a lot of things to do. **You just want the most important functions necessary to help you learn permaculture.**

For each goal and function, **identify the activities and elements necessary** to realize that goal.

Elements are individual things in your design.

For example, you could set up a study space, where you would place all of the items you need to study permaculture. That study space is an **element** in your design. You may need items like colored pencils and graph paper to do maps and diagrams. They are elements too. So are you.

Ask yourself: How do you learn new fields of study? How do you handle incoming knowledge when it shows up in copious quantities and appears complicated? What do you need to make this learning experience work for you?

What is your perception of the structure of iPermie?

How much time do you want to devote to this? What other demands are there on your time and attention?

Make a written record of your observations. You might as well go ahead and start a journal. You'll need it later.

Permaculture is a holistic endeavor. Your observation of your 'self' in this and everything else regarding permaculture needs to be as comprehensive as possible. This takes **praxis – action coupled with reflection on the experience** (feedback!) followed by more action informed by the previous experience.

How will you praxis this information?

Is "praxis" a new concept to you? Do you think it will be troublesome for you? If so, how will you resolve that challenge? If you think it will be easy for you – how will you resolve that challenge?

Sometimes "easy" is just as hard to manage as "difficult," only the details are different.

Permaculture tells us to start at your doorstep. You, the person who learns, does, and is, becomes the place of beginning.

One observation technique that's useful and fun is to pretend that you are already there, wherever it is you think you want to go! Boldly tell yourself – and others! – the most amazing stories that have yet to be realized about future changes in your life – changes that are not yet even planned, but are your wild dreams for the future.

Tell this tale as if it were history. I do some of this elsewhere in this and other sections. It helps you break out of the status quo emotionally so that you can effectively see your way forward into something better. It is the beginning of **your own personal self-fulfilling prophecy of permaculture success.**

This is a "vision experience" about how your learning of permaculture design changes your life. Don't censor your thoughts. Let them flow freely into the best case scenario. . .

> Your learning experience was so wonderful that you developed a permaculture design for your life

that was generative and fruitful and happy and meaningful. As a result of permaculture design, throughout your life you experience more beauty, health, happiness, freedom, and cooperation, with less work, consumption, injustice, conflict, and waste.

People around you were so impressed by your life that they too learned permaculture design. As your works of justice, sustainability, and peace propagated across the planet, together with those of your neighbors, and your neighbors' neighbors . . . genocides halted, tyranny collapsed, justice became possible and real for billions terrorized by evil, and the planet's ecologies began to heal, renew, and restore.

It is a measure of how far we have to go that reading those two preceding paragraphs almost seems like the "dreaming an impossible dream." But the way that we bring dreams to life is to first be willing to dare to dream of the impossible. If we can see it in our heads, we can bring it to life.

This doesn't mean it will be easy. It does mean hope is in order.

Permaculture design offers you the opportunity to **articulate the vision you have for your life** and by extension, the lives of those you love.

Know your destination – where you want, in your heart of heart to be – so you will know that you have arrived when you get there. If you don't know where to go, how will you know which road to take? How will you know you are there when you get there?

As you continue your observations. . . **Make a list of the ways you sabotage your own efforts** to make changes for the better in your life. Make a **list of the ways that society holds you back** and makes it harder to care for people, care for the planet, and care for the future. Knowing problems is the first step to finding solutions. Let us count these ways.

1. Your own feelings of disempowerment – helplessness – and hopelessness. The default design is to immediately feel hopeless and helpless and fears when we think about changing our lives in such a transformative way that we could impact the world around us for the better.

2. Family and friends. Others may be threatened by our movement toward transformative change. They may respond with discouragement, ridicule, challenge, and anger.

3. Resource limitations. You may think you don't have enough time, enough money, and/or enough brain power, to learn permaculture design.

4. Denial. You may develop feelings of denial – "Things are not so bad that I have to change my life."

5. Procrastination. Why do today what you can put off until tomorrow or even better, next year? That's a popular attitude. It is not a permaculture design principle.

6. Distractive activities. We don't lack for distraction in this world. Five hundred channels on cable. Thousands of programs to download on the internet. Hundreds of millions of websites. Sports teams. Movie stars. Computer games. Music megastars. Oh yes, bread and circus is an old game and it reaches its most masterful demonstration in the modern era.

7. Compensatory activities. Learning about the problems we face can cause internal commotions and sometimes it is easier to just get drunk, stoned, or shop till you drop instead of facing realities and doing something about them. It doesn't make things better. It makes things worse. But somehow we feel better about

ourselves. Beware the siren song of compensatory activities that numb the mind too much too often.

8. Systemic limitations. As you start this journey, you may not find much in the way of systemic support. By this I refer to organizations, ideas, systems, and structures that make it easier to learn permaculture design and live more sustainably. There are plenty of organizations, ideas, systems, and structures out there that help you make bad, badder, and baddest decisions. We need more support for good, better, and best decisions.

You can safely ignore all the programming that says, "This is impossible. It can't happen. You'll never make it." That's the controlling voice of the domination and subjugation system preaching helplessness and hopelessness to you. It is a lie. Turn away from it.

Whew. That's a lot of information. Always remember you don't have to be in a hurry with any of this. This is your schedule on your timeline that fits the cycles of your life. Don't stress. Permaculture design helps relieve stress in your life. It should not promote stress.

Study and Evaluation.

After Observation, in light of what you now know about yourself, you study your observations so you can evaluate them. We will learn a lot more about how to evaluate observations, but here at the beginning, mostly you need to discern the best way for you to proceed in this journey of permaculture education. Do this in accordance with your existing abilities and knowledge of how you participate in and experience learning opportunities.

The first layer of review is always **ethical.** Study your goals and functions in the light of the ethics of permaculture.

Prioritize! You can't do everything, at least not at first. What's most important? First things first, second things second and so on down your list. Always start with the high priority items.

As you study and evaluate, continue to drill down for each of the goals and functions, with their associated activities and elements. **Refine your observations and increase the level of detail.**

Look for common elements – **beneficial connections** as we say in permaculture. We like situations where multiple systems or elements provide each important function. We want each element or system to serve multiple functions or purposes. We prefer biological answers and small and slow solutions. We structure activities so that they are energy conservative. We act in accordance with the permaculture ethics. All of these can be filters for your lists and plans.

Examine your list of the expected barriers to your success and problems you may encounter. How do you weaken or remove them so you can do what you want to do? Write a plan to handle these kinds of problems.

Make a list of the **resources you need**. Start with "A learning community." Go on to folders by subject, a journal, and study schedule. What else?

Study and Evaluation includes understanding that there are factors out there that work against change. The system is strong and well-practiced in discouraging all who would change their lives as the first step toward changing the world. Your learning plan should include ideas about overcoming the structural bias against change for the better built into the world's systems and structures.

The Benefits of a Learning Community

Generally, in a conventional permaculture design course, students critique design work within the learning community that came together for the educational experience. you downloaded iPermie ebook does not come equipped with a community. That's why one of the first

two design challenges is to call together your own permaculture small group education community.

Therefore, an important right-up-front question is –

> Do you want to attempt this by yourself or in company of others?

The Learning Community chapter (00081) suggests forming a small community of friends to work your way through this material. There are many good reasons for that, beginning with the detail that permaculture is a communitarian activity. Feedback is important to permaculture design and that works best in a group.

Maybe you already have a learning community at hand in the form of your family or household. If not, calling together such a community, or finding one, is important to the development of your permaculture learning experience.

You can meet in person, or you can be a cyber-community.

There are no permaculture police that will come in black helicopters and take you away for not starting or joining a small group permaculture learning community. It's up to you what you want to do. My recommendation though is to go with the learning community option, even if you find that difficult at first.

Design

Permaculture designs are always written documents. There is too much detail in designs to carry the information around in your head.

Make **specific decisions** that lead to **actual outcomes consistent with your goals** and list of functions.

Designing small incremental steps is the wise way to go. Nibble at your situation one little bit at a time. Success at small achievable activities creates empowerment. Nothing succeeds like success. For example, a design decision could be: "Study written iPermie materials 30 minutes a day six days each week."

Use the various lists of permaculture principles to develop strategies and plans to achieve goals and functions.

A good place to start is to make a list of things to stop doing and/or to minimize. Begin with – "Stop thinking that you are helpless."

Don't plan grand agendas. A common response to disempowerment is grandiosity. We plan such major projects that nobody could ever achieve them. Thus we prove our feelings of helplessness to be true. Sure, it's fine to stretch. There remains a difference between challenging yourself to do more and better and planning a grandiose adventure there is no chance of achieving.

Avoiding grand agenda's is not the same thing as abandoning your holistic vision for your future. You may indeed dream of a great day when a host of permaculture design-driven changes have come to fruition in your life and throughout your community. But your first step is not into that grand vision of the future. Your first step is into something you can achieve in the here and now, with the knowledge and resources you have know. This will be a baby step to carry you on to the next step, and the one after that, and so on and so forth until you reach the future of your dreams.

Work with the **most important functions first,** as in "these are the most critical things I need to do to learn permaculture design."

Look for **beneficial connections on your lists.** If something shows up on three or more lists, zero in on it and see what it is and why it is important enough to show up multiple times. **The more lists you see an item on, the more important that item is to the entire design.**

Always look not only at the parts, endeavor to **see the whole.** We see trees but we may not understand the forest. The forest does not exist without the trees but it is more than any individual tree. The danger is that we focus on the trees and ignore the forest, which is what the default system design wants us to do. Seeing the world and your life as a whole system is not easy. You can learn to do this with practice, just like anything else. But you do have to practice at it. People rarely just magically acquire that sense (at least in our culture).

Don't forget to count the cost in money and materials and time! Live within your budget – your finances, your access to energy, your time. Don't bankrupt your bank account, your time, or the planet for the sake of your design.

Implement.

After you complete your design, Just Do It. Adapt it as necessary in response to feedback and outcomes. Everything you think of initially may not work out in practice. That's fine. You did something. As a result, you learned something. So now you are ahead. Think and reflect about what you did and what happened. Next do something else. Learn more. Reflect again. And so it goes.

Listen to feedback. Observe outcomes. Continue to evaluate and redesign as necessary.

The Author's Suggestion for Reading iPermie.

Read each document in the Basics and Invisible Structures sections first. Study the other sections in any order you please. If you don't do the Basics and Invisible Structures first, the other sections will not be as useful to you. If you are in school, read the Education section third.

Many people will read through the whole collection of documents to get an overview of what is here. That's a fine strategy. Most of us however will need to go back and study each chapter of the sections and work through the questions and design problems at the end of the section in order to get the full value of the information.

Study each chapter in a section until you understand it, then go on to the next chapter in sequence. If you have a hard time understanding a concept or a whole chapter, talk about it with others, either online or in your local learning community.

Don't be in a hurry. We don't have time to be in a hurry. You've spent your entire life learning to consume and excrete on demand until your credit cards and credit lines are maxed out in accordance with the Excess Consumption Design system. You won't overturn that programming in one or two reading sessions, even if you stay up late drinking double shot espresso coffees.

It's not excessive for you and your small group permaculture learning community to decide to spend one to three months studying each section before going on to the next one.

That stretches the initial learning process out to perhaps one to three years.

That is not too long of a time to devote to learning how to hack permaculture design for the benefit of your life and the lives of those you love and who care for you.

Enjoy!

Always make time for celebration as your learning progresses.

Together, we can become a supportive learning community that will ride the iPermie wave of permaculture design knowledge.

This is a stress-free place. There are no permaculture police to pounce on you if you make a "mistake." It is not a college class where your grade will impact your ability to get into graduate school or find a good job. You don't have to get everything first time you hear it. You can just relax and go with the information flow and let it wash over you and through

you and become part of your understanding of life, the universe, and everything.

Don't be afraid to ask questions!

Transformation and Permaculture

Learning permaculture is a transformative experience. It is not just a matter of mastering a set of principles, strategies, and techniques. "If only it could be so simple."

> Transformative learning is learning that enables irreversible, profound, emancipatory change for the better – in our values, world views, beliefs, perspectives, understandings, and frameworks (or 'meaning schemes') for imagining, thinking, designing, planning and acting; and in our day-to-day living and relating (to self, others, and the built and natural world). It is the 'highest' level of learning." (Jack Mezirow, Understanding transformation theory, Adult Education Quarterly).

So as you can see, if you thought this permaculture stuff was just another gardening class, you are wrong. It is a plot to change the world by changing lives – one person, one family, one household, at a time. If you don't want to change the world for the better by transforming your life, stop reading now.

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00081 Design a learning community.

No one knows the age of the human race, but we are confident that the human race is old enough to know better.
– Found floating around the Internet.

To date, most permaculture education takes place live and in person at a permaculture design class or workshop. That is a great way to teach permaculture. But in-person education via a class financed by tuition isn't the only way to learn. The development of the internet makes it possible to present new methods of teaching permaculture, in ways that reduce the impact of the activity of teaching permaculture on the planet. Flying around the world to teach or study permaculture design is pretty hard on the planet and its living ecologies.

This is a permaculture **hack**. You could call it an "app" except that it doesn't work with your phone. It works instead with your brain. The word "app" is short for application and it refers to software that does something on a computer or phone or other portable electronic device. Software, as we all know, is a set of instructions that enable computers to do what we tell them to do.

Permaculture teaches the importance of learning from nature. It applies natural biological principles to human situations and makes decisions about good, better, and best options given the context, circumstances, and situations involved.

iPermie is a set of instructions (software) for a biological computer (the human brain) that will enable you to develop a permaculture design for your life. That's an observation from the viewpoint of a particular urban ecology.

Permaculture is not a solitary discipline. It is best if studied and practiced in the context of a community. If you take an in-person permaculture design course, you become part of a learning community by virtue of your participation in the course.

iPermie, however, does not come with a live and in-person community. I do offer participation in an online listserv discussion, open to all who buy iPermie. That large discussion isn't a substitute for a live and in-person community with which to learn permaculture and do design work, although a smaller cyber discussion among a limited number of people could work as an effective learning community.

Permaculture education is more interesting, fun, and understandable when approached as part of a group.

Your first permaculture design challenge, in document 00071, was to design a method to use these materials to learn permaculture.

Your second design challenge is to **find or create a group with whom you can study permaculture.**

Where would you find such people?

Do you know people who have downloaded iPermie?

Do you have people you can recommend iPermie to and invite to join you in a learning community?

Is there an existing group of friends that you can persuade to form a small group to study permaculture?

Everyone will bring something to the group and you will learn much from each other. You may not all agree on everything that comes up for discussion.

That's fine. Permaculture has no pope that enforces ideological conformity. You will learn that permaculture design abhors monocultures. In all discussions, learn to disagree agreeably.

The actual design work that will describe how your group will work should be done as the first exercise of the group working together. You need –

– A place, time, and schedule for the meetings,

– Meeting facilitation, which could be rotated among the group members.

– A design for the actual meeting itself.

Components of a permaculture learning meeting include:

– an easy icebreaker exercise,

– a vision exercise where we imagine how things will be in a more permacultural future.

– a discussion about one of the readings,

– permaculture "show and tell"

– as the group develops and individuals begin to do design work, you can share and critique designs, and

– Refreshments! Table fellowship helps a group bond together and develops morale.

Some people will be tempted to skip this step, and certainly, each person must consider how best to approach learning permaculture for herself or himself. If you simply are not inclined to approach this as a group experience, then don't do a group experience. Although everyone's mileage may differ, the experience of the permaculture community thus far suggests that working with a group is a great way to enhance your permaculture learning experience.

Why not give starting a permaculture study group a try? If it doesn't work out, fine, try something else. If you don't give the group process a good try, you may miss out on what could be an important experience for your learning process.

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00091 Why this is necessary.

"Since mankind's dawn, a handful of oppressors have accepted the responsibility over our lives that we should have accepted for ourselves. By doing so, they took our power. By doing nothing, we gave it away. We've seen where their way leads, through camps and wars, towards the slaughterhouse." -- *Alan Moore, V for Vendetta*

You probably have some knowledge of the problems we face. That's why you bought iPermie. Since permaculture design is a big picture systems thinking deal, let's consider for a moment how big problems impact whole systems.

Energy is everywhere and is essential everywhere.

Our daily living embodies energy in the simplest tasks. It's been said that even a low-level modern life is possible thanks to the energy equivalent of hundreds of slaves. If you doubt this statement, get behind an 18-wheel truck and push it up a hill.

How many people pushing would it take to get an 18-wheeler truck loaded with tons of cargo to 55 miles an hour going uphill?

For more than a century, energy has been cheap and the developed world's political and economic systems enabled us to avoid the costs and the consequences of our lifestyles of the energy rich and self-entitled. We externalize costs, privatize profits, socialize risks, take from those without the power to resist our demands, and make a profit at every step of the process.

Nice work, as they say, if you can get it and there generally hasn't been a problem with finding it. Well, this "hasn't been a problem" as long as we see things from somewhere close to the top of the global food chain, which is certainly true for all of us in the developed countries of this world.

But lately it seems as though the bloom has fallen off the rose of the modern project. We aren't making profits at every step of our modern economic process. We are losing money. Banks go broke. Jobs disappear. The four horsemen of the modern apocalypse – peak oil, economic irrationality, climate instability, political criminality – ride across the land wreaking havoc wherever they go.

Our externalized cost system seems to be not working as well as it did historically.

The problem of externalized costs.

Anything that goes into making a product or delivering a service, whose cost is not included in the final price, is an externalized cost. This often happens as a result of political maneuvers. Many economic aristocrats – wealthy and powerful corporations, their officers, board members, and major stockholders -- blatantly pay politicians to socialize their risks and costs while keeping their profits private.

The problem with externalized costs is that they don't actually go away. They just aren't accounted for on our balance and income/expense sheets. That is nice work if you can get it. We should ask: how long could a business stay solvent if its managers simply ignored their costs? Not long. Sooner or later, all costs will be accounted for and paid. That includes all of the energy costs we externalized over this past century and even longer in some cases.

It's not a small bill. It's larger than the limits on our credit cards. When presented

for payment, the system will report **"Payment Declined."** The waiter will stand there, looking uncomfortably at us, as we fish around for another card. The manager comes back with the news, "The bank declined this card also sir, do you have cash?" Well of course we don't have any cash! If we had cash, we wouldn't have been handing over credit cards now would we?

The restaurant manager, standing by your table with his hand out expecting to be paid for the grand dinner you just consumed, is a metaphor for these times for our civilization. The planetary management doesn't want the Greenwash Card which reads, *"We can do anything we want without paying the price."* The planetary management demands payment for all the costs we thought we had so cleverly avoided.

So it comes to pass that everywhere we go, we **pay more and get less** and that trend will only intensify going forward. Consider the impact of a century of externalized costs demanding payment in the present with current dollars (or pounds, yen, euros, and renminbi). If that doesn't make you afraid, you aren't paying attention.

Chaco Canyon, New Mexico

Let's hop into the "Way-Back Machine" and visit Chaco Canyon in northwestern New Mexico, about a thousand years ago. For 250 years (roughly 900 to 1150 AD), this area contained a thriving civilization. They founded 15 major centers containing the largest buildings built in North America until the 19th century. Pueblo Bonito is about the size of the Roman Coliseum! They moved goods and people via a network of nearly 200 miles of roads, 30-feet wide, imposed on the landscape and apparently oriented in accordance with the positions of the moon.

In their beginning, there were dense forests in the area, which provided plentiful resources for building projects.

The story doesn't have a good ending.

As population and social complexity increased, natural resources became more scarce as the inhabitants converted them into buildings, fuel, and artifacts. Archeologists say that the buildings of Chaco Canyon required the timber of more than 200,000 trees! As time passed and resources dwindled, people had to go further and further afield to find the necessary items for their lifestyle. Even so they muddled along until 1130 AD, when a 50-year drought began. By 1140, the Chaco Canyon civilization was in disintegration. They abandoned communities along the periphery of their area and by 1200 AD, the entire region depopulated. Most of the survivors migrated south and east and became the ancestors of the Pueblo Indians of New Mexico.

The trees never came back.

Greater investments in Chaco Canyon complexity led to diminishing returns.

The archeological evidence suggests that as the resources became more constrained, their solution of choice was to make even greater investments in the complexity of their civilization. They founded increasing numbers of small settlements. The burst in building activity perhaps doubled the labor requirements. New villages located in more marginal areas and the functional specialization of buildings increased.

In other words, as they faced grave crises and stress, they responded with "more of the same."

They made ever-greater investments in social and economic complexity, while their return on their investments steadily declined. One of the characteristics of late Chacoan architecture was large storage rooms. Archeologists think this is the

result of increasing problems with food production.

Pushing the Chaco Canyon ecological limits to the breaking point led to a catastrophic depopulation.

Climate change broke the back of Chacoan civilization.

The 50-year drought (1130-1180) appears to be the proverbial straw that broke the poor Chacoan camel's back. While they survived severe droughts several times during their history, those were in earlier times. Their population was lower, biological diversity in the area was higher, and the "resource bank" was not quite so empty.

They were not without alternatives. They could have mobilized their population to carry water, pot by pot, from the rivers to their fields. They did not do this because they had finally reached the point of no return for their investment in even more complexity. Imagine the amount of organization, effort, and resources required to carry enough water in pots for the needs of thousands of people! The drought expedited existing trends by sharply increasing the decline rate of their returns on their investments in complexity.

They opted for collapse to a simpler way of life and migration to other areas. The archeological evidence suggests the collapse was violent and chaotic.

OK, that was Chaco Canyon. In our modernity we soothe our fears by whispering to ourselves – "They were geographically constrained. They did not have the knowledge advances, technology, and energy resources we have today."

Rome, Eternal City and Empire!

The Roman System was conquer, loot, spend. Sound familiar?

The Roman Empire made its profits by conquering surrounding peoples, looting their riches, and investing those riches in increased social complexity at home.

As time passed, however, they looted all the rich countries profitable for conquering that they had the power to conquer. Greece, Egypt, Carthage, all were drained. The Parthians didn't want to be Roman and provided an eastern limit for the empire as well as a several hundred-year long series of "hot" and "cold" wars that consumed resources and returned little other than the status quo. To the west was the Atlantic Ocean, north were various barbarians who lacked the ready wealth in gold and silver that the Romans coveted in their targets for military expansion. The southern coast of the Mediterranean was already in hand, and beyond that was an apparently endless desert devoid of lootable riches. What's the point in going to war without rich cities full of gold and silver that could be carried away? Indeed, who could afford to go to war without the prospect of cities to loot?

Even so, the decline in the return on their investments in complexity was not sharp enough to produce collapse early in the process. In the 2nd Century AD, the Roman Empire reached its largest geographic extent and generally held together. But as time passed, the stresses and crises multiplied. Today we would refer to these events as "Black Swans." Barbarian invasions, plague, weather disasters – all began to take a toll on the economy and the people.

When war, weather, or government corruption destroyed real wealth in the form of buildings, productive land, and trained personnel, it was not easy to replace whatever had been lost or destroyed.

Aside from the loot of military conquests, the primary foundation of their economic system was agriculture. Without loot from conquests, there wasn't much surplus to support armies, aristocrats, bureaucrats, and all the other accouterments of empire.

Political criminality and economic irrationality made the Roman situation worse.

Like the Chacoans, the Romans ongoing response was "more investment in more complexity." They externalized present costs onto future taxpayers by debasing their currency and borrowing money. This is a fine strategy as long as in the future, there are no more crises and people can afford to pay the costs of past work. Oops. That didn't work out well. So the government raised taxes and regulated the lives of Romans and conquered peoples in minute details. The aristocracy blamed scapegoats and persecuted them. Thus, the barbarian invasion crises of the late fourth and early fifth centuries were terminal for the Roman state in the west.

For most Roman people, the advantages of being Roman were no longer self-evident. In the countryside, the peasants and slaves viewed the barbarian invaders as "liberators."

The Collapse of Complex Societies

Joseph Tainter's book, "The Collapse of Complex Societies," is one of the best treatments of this subject and I recommend it to everyone. His conclusion is that civilizations collapse when their increasing investments in complexity bring greatly reduced returns. In each case that he studies in the book (Roman, Mayan, Chaco Canyon), he finds that a surge of investment in new complexity preceded each collapse.

About Rome, he writes –

> "Rome's collapse was due to the excessive costs imposed on an agricultural population to maintain a far-flung empire in a hostile environment."

About Chaco Canyon, he says –

> "The regional population of the San Juan Basin chose not to continue participating in the Chaco Canyon network, nor to rise to the challenge of the final drought, because the costs of doing so had grown too high in comparison to the advantages conferred. Collapse and migration were economically preferable."

Neither the Romans nor the Chacoans had anything quite like permaculture -- an intentional, conscious design system based on the sustainability ethics of care for people, care for the planet, and care for the future by limits-aware and surplus-share -- to help them address and resolve the contradictions of their times that led to the demise of their societies. They collapsed onto the ash heap of history.

Permaculture can be fairly compared to the martial arts, in that it uses the overwhelming strength of the challenge as both an offense and defense leading to a positive resolution over the situation. This is why permaculturists often say "the problem is the solution."

Back to the US of A.

The modern investment in complexity achieved stunning results during the 20th century in the United States and other developed countries in the world.

We worked hard and smart.

We exterminated the indigenous population and stole their lands. Always seeking our advantage, we broke treaty after treaty in our pursuit for land and wealth. This gave us an enormous inheritance of capital wealth to spend.

We advanced our wealth and power by capturing and selling human beings as slaves.

We developed large sophisticated financial systems to facilitate our efforts.

Governments finagled the energy markets to ensure cheap, below-market prices for fossil fuels.

Powerful aristocracies of finance distorted the government process in order to control market entry, reward friends of political

power, and punish enemies. Instead of defending the public welfare and the common good, with a government of, by, and for the people, we have a government of the corporations, by the politicians, and for the aristocracy. This process drives the centralization of wealth, as the wealth of the majority is transferred to the rentier ruling minority. The extreme centralization of wealth in the modern world is evidence of the corruption of the system.

We ignored the costs of our development for the natural ecologies of the planet. We willingly ruined and destroyed ecologies in our quest for industrialization. We frivolously spent our natural capital on frilly curiosities and wasteful gluttony.

We ruthlessly suppressed anyone elsewhere who got in the way of our incessant quest for cheap resources to fuel our industrial machine. This included assassinations, overthrow of governments, and the use of weapons of mass destruction against civilians. We manage a continual state of war for the purpose of enriching the powerful and distracting the masses.

We enact social policies whose result is to destroy family bonds of kinship and support, suppress individual initiative, and isolate people from natural and traditional sources of community.

Like the Romans and the inhabitants of Chaco Canyon, we heap complexity on top of complexity as we attempt to stave off the looming disaster that we see ahead of us.

Even so, it is evident that our increasing investments in complexity yield diminishing returns and in some areas, the returns are negative. History does repeat itself, especially when people fail to learn the lessons of the past. Rome, Chaco Canyon, US of A, and Europe – all demonstrate a straight line path to collapse and the ash heap of history.

Energy crises bring on economic crises. When we devote an increasing share of wealth to purchasing energy, without corresponding increases in productivity, we have less money for other needs. Someone doesn't get paid.

A critical problem with energy is EROEI – **Energy Returned On Energy Invested**. In the early days of petroleum, we got 100 barrels of oil for every barrel of oil equivalent of energy invested in exploration and extraction.

As time passed, we found and began to pump all of the easy oil. In the beginning, oil actually flowed to the surface on its own. Early wells were shallow and tapped formations with so much pressure the oil blew through the drilling equipment creating "gushers."

Now we willingly pay tens of millions of dollars to drill wells in the deep ocean and millions of dollars to drill for oil on dry land.

Of every 100 barrels of oil that we pull out of the ground –

– 10% of the energy is used to extract the oil.

– 27% is used to refine the oil into usable products.

– 42.5% is used to construct and maintain the transportation infrastructure necessary to move the oil around, and to actually move the oil around to where it needs to go.

So only 20.5% of the original energy value of the 100 barrels of oil is available for use at the end consumer stage.

But wait. . . there's more! And it's still not good news.

Most of that 20.5% of our 100 barrels of oil energy ends up as fuel, and the internal combustion engine wastes most of the energy it burns as heat. That's why your car has a radiator and a cooling system that you fill with antifreeze. According to Wikipedia, the average efficiency of internal combustion engines is 18-20%.

This means that only FOUR PERCENT of the original energy of the

100 barrels of fuel actually is used to move a vehicle. Or, for every 100 barrels of oil we pump, we get to use four for our personal use.

That's not quite true though. What does the weight of a vehicle consist of? Mostly steel, rubber, plastic, etc. and the weight of the fuel itself. Less than TEN PERCENT of the weight moved by a typical vehicle is an actual human body.

So ultimately, the way we presently do things. NINETY-NINE POINT SIX PERCENT of the original energy endowment of that 100 barrels of oil is either consumed in its production of fuel, frittered away as heat, or used to move steel, plastic, etc. down the road. **ONLY FOUR TENTHS OF ONE PERCENT moves people around.**

That's apparently the best that the world can do at this stage of its development. It's embarrassing, though, to run the numbers like this, and discover how incredibly energy inefficient our transportation system is.

Big Oil – Big Finance – Big Food?

One of the first effects of a rise in the price of oil is an increase in the manufacturing of biofuels (mostly alcohol) made from food grains. This drives increases in the price of food. While the developed countries can manage such price increases, corn price increases cause suffering and death in the poor nations of the world. This is an example of both political criminality and economic irrationality at work. During the serious drought year of 2012, the United States burned 40% of its corn crop as fuel.

The problem is not an absolute lack of food. The problem is that poor people don't have the money necessary to buy food. Even though people die of hunger-related causes every day, it has been a long time since an absolute lack of food caused a famine. During the Irish Famine in the 19th century, the absentee landlords of Ireland consistently exported grain every year while millions of the Irish people died of starvation or fled for refuge elsewhere. There was plenty of food to feed everyone in Ireland. Since the poor had no money for bread, they died as collateral damage of the economic irrationality and political criminality of that era.

Nobel prize winner in economics Professor Amartya Sen has proven the hypothesis that **in the modern era, famines are the result of politics and unjust economics, not an absolute lack of food.**

This can't happen here, can it?

A food crisis in the United States or other developed countries is unlikely to be caused by an absolute lack of food. One of the issues in food processing and distribution is that a half-dozen transnational corporations control most of the food system of the U.S. There are similar problems of food system consolidation elsewhere. Indeed, these United States corporations play a dominant role worldwide. While a grocery store appears diverse in its production selections, a handful of corporations own most of the brands. This is exactly the area of the economy that is at particular risk of systemic financial failure.

The bigger they are, the harder they fall.

The just in time inventory system has little flexibility when it comes to shortages. Food leaving the system to its end users must be balanced by raw materials coming in at the beginning of the process. If those deliveries stop for any length of time, at any place in the process, the system begins the grind-to-halt process.

If the big transnational aggregators go, we will have a situation where on one hand you will have farmers with food, and on the other hand, 300 million hungry customers, and no structural markets in between to move, process, and distribute the food.

Folks will immediately begin to find work-arounds, although new market structures won't magically materialize overnight. Large inventories of primary products can be frozen in place while bankruptcy proceedings drag on. Processors may not be able to get raw materials and the processing pipelines that feed the warehouses that supply the stores may at best operate at a much reduced level of supply or even come to a complete stop in some areas.

It could take months for this to sort itself out, and the more remote people are from farms, the longer it will take. All of this adds up to potential food shortages, possibly right in the middle of winter.

On an emergency basis, the government may supply cities with whole foods like grain and soybeans. That food won't arrive at cities nicely processed and packaged. We'll be looking at bushels of raw grain and soybeans. Many areas won't have local or household infrastructure to process these products.

At the supermarket level, anyone who has lived through an extended ice storm that disrupts shipping has seen how quickly grocery store shelves empty if not resupplied every day.

This is not a prediction of inevitability. It is an observation on the weakness and brittle nature of our supply systems.

A Nutrition Crisis?

We are not at an absolute food shortage at this time. We do seem to be in the midst of a nutritional health crisis.

Obesity, diabetes, heart disease, cancer – the list of medical problems that nutrition can either cause or aggravate is long and getting longer all the time.

High fructose corn syrup is in "just about everything" in the processed and prepared food aisles of supermarkets. In 1996, the per capita consumption of sweeteners in the United States was 103 pounds! Production per capita was at 128 pounds!1

Pesticide use increased 50-fold since 1950, with 2.5 million tons produced and used each year, 75% of this in the developed world. Pesticide use has been linked to reduced nitrogen fixation, pollinator decline, and reduction in soil fertility. They contribute to long-term health problems in farm workers and consumers. One study found that diet is the primary way that children and infants in the US are exposed to pesticides. 3 Another study found that switching children to an organic diet dramatically reduced the children's exposure to pesticides.4

Wikipedia details the negative aspects of herbicides at http://en.wikipedia.org/wiki/Herbicides .

Ecological Consequences of Production Agriculture

In the United States, we lose topsoil at a rate 10 times faster than it can be replenished by natural means. A good estimate of the economic impact of topsoil loss is $37 billion/year in productivity losses (by Professor David Pimental, Cornell University), http://www.news.cornell.edu/stories/march06/soil.erosion.threat.ssl.html

Concentrated Animal Feeding Operations (CAFOs) cause major environmental problems. They emit large quantities of greenhouse gases, divert high quality feed grains from human consumption to animal, require large areas of arable land to produce feed grains, pollute ground water supplies and deplete water supplies at high rates. CAFOs are breeding grounds for infectious disease. They may be driving the development of antibiotic resistant bacteria due to daily feeding of antibiotics in rations, and land degradation.

For more information on the ecological consequences of conventional agriculture, see the power point presentation, at http://tinyurl.com/29qkc9 . Note in particular the maps showing pounds of

pesticides applied in watersheds and excess topsoil erosion. Oklahoma has high rates on both maps.

Get big or get out: the impact of modern food systems on rural communities.

In 1938, there were 6.5 million family farms in the United States. Today, there are less than two million.

For decades, the government mantra has been simple – "Get big or get out," a phrase coined by Secretary of Agriculture Earl Butz, who served under the Eisenhower and Nixon administrations. He famously urged American farmers to go fence-row to fence-row with the big commodity crops like corn and wheat. He eventually resigned after the media caught him telling crude racial jokes about African Americans.6 Later, a court judged him guilty of tax evasion. He served some time in jail and paid a large fine.

"Get big or get out" was a great phrase, as such things go, although like all propaganda, it was a creation of an irrational unquestioned assumption. The consequences of the policy, for rural America, were never publicly considered.

Bigger farms inevitably mean fewer farmers.

If there are fewer farmers, there will be fewer people living in rural areas.

And so it comes to pass that there are fewer people buying clothes at local stores, going to school at local schools, serving as volunteers in community organizations, and attending local churches. Thus, rural communities wither and die.

According to the government's propaganda, this is all as it should be. It is no one's "fault," it is just the impact of giant megatrends over which no one has any control.

Those of us interested in reality know that it is not an accident that our rural communities are dying. It is the direct result of deliberate government policies that have the effect of depopulating rural areas and encouraging the movement of population to urban centers.

Small Leaks Can Sink a Large Ship.

Generally, in most communities (cities and towns in rural areas, neighborhoods and regions in urban areas), the economic pattern is simple:

Items necessary for human life (food, energy, manufactured goods), are trucked in from other areas, with the local area being a link in a global just-in-time distribution chain.

Most of the money paid for those items goes out of the area quickly.

Outside interests finance much of the economic activity, interest paid on the loans leaves the area, and persons seeking financing must meet national standards. Lenders may not be interested in non-traditional financing needs.

Some money comes back into the area in the form of government transfer payments, government spending programs, and the sale of goods and services produced/located in the county to places elsewhere.

Therefore, the net result over time is that a "death of a thousand financial cuts" slowly kills rural communities. More money goes out than comes back in and this financial accounting doesn't even begin to report ecosystem issues such as the continuing loss of fertility, depletion/pollution of water/aquifers, and erosion of topsoil. Our conventional accounting systems do not report such losses.

A local economy can be compared to a ship with lots of leaks. As Benjamin Franklin said, "A small leak can sink a large ship."

The Human Cost

Over the last few decades, there have been several waves of bankruptcies among American farmers. Between 1986 and 2002, Oklahoma alone counted 500

farm-related suicides, as people reacted with despair to the ongoing financial crisis in American agriculture.

The National Catholic Reporter article, “Farmers: get big or get out,” quotes Mary Hendrickson, of the Department of Rural Sociology at the University of Missouri in Columbia, about the devastation of rural communities caused by the loss of farmers:

> "The devastation in America's rural communities is caused by the loss of infrastructure that makes society work. The small farms go down, and they pull everything else along with them. What disturbs me most are the compromises rural folks have to make in order to stay on the land. People are desperate to stay because of family connections and love of the land, and they find themselves in a powerless relationship with the big guys. As a result, they have to do unpleasant things. When food decisions are made somewhere else, dollars also go out of the community. You lose human capital, too. When you work for someone else, you don't learn those leadership skills, the ability to evaluate many factors and uncertainties and then make good decisions that have been the hallmark of farming since day one in this country.”

> “Public figures are actually telling farmers there is no necessity for small-scale agriculture in the U.S. anymore. `Tough luck,' they say, `you just have to move, go somewhere else.' But people don't want to move. Not only do the farmers have to leave their land, but the butcher, hardware store proprietor, implement mechanic in town, they all have to go, too. Then all that's left is the Wal-Mart."

Katherine Copeland was an advisor to the 4-H Club I was a member of while growing up in Tillman County, Oklahoma. She was truly the “salt of the earth.” If you had a potluck dinner, you wanted her to come because she always brought a tasty covered dish. If you sold tickets or band candy, she was sure to buy. Her family had farmed their land outside of Chattanooga, Oklahoma since 1910. They followed the government’s advice. They got big, they borrowed heavily, the price for farm commodities declined, and they were at risk of foreclosure. In despair, she took her own life. She climbed on top of a barrel of burning trash **and died of smoke inhalation.** The New York Times, reporting the story on July 11, 1986, put it this way:

> The suicide of Katherine Copeland, whose family had plowed the fields of southwestern Oklahoma since 1910, came the day after they harvested their wheat crop. She hated the idea of losing the farm, said her eldest son, Robert. "She felt that she had failed her parents and failed her children," he said.

According to conventional economic theory, these bankruptcies and the declining number of farmers are actually “good.” Bankruptcies “eliminate” inefficient producers, and distribute their assets to “more efficient” producers. They see a net gain for the economy.

This accounting is a problem. Our primitive systems have no way to account for the death of Katherine Copeland, or the 499 other people classified as “farm-related suicides” in Oklahoma since 1986. How do we put a price on the loss of this kind and loving woman’s life?

Frederick, my hometown, during the 1960s had four department stores downtown -- Norwoods, Penny’s, Perkins Timberlake, and Anthony’s, plus a “Dime Store” – TG&Y. There were three locally-owned pharmacies with soda fountains.

There were two dress shops. All of these stores had owners, managers, employees. Now they are closed. Those jobs are gone. There is a junior big box store on the outskirts of town, and a couple of dollar stores.

How do we account for this loss of economic vitality on the "Get big or get out" ledger?

Agribusiness Corporations Laughing All the Way to the Bank

Meanwhile, back at the transnational agribusiness corporations, profits are up. Cargill – 160,000 employees in 67 countries – up 62%9 ; Tyson – up 50%10; Archer Daniels Midland – up 24%.

This is not an accident. This is what we pay for when we go to the supermarket and buy the products of the agribusiness system. These are the consequences of the "Get big or get out" philosophy.

Cities have a vested interest in a healthy farming economy.

People in cities have a vested interest in the social and economic health of rural areas. We are dependent upon supply chains from those communities for our daily bread. Cities were once fed by the farmers of their immediate foodsheds, the areas of up to a hundred miles or so around each metropolitan area. There were many economic and social ties between cities and their rural areas. Most of those relationships have been abandoned by people in both rural and urban areas. One of the tasks going forward is to reweave the urban-renewal connections that have potential to shorten the supply chains that keep our cities alive and healthy.

Finding a better fate than Chaco Canyon or Rome.

If we want to avoid the fate of Chaco Canyon and Rome, we need to rethink the whole "let's do more of the same and hope we get something different this time" plans enthusiastically embraced by the political, economic, and social aristocracies of the United States and other developed counties.

We do this one person, one family, one household, one community, at a time.

iPermie will help you get yourself and others out of this increasingly toxic situation, and into a much better – more sustainable, more frugal, more socially just – place.

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00101 Four horsemen that stalk the land: Peak Oil, Political Criminality, Economic Irrationality, and Climate Instability

It should be no surprise that when rich men take control of the government, they pass laws that are favorable to themselves. The surprise is that those who are not rich vote for such people, even though they should know from bitter experience that the rich will continue to rip off the rest of us. Perhaps the reason is that rich men are very clever at covering up what they do. – *Andrew Greeley*

Because permaculture is a holistic discipline, we begin our journey with a stark look at four big gorillas in the room –

– peak oil,

– economic irrationality,

– climate instability, and

– political criminality.

Through permaculture design, we seek a beneficial synergy that connects the various elements, functions, and systems of our life into a system that works together to achieve our goal of a good and ethical life.

The universe doesn't necessarily cooperate.

Affinity may be pulling things together, but entropy always makes things fall apart, often apparently spontaneously and without warning.

The problem of dysergy.

Just as good things work together to make even better situations – a situation we call synergy -- bad things work together to create even more catastrophic situations. Consider the Katrina hurricane event in 2005. Catastrophic weather, poor local preparation, social injustice, toxic political responses, big engineering mistakes – all worked together to make a bad situation worse. The word for this negative "synergy" is "dysergy."

Note that these events involved all four of our cardinal threats: climate instability, economic irrationality, political criminality, and even peak oil, which drove the rapid post-Katrina price increases in fuels due to the inability of the world to make up the production lost in the Gulf of Mexico due to Katrina.

Four mega-problems.

The four mega-problems we face going into the next 50 years are peak energy, climate change/instability, economic irrationality, and political criminality.

Most observers of **peak oil** see a direct connection between the price run-up of oil in 2008 with the economic crises of that year. The same month that oil peaked in price (July 2008), the world witnessed the all-time high peak of consumer credit in the United States.

We are now in the midst of a "great-unwinding" of credit with many problems in the economy as a consequence. Less money spent by consumers leads to less money available for oil exploration, and that means even less oil in the future. The year 2008 saw food riots in developing countries, as the price of food soared beyond what the poor could pay for food. The **economic irrationality** of our

systems makes it harder for people to earn enough for their basic needs because politically connected elites take so much for their own use by their clever manipulations of the system. There isn't enough to go around and our politicians make it worse by looting the entire population so they can reward their friends and punish their enemies.

Climate instability drives an increase in extreme weather worldwide. The annual costs of the repair and recovery of storm damages increases with each passing storm season. This contributes to economic instability and is a constant threat to energy production infrastructures.

Alternatively, they may understand exactly what is going on but they don't want to spend the money necessary to mitigate the problem. They bet that whatever happens to the population, they will end up on top. I don't have any problem believing that the economic and political leadership of the United States could be so cynically corrupt. Do you?

When it comes to climate instability. . . One question that must be considered is how much of the world will be habitable in 50 years. In the past, the human response to drought and desertification has been to move somewhere else. Without water and without agriculture, human life as we know it is not possible.

With seven billion people in the world, and the threat of desertification hanging over major parts of the planet, we have to ask ourselves: If we are on the verge of a 50 year drought, where will we go? What will seven billion people? Fifty year droughts are not uncommon in the history of humanity. The Chaco Canyon civilization was destroyed by a 50 year drought. A civilization killing deal doesn't have to be a 50 year drought either. A ten year drought destroyed the lives of millions of people in the United States during the 1930s, sending hundreds of thousands of people on the road, climate refugees in search of better weather.

Anyone who doubts the reality of climate change, which includes most of the political and economic leadership of the United States, isn't paying attention.

The similarities between the ruling elites in the United States, and the Russian aristocracy in 1917, and the French aristocracy in the 1780s, are numerous and chilling.

This **Political criminality** enormously aggravates all of our problems pretty much everywhere on the planet. The purpose of government should be to protect and enhance the common good. Instead, everywhere we go, governments are under the control of special interests who distort public policy for their own economic benefit. The **rent-seeking economic and political aristocrats who dominate our governments are merciless, violent, and amoral.**

Our elections are contests among competing bands of thieves and parasites. The major political parties contend for the right to loot the public so they can reward their friends and punish their enemies. They use their authority to rig the system to disadvantage anyone who would challenge their monopolies on political power. Until permaculture has reached enough people to become a critical mass, this situation will go from bad to worse.

It will complicate every other problem and will drive us steadily toward the ash heap of history.

I discuss each of these crises individually at greater length in section 9. Right now I want to focus on how these issues work together to make a bad situation worse and gravely complicate our response.

In Chaco Canyon, the foolish decision of the elites (political criminality) to invest in grandiose buildings with no economic purpose (economic irrationality) wasted resources and work (resource exhaustion) and hastened their decline and collapse during a time of on-going extensive drought (climate issues).

The toxic combination of economic irrationality, political criminality,

resource exhaustion, and climate problems, in earlier times and different contexts, brought down ancient Rome and the Mayans and other civilizations of antiquity.

They will take us down too if we don't take determined action to deal with the real issues of the four horsemen of the modern apocalypse before it is too late.

The thigh bone connected to the knee bone.

Everything really does connect, often without many degrees of separation. The connections can be beneficial or they can be negative. In permaculture design, we want to increase and strengthen beneficial connections as much as possible, while eliminating or mitigating negative connections.

Peak oil brings higher prices and problematic availability of fossil fuels. This reduces conventional food production which depends upon fossil fuels (declining food production is really bad.)

Climate instability may make it impossible to grow certain crops and will reduce harvests of other crops. Meanwhile, peak oil will limit our ability to throw energy at the problem which has been our typical response in the past.

Economic irrationality can make it impossible to grow food because production money isn't available. It limits the money available to explore for new oil reserves and deploy alternative energies like wind and solar. Productive wealth may be destroyed by rent-seeking elites who take from the productive and squander their resources on displays of high living and gratuitous consumption. Because crops aren't planted, or are destroyed by weather, farmers can't pay loans and mortgages and don't buy much in stores which increase the economic crisis, which in turn feeds the food production crisis. (Declining food production is really bad.)

Over the world situation hovers the specter of toxic **political criminality** responses to these challenges that will make the situation much worse.

So as you can see . . . one thing really does lead to another, and the end results are not always what we want or need.

Avoiding die-off.

The ruling elites of this country are every bit as blind to the consequences of their actions as the Romanoffs were in 1917 and the French aristocracy in 1789.

Those who do not learn from the mistakes of history are doomed to repeat it. If we learn anything from history, it is that it is dangerous for social stability to allow economic aristocrats to centralize so much wealth that others have too few resources to have decent lives.

The political criminalities of our major party politics could lead us into a civil war that might push us right over the edge onto the ash heap of history. The problem with unsustainable systems is that they are unsustainable. Sooner or later they collapse. We will not be an exception just because, you know, we are the Americans and the British and the French and etc. and we like ourselves a lot and think we are special.

If this vicious downwards spiral begins, we could end up with a terrible die-off of the human species – billions of deaths. That would not be a peaceful process. The destruction it would leave behind would be devastating to the earth's natural systems.

I'm not telling scary stories for the sake of the adrenalin rush.

Our job, as students of permaculture, is to make sure that the worst future does not happen. The default choice that our aristocracies are leading us to is a future a dystopia of post peak oil/peak food and energy shortages, climate instability, economic irrationality, and political criminality. There's money to be made in

chaos, collapse, and violence. Just ask Blackwater and Halliburton.

With iPermie, you become part of a process to direct, deflect, and harness the enormous energies at play in our world so that instead of doom, we create a self-fulfilling prophecy of wisdom, peace, and sustainability going into the future.

There are reasons to be hopeful. We are here, having this conversation, openly and flagrantly one might say. Many sustainability concepts, which just a few years ago were marginal, are now at play in the public square.

Our temporal salvation cannot be imposed from above by the government. It must grow from the grassroots, starting with individual people and their households who make their own decisions to use less stuff, burn less energy, and live more lightly upon the land.

As this process spreads from one household to another, our grassroots work for wisdom and justice and beauty will impact the large systems of our societies and their economies. We will develop new systems that make it easier to do good for the planet and for humanity.

If you are impatient for the process to begin – and who isn't – take some satisfaction from the fact that by working through the permaculture design process **you take the essential first step necessary to save yourself, all you love, the planet and the future of humanity.**

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00111 Why You Should Care.

"The lesson of the Nazi years for me was to resist current opinion."
Joachim Fest, historian of Nazi Germany

The bill for generations of political criminality, economic irrationality, climate instability, and energy gluttony comes due over the next few decades. Trends in motion for centuries move towards convergence and climax even as I write and you read.

The cardinal threats of peak oil, political criminality, economic irrationality, and climate instability proceed steadily toward peak intensity.

An unsustainable system does not continue indefinitely. It comes to an end. That's why we refer to it as "unsustainable." Avoiding that fate calls for changes – in economics, politics, and culture. Today's young people will manage that Great Change.

Because conventional wisdom is not what you need to hear in light of these threats, iPermie is a concentrated dose of contrary wisdom.

In this world, you will either follow your own design for your life, or you will follow the designs of others for your life.

Design or be designed – those are your only choices.

iPermie gives you the design tools you need to make a better life for yourself and those you love.

If you still wonder if this is worth any effort, watch the movie "The Age of Stupid."

http://www.spannerfilms.net/films/ageofstupid

It is your future. What will you make of it?

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00121 Prerequisites for Permaculture Design

There is one way forward: The creation of flesh and blood examples of low consumption, high quality alternatives to the mainstream pattern of life. This we can see happening already on the counter cultural fringes. And nothing – no amount of argument or research – will take the place of such living proof. What people must see is that ecologically sane, socially responsible living is good living; that simplicity, thrift, and reciprocity make for an existence that is free. – *Theodore Roszak, professor emeritus of history, California State University*

Permaculture is Secular and Temporal

Permaculture design is a **secular, temporal activity.** It is not a religion. Believers in all religions can practice permaculture design without compromising their religious beliefs.

Permaculture design is a useful **tool**. It's like the spoon and bowl which help us eat our soup. Christians, Muslims, Buddhists, Jews, Animists, and Atheists can all use a spoon. We could maybe sip soup from the pot, once it had cooled, but it is better if we use a bowl and a spoon to sip our soup. Well, except on cold snowy days when it is more fun to sit in a comfortable chair, wrapped in a quilt, and sip your soup from a thick ceramic mug.

Permaculture design is a **human cultural artifact** that can help you design your life so that you experience more beauty, happiness, freedom, health, security, and cooperation – with less work, consumption, conflict, injustice, danger, and waste.

The importance of observation.

In the permaculture design beginning. . . we start with long and thoughtful observation.

All permaculture design . . . for everyone, without any exceptions . . . begins with opening your eyes so that you see the realities in which you live, move, and have your being.

Notice that I said "realities" rather than "reality" because the "reality" of modern life is that there are multiple "realities" out there. OK, this is not a technical philosophical or theological discussion of the nature of reality. At most, it is a lay person's practical approach to life. On that basis, it is obvious from even a casual observation of modern life that people live in different realities.

It's hard for us to think this way. We want to think that there is one reality, and the real reality is the one we are most familiar with.

But nothing in nature is a monoculture and that includes the practical temporal realities in which we live.

Some say that "perception is reality". Sure and that's another statement that could be the subject of hundreds of doctoral dissertations and long scholarly philosophical and theological debates.

That's not my job. I didn't write this to decide any ultimate religious or theological questions. I simply think we need a way to go forward into a better, more humane and just world.

We cannot do that if we do not come up with accurate observations of what is around us.

I personally live in a devout Roman Catholic reality. My neighbor up the street, who is from Pakistan, lives in a devout Islamic reality. I will not abandon the reality of my Catholic faith. My

Pakistani neighbor will not abandon his Islamic faith. I have other neighbors who are Baptist, Buddhist, and Bahia. I know some atheists and agnostics and lots of pagans.

How shall we live together in this world? My little neighborhood is the world writ large. It is multiracial, multireligious, multiethnic.

That's what cities are like and if we are honest, that's a big part of what makes them so exciting.

But we have to see the cities for what the cities actually are, and that means we have to accept the temporal reality that there are multiple temporal realities out here.

So we start with long and thoughtful observation of the realities in which we live. Make notes, take pictures, record videos. Compile spreadsheets and databases. Much more will be said about this in the course of our discussions. Get ahead of the game and start a journal of your observations.

Embrace a holistic viewpoint.

Long and thoughtful observation requires seeing everything in its actual context, which may actually be a multiplicity of contexts and realities. We want to categorize and separate. That's what we've been taught (it's known as reductionism). Permaculture invites us to embrace the holistic viewpoint. Vision everything as part of a whole. See that the whole is greater than the sum of its parts.

Consider a forest.

We see trees, vines, herbs, shrubs, little critters, bigger critters, creeks, springs, lot's of different elements make up a forest. Yet, the forest most definitely as an entity is greater than the sum of its various parts. Further, we can ask -- Where is the gardener? The designer? How does it work together so excellently that it persists for centuries and millennia? The wastes of one element are foods for others. What are the links and beneficial connections that unite these disparate elements into a harmonious whole system?

So we need to see not only the trees, but also the forest, which is the way the individual elements (trees, bushes, worms, birds, wildlife, grass, etc.) work together as systems to make something that is greater than any individual part.

People who can't see the forest for the trees are so concentrated on understanding individual parts, that they never quite get how everything in the forest connects with everything else in the forest.

In urban areas, we look for the community that is the sum of the various elements in a city or region or neighborhood. Like the forest, it will be greater than the sum of its parts.

Trust Yourself.

This is more contrary wisdom. We're not supposed to trust ourselves.

The Experts say – Trust us! The Experts know all truth. What they say is true. What I think is mere opinion. We should never disobey the Experts. The Experts will never lead us astray.

That is a foundational principle of the default design of the Excess Consumption system. It is part of the system of social control and subjugation that keeps powerful people powerful at the expense of the liberty and freedom of the people and the sustainability of our civilization.

Experts are fine as long as we consider them as resources. When they become authorities, we are in trouble. You are the one doing the design for your life. You make the observations and that includes observing the observations of others (that's called research).

To do permaculture design, **trust your own observations and believe in your ability to make good decisions about your life**. The system doesn't want you to do that, because people who think for

themselves take the red pill and drop out of the illusion system that keeps them in mental and emotional slavery.

Respect all creation.

Another bit of contrary wisdom is the permaculture advice **to respect all people and creatures as unique manifestations of creation.** Permaculture is **people-centric.** We design and develop systems that people use. We are **nature-centric**, or planet centric, because we ignore nature to our mortal peril as individuals and as a species. We are **integral elements** of natural ecologies. That is reality. If we ignore that reality, our designs create unnecessary work, pollution, and waste.

This doesn't mean that we would never chop down a tree to build a house, nor that we would never kill a steer for food. It does mean that we should never frivolously kill, damage, or destroy for fun and entertainment or mindless activity. Our ability to think and use tools gives us the responsibility to use our abilities to be stewards of the natural creation. The necessities of the future call us to adapt, not dominate.

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00131 How to permaculture your urban lifestyle and why you should do this.

No place at last is better than the world. The world is no better than its places. Its places at last are no better than their people while their people continue in them. When the people make dark the light within them, the world darkens. – *Wendell Berry*

Here's some more contrary wisdom:

The future hope of humanity is in the cities.

Since Thoreau, we've dreamed of self-sufficient acreage in a rural area as the ideal homestead. Add guns (lots of them) and you have the basic modern survivalist orientation.

Like much of life, time has given us a different reality. While we may long for rural areas, people have been voting for the City with their feet for a long time.

If half of everybody in cities flooded out into the countryside and attempted to set themselves up as subsistence farmers, the two primary results would be an enormous ecological catastrophe and a die-off of the human species so chaotic the earth would not recover for centuries, maybe millennia. We've had a recent example of what happens when cities empty into the surrounding countryside – the forced evacuation of Cambodia's cities by the Pol Pot regime.

Living in cities can be good for the environment.

The greenest city in the United States is New York City. That's what the data say:

– The carbon footprint of the average New Yorker is less than 30% of the US average.

– 54% of NYC households don't own a car. On the island of Manhattan, 77% of the people do not own a car.

– It is the most densely populated US city – 27,000 people per square mile. Manhattan has 67,000 people/square mile.

– 1/3 of all public transit miles in the US happen in NYC.

– While the average size of living spaces elsewhere continues to increase, in NYC the average size of dwellings is decreasing.

Living in cities is not a good way to engage in subsistence agriculture but **subsistence agriculture ("growing all your own food") is not a synonym for sustainability or for permaculture design.**

In some ways, it is actually easier to live lightly upon the land in a city. Depending on how you organize the geographies of your life –

– You can manage your life without owning an automobile. This is HUGE! It is one of the most important things people can do to become more sustainable.

– Cities require less wire, pipeline, and street infrastructure per person than do rural areas. A ten-mile long road, with electrical and communications wire and maybe water pipe, in a rural area might serve a half dozen families totaling perhaps 24 people. That same stretch of road in an urban area could serve thousands of households.

– On a per capita basis, there are economies of scale in moving resources to cities (the energy expense and material cost of the transportation).

– It takes fewer resources and land to house people in apartment buildings than in single family dwellings.

– People in cities walk more than people in less densely populated areas. One reason for this is that city walks are interesting. A mile walk in NYC takes you on a route with a myriad of things to look at so you never get bored.

Cities help us to --

– live in smaller spaces,

– live closer to each other, and

– drive less,

– all of which are necessary for a better, more sustainable and resilient future.

Urbanization can be bad for the environment.

Because of poor design, cities create large amounts of **waste and pollution.** Although in the denser populated cities, the amount of waste generated per resident is lower than it is in less populated areas, the sheer amount of it is problematic. The concentrated nature of the problem is an issue in finding solutions.

Extremes of social injustice are common in cities. The low income neighborhoods of virtually every large American city have been attacked by various varieties of urban renewal schemes. While the details vary a bit, in the end these scams are about taking the properties of the poor at cheap, non-market, politicized prices and transferring them to those with privileged access to political power. Another driver of social justice is the exclusion of people without access to power from certain kinds of work and employment. It may be effectively unlawful for poor people to live in certain neighborhoods in a city.

Large cities have persistence, constancy, and resilience issues. **Constancy** is the ability of a city to maintain itself. Cities depend on supply chains which are often long and complicated to bring food, water, energy, and other necessary items to support their populations. Throughout history, as the infrastructures that supported cities failed, so did the cities (cf. the failure of Rome's aqueducts due to military attacks and neglect which resulted in the near-depopulation of the city).

Persistence is the ability of a city to resist damage. Most large cities in the United States do not have much in the way of defenses or mitigation for severe weather events and other threats to human life and property. Some cities near rivers have levees and there are sea walls, but we have nothing so aggressive as the Dutch. Their port of Rotterdam has structures twice the height of the Eiffel Tower that they deploy as necessary to prevent flooding from damaging the port and the city. London has flood gates on the Thames River. New York City has nothing. When the city flooded, there was nothing to prevent the subways from flooding.

In the United States, the recent hurricane Sandy event exposed just how defenseless New York City – our richest city! -- was during the recent super-storm.

Resilience is the ability of a city to repair itself. Most cities do better with this. They have police and fire and emergency services departments. There are dense networks of civil society organizations. Most nations have national systems of disaster relief and recovery involving both government assets and large national civil society organizations.

Recognizing that they have problems with constancy and persistence, people in many urban areas around the world are developing local foodsheds and creating other systems of resilience that build redundancy into the systems that supply their cities. **Redundancy decreases the risks of failure.** It is a measure of **constancy and persistence**.

Individual households in cities can significantly reduce their risks in the event of catastrophic failures of supply systems that support cities by developing

storage systems for food, water, and energy for their cities.

Permaculture design teaches us that **waste and pollution are design issues.** Cities produce so much waste and pollution because they and our economy are poorly designed. With better and smarter design, waste and pollution in cities can be greatly reduced. Ultimately, we will eliminate urban waste and pollution.

Injustice and persecution of the poor are additional design problems for urban areas. Better design of the invisible structures that govern urban life can eliminate social injustice and bring economic opportunity to all residents.

Permaculture design is the solution to the problem of the sustainability, persistence, constancy, and resilience of cities. It is a way towards a better future for all people and ecologies.

Permaculture can help you design your life so that you experience more beauty, health, freedom, happiness, security, and cooperation – with less work, consumption, conflict, danger, injustice, and waste.

What's not to like about that?

How do we permaculture our urban lifestyles?

Keep reading and studying,

Find or organize a small group to study permaculture.

Tell others!

Observe, Study, Evaluate, Design, Implement (OSEDI)!

Reflect on what has happened (your experience and feedback), repeat OSEDI.

Reflect on what has happened (your experience and feedback), repeat OSEDI.

Reflect on what has happened (your experience and feedback), repeat OSEDI.

As you develop your own permaculture design for your urban life, you will join a process that makes your city more resilient, more sustainable, safer, and a better place to live.

Don’t stop with yourself and your household. Spread the word! Permaculturing your neighborhood is a significant step toward urban resilience.

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00141 How to permaculture your college lifestyle and why you should.

The future belongs to those who believe in the beauty of their dreams. – *Unknown*

Since nearly all colleges and universities are in cities and larger towns, permaculturing your college lifestyle is an aspect of urban permaculture with its own unique tweaks due to the nature of the college lifestyle.

Here's some reasons why you should be interested in permaculturing your college lifestyle:

– 50% of recent college graduates are unemployed or under-employed at jobs that have nothing to do with their degrees.

– Median wages for new graduates with bachelors' degrees are lower than they were in the year 2000.

– 57% of student loan borrowers owe more than $10,000.

– 21% of student loan borrowers were delinquent on their loans as of March 2012.

In other words, despite what you have been promised, getting a degree is no guarantee of a job. Permaculture will give you the design skills you need to help you live a good life during and after your college career. It will help you avoid the traps the system sets for young people that cause you to make decisions that are not in your best interest.

Being a college student can be good for the environment.

The college lifestyle is way more communitarian than most modes of living in the modern world.

College students often live in dormitories, or with roommates in smaller off-campus apartments. Fewer square feet per person means less energy to heat and cool and fewer other resources that are necessary to operate the building. Dormitories are nearly always built to be energy efficient. All of this is good for the environment and for the future.

A college cafeteria is an energy-frugal way to eat. The kitchens prepare food in large quantities which is more energy conservative than preparing small amounts of food.

College students often walk and ride bicycles more and drive less.

Being a college student can be bad for the environment.

Many college students are well integrated into the mindless consumption popularized by media. They run up credit card debt and live way beyond their means while accumulating ever larger piles of useless junk. They borrow too much money for college and do not work enough to earn money to pay for their expenses.

Many college students like to travel by air, which is one of the worst ways to travel in terms of its environmental impacts. They think the only limit on their travel should be their bank account, credit card limits, or time. Some college students spend liberally, accumulating ever larger piles of mindless consumer junk.

Permaculturing your college lifestyle is not rocket science.

Go ahead and read the Education section before going any further.

Permaculture design is more fun than you can presently imagine.

Yes, it involves work. That work is an investment in your future – and let's not forget our goal –

Permaculture can help you design your life so that you experience more beauty, health, happiness, freedom, and cooperation – with less work, consumption, conflict, injustice, and waste.

What's not to like about that?

The process of permaculturing your college lifestyle:

– Keep reading and studying,

– Find or organize a small group to study permaculture.

– Tell others!

– Observe, Study, Evaluation, Design, and Implement (OSEDI)! Reflect on what has happened (your experience and feedback), repeat OSEDI.

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As you develop your own permaculture design for your college life, you will be part of the process that makes your school more resilient, more sustainable, safer, and a better place to live.

Don't stop with yourself. Spread the word! Permaculturing your college lifestyle is a lot more fun when done in the company of others.

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00151 Visions of the Future

Courage is not the absence of fear, it is the conquest of fear. – *Anonymous*

This story happens in the future, after the calamities of the Change Years have passed. It illustrates how a "permacultured urban society" might function. For a vision of how the actual collapse might occur, see 09131 "Old Ways, New Ways" in the Resilience Section.

Anytown USA, some time in the future . . . John's Story.

I am one of 8 people who live in an older home, built in the 1920s, close to downtown Anytown. We are a diverse group – two married couples, one older, one younger, and the rest of us are singletons (for now anyway).

All of us except Jeremy and Patricia, the original owners of the house, met during college. As we graduated, we started a worker-owned cooperative which is our present source of income. The Change Years were just coming upon us, jobs were scarce, wages weren't great, we decided we could hardly do worse on our own.

We set ourselves up to offer a variety of support services including tutoring to home-schooling families. We help high school students study for the battery of tests they had to take. It took almost no money to start since we capitalized our knowledge and education as working assets. We took something we had a passion for, an area of endeavor where we already had the necessary knowledge and education, and turned that into a business. With the ongoing problems of the school systems, home schooling and neighborhood private schools became popular.

We were a success because we were flexible. Money became scarce during those years, so we bartered for our services. For a while, until the health cooperatives got organized, we traded tutoring to a doctor and his nurse-practitioner wife for medical services. As people converted their lawn areas to growing food, sometimes we took zucchini and tomatoes in trade. April, our bookkeeper, kept really interesting books in those days listing everything we took in, whether it was cash, gold, recyclable metals, food, services, whatever it was.

How did we know we made a profit? Well, we didn't starve and we had stuff to trade with others at the various weekend barter fairs that became popular early in the transition. We had more stuff incoming than we could personally consume, so I guess that qualifies as profit. We were just happy to have a roof over our heads, food to eat every day, and some medical care when we needed it. We were doing something useful – creating a new educational system from the ground up, in the vacuum created by the collapse of the statist school system.

Jeremy and Patricia: the house

As things began to fall apart, we knew we would have to adapt fast or things would go hard for us. Our house was in the Georgian style, two stories, full basement, about 2,600 sq. ft., with its long axis running east and west. It is on a 1/7th acre lot, in a neighborhood only 20 blocks from downtown Anytown.

Since fuel was scarce, we knew we had to do a better job of hanging onto what heat we had in the winter. We began by encasing the exterior walls of the house

with an insulating foam (made from soybeans), which we covered with stucco. This insulated the walls to R-50. This was the recommendation for attics. We figured if it was good for an attic, it was good in any direction, since heat will move in any direction towards cold.

We insulated the attic using cellulose insulation, to R-50 and did the same with the basement walls and floor, on the inside. Insulation inside the masonry walls wasn't the best choice, since basements should be insulated from the outside. That is practical only in new construction. We did the best we could with what we had. We built new walls inside the exterior basement walls, a new floor, and we insulated the new cavities these created.

When we finished, our house no longer had any north facing windows. We just covered over them with insulating foam. We extended the porch so it ran all the way across the north face of the house and fitted it with screens and storm windows. In the winter, we put up storm windows and the porch becomes a buffer zone between the north wall and the weather. In the summer, we take them down and enjoy a cool and shady place to sit in the evening.

We hired the foam insulation and storm shutter work done. We did most of the rest of this extreme green retrofit by themselves with the help of some casual labor, which was how we first met John.

Along the south side of the house, we built a low mass sunspace, two stories tall, divided in the middle (horizontally) so it had two stories just like the house. The sunspace has an insulated roof, and insulated east and west walls. The south is all glass except for the necessary supports for the roof, divided in the middle by the floor/roof separating the two floors. This functions as a passive solar heater and it does a great job as long as the sun shines.

The gables over the windows of each story's sunspace shade the windows in the summer while allowing the lower winter sun to penetrate the windows and heat the house.

To get the air from the sunspace into the rest of the house, we installed ventilation openings at the ceiling level between the house and the sunspace and above every door in the house. The original house windows remain on the south face of the house, only now they are inside of the passive solar sun space. We often open them during the day in the winter to help bring sun-warmed air into the house. In the summer, we open the windows at night for ventilation (in the house and in the sunspace.

We used mostly recycled and scavenged materials for this construction work.

Every window and door in the house has an insulated interior window shutter and an exterior storm shutter. Some have insulated curtains. This includes the large windows of the south-facing sunspace. During the summer – when we want to keep heat out of the house – the shutters stay up during the day and we open them at night. During the winter – when we want to keep heat IN the house – we open the shutters whenever the sun shines through them. We close them whenever the sun stops shining through them.

We evolved our landscaping to emphasize edible plants although of course we kept the roses and the azaleas and the shade trees. All of the former Bermuda grass lawn (front, sides, and back) we converted to growing food. We only have 1/7th acre, but we get a lot out of it even so. Besides the former lawn areas, we grow food on concrete (driveways and private sidewalks) in containers and garden beds we built. We don't grow food on the public sidewalk because people walk on that and by law the sidewalks must be kept clear.

When it rains, no water runs off our property into the storm sewers. Rain hitting the roof flows from the gutters into storage tanks. Rain falling on the sidewalks and driveway runs into swales which channel the flowing waters into the growing areas.

When the Social Security system collapsed, we decided to open a boarding house to provide some income. Our children lived in other states and did not plan to move home. John saw our notice and immediately he and his friends applied to rent from us. What started out as an economic arranged evolved, over time, into a new "adoptive extended family." Now eight people now share the space where only two had lived in previously. I guess I should say "8-1/2" since Karen is pregnant.

John

When all this started, none of us had family in the area. We originally came together for work and convenience. We became an extended family by willing adoption. This kind of arrangement became popular when things got hard. The extended family is really popular these days, whether they are by blood kinfolk or as in our case, by adoption. No one except the wealthy would be able to live as a single nuclear family anymore, and there aren't many "very wealthy" people around anymore, after all mother of all economic crashes that jump started this new way of living.

The evolved house was six studio apartments, sharing three bathrooms, with a large common kitchen, living room, and storage workroom areas.

We ended up forming a housing cooperative, which bought the house from Jeremy and Patricia. Split eight ways, even with the capital payment to Jeremy and Patricia, our household expenses are low (they didn't ask for any interest on the capital purchase). Taxes are cheap. With the currency reforms, there isn't any inflation to speak of. I don't own a car, in fact, no one owns a car at our house or even on our block. I pay the equivalent of four hours salary for my monthly transit pass. Everyone pays into a medical plan, that was cheap too.

One of our routine student math assignments is to figure out the modern cost of goods and services in the old United States dollars, and by that measure, my modern transit pass costing four work hours was a bit more than $100 as valued in 2012, or nearly 14 hours of minimum wage work in the old days. I'm glad that I'm working now and not back then. That transit pass that cost so much money didn't hardly get you anything in those days. There was only one bus service and the government operated it! It did not run 24 hours/day, seven days a week. It didn't go everywhere. People paid so much for so little in those days.

Bottom line is that I only work about 20 hours a week to pay my bills and put some surplus aside for the future. We do some other work on gardens and our various food and energy producing activities although that can hardly be considered work. I like to fish, and as we all know, time spent fishing isn't actually deducted from your time on earth. It's actually safe to eat the fish we catch – although it took several years for that to happen. So we like that (fishing in the river), even if we do raise tilapia and catfish in barrels in the basement.

It wasn't easy getting to where our society is now. The price was worth the effort because things are certainly better today than they were before the Change Years.

All this was possible because just as our individual living arrangements evolved to meet the new circumstances, so did the economic and political structures. In the old days, it was hard to live sustainably, because the economy and politics of the time encouraged a culture of death attitude about everything. Eat, drink, consume, excrete, be merry, eat some more, drink some more, consume and excrete more, be more merry and etc. Never sober up! That was the theme everywhere. And we wondered why everything was going to hell so quickly, lol.

Now I don't need to own an automobile because I can get everywhere I want to go either by walking, by bicycle, or by general transit. People don't go long distances as much as they used to, mostly because there is so much interesting stuff

to do in the neighborhood. I think in the old days people were desperate to travel because their lives at home were so empty. They worked forty, fifty, sixty hours a week, at boring jobs, for people they hated and who hated them. They arranged their cities so that anything worth doing was far away from anywhere worth living. How dumb was that? It was certainly no way to live and the only surprise is that it continued for so long before collapsing flat as a pancake.

In the evenings, I like to go to a nearby coffee house. It's just two houses up the street. While Jeremy and Patricia converted their property into a boarding house that evolved into an extended family, their neighbors, the Jones family, moved upstairs and converted their downstairs into a coffee shop. They have great coffee that they get from a half dozen partnerships they have with cooperatives of coffee growers around the world. They get cacao for chocolate and teas, although they grow a considerable amount of herbs and flowers for teas right there at their place.

Sam and Jenny, two of my house-mates, are musicians, and they often entertain there – Sam on the piano, Jenny on vocals and the occasional flute. If you don't want to cook, you can get a sandwich or some soup or a nice dessert. Some people go there for all their meals, they don't like to cook I guess and Mrs. Jones is a great cook.

A bit further down, our street runs into a six-lane street with a wide median. Three of the six lanes (the northbound side) and the median (planted with trees) are a perpetual flea market. There seems to be something going on there from early in the morning until late at night. It's known as Street-Mart, which was obviously a play on a certain old-style retail corporation that is no longer with us these days. It's actually about 16 miles long, running from downtown all the way out to the city limits.

Speaking of that street . . . the city reserved the inner two lanes of the southbound lanes actual vehicle traffic. The outer southbound lane had the street car tracks. There isn't a lot of vehicular traffic. There isn't much need for it. Mostly its buses and jitneys, emergency vehicles, and trucks and carts that supply stores and market stalls.

People aren't as interested in personal vehicles as they used to be. Private ownership of fossil fueled motor cars has been out of style for years. No one passed a law against it. People simply stopped buying new cars. Things got really crazy for a while as that process played out, mostly because car ownership wasn't just a transportation thing, it was psychological. Status was a big deal and then there was the whole masculinity thing.

People used to be very attached to their cars. This was partly necessity because in those days, people might live in one place, work ten miles one way, have their kids in a school 12 miles the other way, and shop at stores 20 miles in a third direction. With such crazy geographies in their daily lives, personal vehicles were essential.

Guys seemed to view their personal vehicles as an extension of their sense of masculinity. They wanted big powerful trucks and fast cars. As times changed, people's attitudes evolved. A joke went around, something about the bigger the truck, the faster the car, the smaller the penis. I don't know who got that idea circulating, although I vividly remember a late night comic who would show a picture of a giant truck and/or a fast sleek car, look at the camera, wink, and say in grave tones "Small Penis."

One time he showed a picture of a Hummer and said, "VERY small penis."

Every year, five years in a row, fewer new cars sold. The car companies went nuts. The government gave them billions of dollars. Ads promised great deals and zero interest rate financing. People just did not buy. Then, in the fifth year, all of the remaining auto manufacturing

corporations went completely belly up broke. The government was no longer in any condition to bail them out. Instead, they put money toward humanitarian help for the newly unemployed autoworkers.

As it turned out however, many of those newly unemployed auto-workers had seen the handwriting on the wall and were already working little side jobs and starting coops doing various kinds of useful things that people needed and would pay a little money for, even during hard times. Some of them started making Open Source cars and trucks in their home garages and selling them to neighbors. There wasn't as much hardship as people supposed would happen.

You can still buy the Open Source vehicle these days, based on plans developed by the Open Source Ecology folks in Missouri. They've got plans for pickups too. Local coops make them all over the nation. Most of them run on ethanol or biodiesel.

After that, the whole car culture thing started just winding down. That same year the entire new road building system shut down. Government funds for building new roads shifted to maintenance, mass transit, and to actually deconstructing some roads in large urban centers, where land was so expensive.

There are more transit options these days and they aren't all run by the government either. The government maintains the roads and railroad tracks. Track is considered a public good just like roads, and governments construct and maintain it with user fees. Transit cooperatives operate cars and trains on various schedules. They compete for the allegiance of customers. It works well. Some of them sell memberships to customers, so they are hybrid operator/rider transit cooperatives. This was popular in the early days when they needed capital to get going.

Besides the rail-based transit, we have several street-based options. Some are transportation cooperatives owned by neighborhoods, or by workers at industrial cooperatives, or by people who needed work and invented their own job driving small buses along routes. Most of them would pick up within a block or two of their primary route. Just call their dispatch number! There are several systems to connect riders with carriers. That's one of the jobs that people do out of their homes. They are members of transit connector and dispatch cooperatives.

The development of this diverse transportation system was mostly a matter of cutting through the red tape and eliminating various rules and regulations that limited the ability of people to compete with private ownership of automobiles. As a result, people could design and invent their own jobs in transportation and offer their services to anyone who wanted to buy them. Is that such a radical thought? It's amazing to think about how much energy in the old days went into actually preventing people from competing with fossil fueled automobiles.

And speaking of fuel, nobody uses fossil fuels for transportation these days. A wide variety of fuels are in use right now – alcohol, biodiesel, wood gas, methane, pedals, animal traction – I swear I saw a camel the other day pulling a surrey with a fringe on top. As it went down the street, it splatted some camel manure (it wasn't wearing a regulation diaper). Three people zoomed out from Street Mart and there was a minor bit of haggling as they maneuvered to scoop up the free organics. They probably wanted it for their compost pile, or maybe a biogas digester. There's one stretch of Street Mart which has a big sign – "Diapers Operational for Transit Animals" because people want the horse and mule and oxen and donkey manure provided for free by the traction animals.

Street-Mart has gorgeous public restrooms all up and down its 16-mile length. Some offer free drinks and snacks for those who stop and deposit some humanure or urine. These are operated by cooperatives that make and either use or

sell methane produced in their biogas digesters. There's one I like so much I always try to give them a deposit when I am around there. They have an enormous gaudy sign, brightly lit with LED's at night, that says simply, "WE WANT YOUR SHIT!" I have always been impressed by the raw commercial honesty of that sign.

Those biogas digesters are everywhere. We have one in our basement. We made it ourselves! In goes all of our humanure and urine and some miscellaneous biomass materials. Out comes methane that we use for cooking plus fertilizer that, after being routed through one of our hot compost piles, feeds our fruit trees and bushes. We sell our surplus gas to a cooperative that aggregates home-scale biogas production for resale to the transportation cooperatives. When we have parties, we always serve lots of liquids and encourage everyone to use our own nicely appointed facilities. It's considered good manners to leave a bowel movement behind in the host's biogas digester when you visit someone's house for a party, to help repay the energy cost of the event. I bet that would seem weird to someone from the Old Days who could somehow peer forward into our time. These days that's just common sense courtesy and practicality.

Anyway, when I look back to the old days, I think it is weird that people thought of their urine and humanure as waste items to be disposed of out of sight, out of mind, without doing anything useful with it like we do today. Oh well, that's the attitude of profligate waste that collapsed their civilization and gave birth to ours.

I never understood the popularity of driving a personal automobile. When you drive, you obviously can't do something else like read your email or watch a movie. I like the little jitneys that work this area. If I want to visit someone across town, I could take one of the trains. The median of the Street-Mart Street had originally been a street car line. After taking out the streetcars in the 1940s, the city planted trees and other amenities dotted the medians. When the City decided to install a streetcar line, no one wanted to cut down the trees. So they gave a lane on the street over to the street cars, and the median together with other lanes evolved into Street-Mart. The streetcars were electric. They weren't cheap to build, but their operating costs are low.

I can catch the street car two blocks from my house, and go downtown to the Metro Transit Exchange, where I can get a bus or an inter-city train and end up on any of the three coasts or in the depths of Canada. Or I can get to my cousin's farm, well, close enough to my cousin's farm for him to send one of his kids to pick me up with their horse and buggy. Our household is a Cooperating Urban Household with his farm. We get most of the food we don't raise from him and his farmers' cooperative.

Besides investing in the capital and operating costs, we provide some labor during the intense labor times of harvest and planting.

If you want to fly, the airport is still in business. However, dirigibles fly and land there these days. Most people will only take one or two journeys by air these days during their lifetimes.

There are large theaters downtown, and each of the other urban centers has a collection of live theaters. While we still produce cinema, for at least the past ten years, live theater has been on a roll. Vintage performances abound – one of my favorites of the traditionals is Les Miserables. —New works premier each year. Live music is everywhere.

We still do recorded music – Jeremy and Patricia have an amazing collection of recorded music, spanning the years of actual records (78s and 33 rpms) and through CDs. Now people just use the Cloud for storing the music they buy or record. That makes it accessible to them wherever they go – AND – we don't have to (a) pack around a bunch of stuff and (b)

expend our resources to make storage media.

The larger metropolitan area of Anytown totals about a million people. It was originally structured as one main downtown, with a half dozen suburban cities on the fringe. As time passed, the suburban areas melded into one homogenous urban mass of strip malls alternating with single family occupancy housing. That's all been radically transformed. If you look at a map of the city, you see a pattern of urban clusters, linked by transportation and communications networks, that radiate out in spirals from the downtown center.

We no longer have zoning except for hazardous activities. One of the things we learned is that you have to be careful what kind of power you give people. Give the wrong kind of people the wrong kind of power, and mischief occurs. Sometimes its more than just mischief, its ecological insanity. When we use permaculture design principles in urban settings, we get a spontaneous natural order that produces much better outcomes. The process involves more people. They bring more knowledge. More people with more knowledge leads to better decisions. When we stop people from distorting the system to benefit their own special interests, things get better for everyone.

While waiting for a bus, I browsed the news on my pad and found an update on the Mars Expedition. It launched two months ago and was nearing the halfway mark. Our students helped with some of the planning for that, as part of two decades of permaculture network design that went into planning and financing the trip. We were among the first million members of the Space Exploration and Emigration Cooperative (known simply as SEEC, which we pronounce like SEEK), which sponsored the expedition. It is a one-way trip for all hundred people on board. They plan to become Martians, to learn what it means to be human on Mars, to risk the fact that it might not be possible. Then again, the project would not have launched if we didn't have a good idea that in fact humans would do fine on Mars and would be able to begin the process of greening that planet.

Sarah and Nick and the Anytown Sky Dwellers.

Hi! I'm Sarah and this is my husband Nick. We are pregnant! We know John and Jeremy and the rest of their clan. We live in downtown Anytown, in a 50-story building that was originally built as the headquarters for an oil and gas company. This building is irony personified. The oil company built it just before the crunch years began of the Great Change, when the economic irrationalities, climate instabilities, peak energy, and political criminality problems began to really make life miserable. They went bankrupt. No one bid on the building at the bankruptcy auction. The charter members of our building cooperative got it for free from the city, based on our plan to restore the building and make it our home.

We pay property taxes to the city. That's OK. It's a reasonable price to pay for what started life as a billion dollar building.

We are members of an adoptive clan – we call ourselves the Anytown Skydwellers, because we are all the way up on the 49th' floor – formerly the site of a plush upscale restaurant, as a matter of fact. Originally quite posh, by the time we moved in things had deteriorated substantially. While the building was well built, all that glass is really an issue when it comes to reducing the energy footprint of the building.

But never fear, permaculture design was here. The first generation of the Anytown Skydwellers spent a considerable amount of time observing our floor of the building for an entire year before finalizing our plans. This was in conjunction with the architects and engineers hired by the entire building's population to help with the refit of the building as the location of what amounts to a small town.

Among other things, we mapped the path of the sun on the exterior windows every day from morning to night in detail, for a full year. With those observations, we replaced some of the windows insulated walls, punctuated with some ventilation openings. On the sunny aspects of the building, we built new insulated walls inside of the existing glass walls, creating a large passive solar sunspace. We constructed insulated curtains for these windows that we use seasonally. During the summer day, when the sun shines, the keep insulated curtain over the windows. It opens at night when we ventilate. During the winter day, we open it when the sun shines and close it at night.

Another refit created an interesting fin-like effect. We installed awnings to shade the windows during the day during the summer. They function as rainwater harvesting structures, which provide a substantial amount of water to every floor of the building. We like that because any water we harvest doesn't incur an energy price to lift it from the ground to our floor.

Our floor divides into small studio apartments that share larger kitchen, living, and work spaces. Nearly all of us work in this building, either for our Clan Coop (which operates several different businesses) or for someone else. We have a couple of independent contractors doing various jobs.

The building has three floors of market spaces, a theater and restaurant district, and places of religious worship. Thousands of people live here with a minimal per capita energy footprint.

There are wind turbines up top and large biogas digesters down below. Water and humanure flowing down from upper floors turns turbines in the pipes that generate electricity and do other work. Water moves up to higher floors via a variety of mechanical energy devices, some of which are wind powered. The stationary bikes and treadmills in the building's recreation centers all power mechanical energy devices that provide lift energy.

During the summer, some of the extra energy needed for cooling and ventilation comes from solar thermal installations. The systems are rather complex. Everything operates in accordance with the permaculture plan for the building that was the basis for the initial renovation. We update it with a public design process as circumstances change and the times evolve. Our energy deficit isn't much and we make that up with bio-energy from our cooperating farms in rural areas, which are the primary sources of our food supplies. We raise more food than most people think is possible right here in the building. We do container gardening as well as aquaponics with fish and people keep rabbits and guinea pigs for meat. We aren't food sufficient so we trade with our cooperating farms for what we need.

We like our life. There's always something to do, 24 hours a day, seven days a week, 365 days a year. We bet our baby likes our life too. We're investing in the renovation of the old First National Bank Building. It's never too soon to think about where the kids will live. Maybe they'll find room here, if not, they'll have a place right next door.

Jeremy and Patricia.

The Change Years were scary. Everything had been fine for a long time. A few bumps here and there, kind of a slow grind. The system seemed to recover each time although the extreme events increased in frequency and extremity. When things started to devolve, however, it seemed as though everything went to hell in a hand basket quickly. The troubles began as the price of gasoline passed five dollars a gallon. By the time it reached $10/gallon, financial panics were the order of the day. This time even though the government threw a lot of money at Wall Street, things did not get better, they continued to get worse. Factories and distribution systems went out of business. Items disappeared from stores. People started panic buying. Prices went into hyperinflation radically increasing as the value of the currency fell. The last time I

went to Wal-Mart, bread was $100/loaf. I didn't buy any.

The velocity of events boggled the mind. Within 30 days we went from what passed for normality in those days to a very different situation.

The whole social safety net simply collapsed. The government could not pay its workers and could not finance its promised benefits. Welfare and social security and food stamps and Medicaid and housing benefits all just evaporated. This was so shocking that people were just stunned. Fortunately, perhaps miraculously, under the pressure of circumstances, people who knew permaculture design came out of the wood work everywhere and helped people design new systems to meet the radically changed circumstances.

This was true of direct needs like food and water, and indirect issues relating to what permaculture knows as "invisible structures." It was quickly apparent that the most important invisible structure was that of local government. Local governments everywhere declared martial law and proclaimed moratoriums on evictions and foreclosures. The banks were all closed anyway. While there was some squawking about property rights, the dire situation would not be made easier by evicting tens of millions of people who could not pay their rent or mortgages because the financial system had collapsed.

Those who advocated for that kind of a "market approach" were widely seen as delusional, even by conservatives. There comes a time when ideology has to yield to reality. Otherwise, you get things like what happened in Russia in 1917 or France in 1789.

We looked at our situation and decided that as long as the city could keep the water system going, the first thing we would concentrate on was warmth. Winter was on its way. The phones were out, so we walked to the location of an insulation contractor, and bartered a deal for the foam insulation job on the exterior of our house. We traded our wedding rings, jewelry, and some gold and silver coins for the work. The owner was glad to get the work. We were glad to have the insulation. We put the stucco on the exterior ourselves with the help of some young people in the neighborhood who needed the work.

We found our renters, who became our adoptive extended family, over those first few months. Our own children were doing as well under the circumstances as could be expected, so they didn't move home like so many other kids did in those days. We have added to our family, in a sense, by forming a household relationship with these young people. It's a win-win situation for all of us. Our kids are happy there are people here who care for us and watch out for us, since we aren't getting any younger.

Our local government managed to keep the water and electrical systems going. Trash service disappeared and electricity was available only four to eight hours/day. The only way we managed any electricity at all was that Oklahoma City, in cooperation with other area municipalities, had previously used eminent domain to take over the electrical companies. In some other areas, municipal grid power went down and never came back. My cousin lives in Kansas City, Missouri. They don't have grid power to this day. I think at this point that is a choice, not a necessity.

Meanwhile, the new permaculture movement helped people to transition right in their own neighborhoods. As it turned out, more people were interested in such things than most people thought. People concealed their interests because they didn't want people to think that they were weird. They gardened only in their back yards, lest they run the risk of code violations for planting veggies up front. They hid the fact that they used a homemade compost toilet.

But under the pressure of these circumstances, people started talking to their neighbors. When the city announced

that they would not be able to keep the sewer systems going, every neighborhood had people to teach their neighbors how to make a compost toilet.

And Anytown was like everywhere else, you've got all kinds of people who like to tinker in their sheds and garages with stuff. Those people got to work and produced the first biogas digesters. They design them to solve three problems all at the household level – solutions for humanure, cooking fuel, and fertilizer.

We like our life now. It was scary getting here. It would have been much better if we had all learned about permaculture design before things started to collapse. We might have avoided the collapse entirely. A lot of people died – the medically fragile, people dependent upon medications that experienced a hiatus in their manufacture, suicides. They say the population of this metropolitan area experienced a 10% mortality rate each year for those first three years before things settled down. Some areas did much worse than we did, though, we're glad we made it through and have a good future ahead of us, thanks to the intelligent application of permaculture design not only to our own household, but to the entire city and region.

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00161 Lifestyle Inventory: How and Why

He who knows others is learned; He who knows himself is wise. – *Lao-tzu, Tao te Ching*

Observation is the essential first step of permaculture. The more accurate the observation, the better the design processes will go. Observing your own life is harder than most people think it will be. Most of us need some kind of structure to do an adequate observation of our lives. That's the purpose of the Life Inventory.

If you don't know where you are right now, and where you want to go, you won't be able to figure out a way to get anywhere. Every journey has a beginning place and a destination place and the journey connects them. The purpose of your Life Inventory is to discern and describe your own life's situation and goal so you can design a path to get where you want to be. We do this in somewhat excruciating detail. You must know where you are at the beginning, and where you want to be at the end, so you have some idea of what the journey will be like.

The Default Excess Consumption System Design

One of the things I learned early on in my experience organizing the Oklahoma Food Cooperative is that most people have no idea how much food their household requires for a month. The food cooperative is on a monthly ordering cycle and this is not the way that most people shop. If you ask someone "how much meat do you need to feed your family during the month?" they won't know this to any degree of accuracy. Many people buy meat based on sight, not weight. They will look at several roasts and decide which one is enough for a meal for their family based on the volume.

That's the way the Default Excess Consumption System works.

That plan is for people to just bumble through life accepting things as they are without asking questions because, after all, "this is the way things are." If this is the way they are – if this is the best of all possible worlds – then there can't be any other way, right?

A young person can go through 16 years of school and unless they specialize in nutrition, they are unlikely to learn anything about "how to determine how much food you need" in a month, much less why it is important for you to actually know how much food you eat in a month. No one teaches you to monitor how much energy you use in a month – and how much that costs you in time and money. Other questions go untaught – how much clothing do you need each year? How much insurance do you need?

The refusal of our educational system to teach people these important life skills is not an accident. **The people in control of the system don't want you to know what it takes to live your life.** They prefer that you remain dependent upon economic elites to feed you only the information they think you need to know.

Two primary principles of the default Excess Consumption System Design are –

– minimal planning and

– impulse purchases,

So it comes to pass that we waste a prodigious amount of food, energy, time, and etc.

Choosing the Red Pill

If we want out of the default Excess Consumption System Design, we begin

with an examination, in detail, of our present life activities.

I don't see any other way to do it.

Even though most of us aren't used to keeping these kinds of records, they will be helpful to develop the information you need to design a way out of the standard model and into a more sustainable situation. If you don't keep track of what you do, how can you know anything about your life, at the level of detail that is necessary to begin a systematic change in your life?

Most of us won't need to keep records at this level of detail "for the rest of our lives." We do need them "now" to determine our present situation so we can understand how to change it. Going forward, we will need to monitor our activities and resource use to get feedback on our actions.. Paying attention to details like feedback is important to permaculture design.

You can start at the beginning to learn design by designing a way to do this that works for you, whoever you are, in your own unique situation and circumstances and personality traits. You can use the system described below, or develop something different. The specific method isn't important. The act of observation of your life is what counts.

It's your life, what can you know about it?

The Life Inventory requires some household discussion.

If you live in a household of one person, your dialogue is with yourself. (Don't discount the difficulty of "interviewing yourself.") If there is a spouse or significant other in your life, and/or kids, parents, roommates, hangers-on, wing men, girl friends . . . everyone needs to be involved. The goal is a design for your life and you are not an island. There is a social system in which you live which has a stake in your life. Talk to them to find out about you. It's a scary thought, I know it is. It can be a liberating experience.

You do design for your life at the household level. If you live with a group (family, household, roommates, etc.) you need to decide if you will do design only for your life or for your family or household. If you design for the household, you **involve everyone that lives in your household**. That requires talking to everybody and getting their ideas and input into the process. Since the eventual design will require work and cooperation from everybody in the household, get everybody involved early in the process.

If your household is a temporary feature in your life, e.g. a collection of roommates that changes over time, you probably will only do design for yourself. In that case, you don't necessarily have to interview your roommates, although you can learn some things about yourself by talking with the others who live with you.

But if you expect some participation from your housemates – such as recycling, making a compost pile, etc. – you need their involvement in the design. If there are expectations of participation, then they need involvement in the observation phase. This will build ownership in the end product and they will be more likely to follow through and do their part of the implementation.

The Life Inventory takes time.

Discussion, observation, counting, measuring, all these things take time and few observations benefit by being in a hurry. I know it is counter-cultural to say "take your time" in this era when everybody over-schedules to the maximum and events move at rapid velocities. So what? Permaculture is a counter-cultural activity – *TAKE YOUR TIME!*

While you're at it . . . you might as well, perhaps as a thought experiment, glory in this aspect of the permaculture counter-culturality. Don't think you can rush through this and come back later. The success of your design experience is

dependent upon doing a good job of observing your situation and recording those observations so that you can later make better evaluations and design choices as you study your records. We do NOT have time to be in a hurry.

The Life Inventory is not a test.

Permaculture has no police to swoop down upon you if you make a politically incorrect answer. Indeed, the only correct answers are the answers that accurately describe your present life situation. Since I have been known, in my life, to occasionally eat Ramen noodles, don't expect me or anyone to be shocked if, e.g., your food inventory shows a liking for minced fried mystery fish ("fish sticks") or even canned Vienna sausages. If that's where you are, that's where you are. Permaculture always starts with wherever it is we are in the present. It's called reality and context and both are essential to good design.

Observing your life will produce beneficial changes in your life.

Here we could insert a long philosophical diatribe about the effect of observation on reality. We'll dispense with that and just go with the practical. If you write down everything you eat for observation purposes, you will certainly eat better than you do when you don't pay such close attention to your diet. That's just fine.

Beneficial changes are beneficial changes, whatever their motivation. Even if you will be the only person reading your observations, you won't want to embarrass yourself by writing down that you actually ate a fast food burger stuffed with pink slime and drenched in chemicals, so you won't go to a transnational corporation for your burgers. That's good. **All good decisions are good decisions.** All better decisions are better decisions. All best decisions are best decisions. We like all of these.

The Life Inventory is not an evaluation.

Study and Evaluation of your present situation comes later, as you learn/integrate more knowledge.

The Life Inventory does visualize goals.

Part 2 of the inventory is all about where you want to be in the future. Here I think it is best to let your imagination run freely. "Brainstorm" is the key word. As you go into the study and evaluation process, you do some discernment about that constellation of ideas and upon further reflection, you may decide to forgo some of your initial goals. For now, go ahead and cast a wide net. Tell yourself a story about your future. Dreaming and risk-taking can take you to places you can barely even imagine.

The danger of procrastination.

While on one hand we don't want to be in a hurry, on the other hand, procrastination alas is the thief of time. "Not being in a hurry" does not mean "lay around and do nothing."

Life Inventory System Design.

How will you accumulate this information? You could start with systematically saving receipts. Every night, put them in a receipt folder and at whatever interval works for you, record them on the spreadsheet. Make notes on the receipts to remind you if there is a question about the expense. Keep a notebook in the kitchen to record meals, cooking time, ingredients, etc. Record prices AND amounts of what you buy.

iPermie comes with a spreadsheet which you can use or adapt. It's not required that you use that format. If you buy iPermie in an ebook format, go to http://www.ipermie.net to download the Open Document spreadsheets and other pdfs that go with the text.

Areas of Systemic Life Observation

The primary areas of observation correspond to each of the sections. Each section has a document that discusses the

observation and inventory tasks for that topic. Some of these topics overlap, so don't think of these as discrete separate projects. In all of your observations, more is better than less. Some sections have more observation items, others have less. It all adds up to a comprehensive look at your life. From these observations you learn your own story – who and what and where you are.

If you don't find these kinds of questions useful for your own life inventory, that's fine. Develop your own way to observe your life. I offer the information on observing your life here and elsewhere to help you, not to bind you into some kind of information straight-jacket. The goal is to do a thorough observation of your life so you know something about where you need to go and where you start and how you will get there.

Basic

Who are you at this moment in your history? This includes information about your family of origin, present household/relationship status, children/grandchildren, ancestors, education, job status. Where are you? Where is your geographic place? What are its characteristics? How long do you expect to be there? If you leave where you are now, do you know where you will go? Where do you want to go? What is the climate? What is the ecology of your area?

Invisible Structures

How do politics, technology, and economics impact your life? Are you a member of any organizations or groups? Do you want to start an organization or group?

Food

What do you eat? Where does your food come from? How much does your food cost you in time, money, and energy?

Energy

How much energy do you use? What do you do with energy? How much stuff do you buy each year? How much do you pay for energy?

Shelter

What kind of building do you live in? How does it meet your needs? (Or not meet your needs, as the case may be?)

Water

How much water do you use in a year? What water sources provide you with water?

Access and Transportation

Where and how do you travel in your life? What methods of transportation do you use?

Community'

What is your cultural ecology? How has it been damaged? What are your interdependencies with your community?

Economics

How much money do you make and spend in a year? What is your debt and to whom do you owe money? What are your future economic prospects?

Resilience/Hazards

What hazards are you at risk of in your present situation? What level of resilience is present in your household or your community?

Designing for Health

How is your health? Do you have chronic health problems? Do you have good access to affordable medical care? If not, what do you do for medical care?

Education

Are you presently enrolled in school? What is the goal of your school activities? Can you earn a living with your present program of study? How will you pay for your education? Are you borrowing money to study?

Your Observation Journal

Besides spreadsheets and observations of the physical aspects of your life, an excellent method for your Life Inventory is to keep a journal as you develop a permaculture design for your life. It could be something as simple as a small notebook that fits in your pocket. You can make notes in it as you go about your day and transfer the contents to a word processing document and/or spreadsheet in the evening.

Or it could be a larger notebook.

Think of it as a scrapbook or diary to record important events, situations, and observations so you can access them later.

Pay particular attention to what goes on inside your brain as you develop changes in your life. Watch and observe your emotional reactions, your feelings, about the changes coming in your life.

Other options are voice recorders and video cameras.

The goal is to develop a way to record your stream of consciousness developments and observations as they happen to you. Don't trust your memory. You may forget just a few hours later what seemed to be important at the time. Write it down! Or record it! Make a note or two or three. You could tweet your observations and update your Facebook status and track that over time.

You need something that works for you. You will record and analyze a large amount of material regarding both the physical world around you and your own inner landscape. Getting your information organized sooner rather than later will be a great help all around.

Tell the story of your live, holistically, comprehensively, as it unfolds before you. That is the essence of the observation phase of permaculture design.

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00171 Maps and Your Life Inventory

Alice came to a fork in the road. "Which road do I take?" she asked. "Where do you want to go?" responded the Cheshire cat. "I don't know," Alice answered. "Then," said the cat, "it doesn't matter."
-- *Lewis Carroll, Alice in Wonderland*

Think of maps as “pictures” that illustrate your Life Inventory. While you can probably find maps for your community, you will need to make your own maps for your particular living situation(s).

When I began formal permaculture studies with the Barking Frogs Permaculture online Permaculture Design Course, the requirement to draw a base map of my entire property, showing everything therein, and a separate map for the house, intimidated me. This chapter is the result of that learning experience and my subsequent experience in helping other permaculture students learn the importance of maps when it comes to design.

The map is not the territory.

The map is a *description* of a territory based on the work of a particular observer. Maps have limits in what they can show, although those limitations do not prevent us from making use of them for what they can do for us. In permaculture, we never let the perfect become the enemy of the good.

A map is a form of writing that describes a landscape or interior of a building using a combination of words, drawings, and symbols.

The language of maps conveys meanings. That’s one of the functions stacked on this assignment. By drawing a map of where you go in your daily life, you will learn details of your geographies that perhaps were not evident before. To describe them in map language, you have to visualize them in their context and discern a way to record that on paper.

Everyone in the household should work on the map, depending of course on their ages.

These maps are for your personal use. They are not for submission to someone who will grade on form and neatness. Do what you can, with what you have, where you are, to make a report that is useful for your purposes.

One of the important functions stacked on the process of mapmaking is that as you draw maps, you will learn a LOT about the important places in your life.

The mechanics of map making.

If you are already familiar with some kind of online sketch or drawing program, you can use that. For the rest of us, adding the complication of a computer-based drawing system is not necessary for permaculture design.

My first time around, I wasted a lot of time trying to find and learn a computer drawing program. I looked for a complicated tool, when I had access to more simple and fully adequate, tools such as a ruler, craft knife, colored pencils, and graph paper:

That’s a lesson on appropriate scale, an important permaculture principle about which considerably much more will be said later.

I said to myself, "I can't draw." As it turned out, I could do basic drawing, once

I actually got past the jitters and started doing the work.

So in case anyone else is worries about their alleged inability to draw a map -- while I am not a serious map-maker or graphics artist nor do I play those roles on television -- here are my thoughts on "How to draw a map if the last time you drew something serious was in sixth grade art class."

Basic Map Techniques

I used graph paper and tracing templates that I either bought at a local office supply store or ordered off the internet. Below are some URLs for sites where I ordered templates.

Most of my maps were 8-1/2 x 11, because I had to publish those maps in a design document and submit it for certification. Since this project is for your personal benefit, I suggest you make a larger size map, like 11" x 17". If you can't find graph papers that size, simply tape together two 8-1/2" x 11" sheets.

Larger maps are easier to work with than smaller maps.

Draw the map with a pencil, and keep your eraser handy. Use colored pencils to indicate various elements – blue for water features, green for trees and shrubs, brown for a fence, etc. Use the stencils to draw in items like fences, trees, bushes or furniture and kitchen appliances.

Materials of map-making.

– Colored pencils (the same pencils that school kids use for grade school art class)

– a ruler,

– erasers,

– correction fluid,

– number 2 pencils

– pencil sharpener.

– Small T-square

– Craft knife

– scissors

– glue (make your own from water and flour!)

– Graph paper

– Stencils and templates

– A box to keep everything together

Draw to Scale.

"Draw to scale" means that you assign a smaller dimension on the map to represent a larger measurement of the territory depicted by the map. The graph paper I used was four lines to the inch, each little box was a quarter of an inch. That 1/4 inch is the fundamental unit for all of the maps I drew for my design. To "draw to scale," you decide how many feet or inches or yards or miles (or whatever measurement you use) that each 1/4 inch box will represent on your map.

My base map of my house on my personal 1/7th acre urban property is a "1/4 inch = 4 feet" scale. Therefore, each inch on the graph paper equals 16 feet on my property. Some of my maps were "1/4 inch = 2 feet" scale. These were for smaller portions of the site. Some small nooks were "1/4 inch = 1 foot" scale.

Stencils and Templates

You can find stencils or templates for outdoor and indoor design elements, like trees, bushes, furniture, appliances, etc. These stencils have different sizes for these items based on various scales. Landscape templates have outlines for common outdoor elements. Architectural templates have outlines for the elements of a house – kitchen, bathrooms, furnishings for living areas and bedrooms, etc. These stencils and templates are often available at office supply stores and are readily available on the internet.

Alternatively, you can make your own sketches. You can develop your own map symbols. Whatever you do with symbols should be explained in a chart located on

or near the map. We sometimes refer to this as a map key since it unlocks the meaning of the map. List each symbol placed on the chart on the key and explain it. Don't count on your memory three months in the future to remember the meaning of the symbols.

Use pencils, instead of ink, in case you need to erase a mistake or you change you mind about where you want something.

Labels for the map.

You can simply write in the names of elements on the map or you can make labels with a computer printer. Use a craft knife to cut them out and glue to paste them on the map. I've recently thought that I should have made my own glue, which would have been simple enough to do, rather than buy and use a commercial packaged in plastic product like glue stick.

I drew red lines from the labels to the features in situations where an area was crowded with several elements.

If you print really well, you can simply write labels on the map itself. You want the map to be legible and understandable to anyone looking at it. You may want to change something. It may be easier to remove or overlay a label than to erase markings on the map itself.

I colored in the symbols for bushes and trees with green. Anything water related is blue (such as symbols showing the locations of cisterns, or flows of water). Fences are brown lines, thicker than a single line (there are templates to make lines thicker than single-wide).

Household Base Map

The first map you need is a Household Base Map. This is a detailed map of your house or apartment. If you live in a house on a plot of land, you need both a map of the house and a map of the plot of land on which the house sits.

Your Household Base Map should show every element of your immediate household As your design progresses, you may want to make additional maps or sketches to show the locations of new elements or elements you decide to move from one place to another. At the end, you can draw a new map, incorporating all of the recommended changes.

You can use map overlays. Use clear material (such as may be used for overhead transparencies). Tape one end to the top of your base map. Lay it over your map and make additional drawings. This could be part of your design process, allowing you to test different ideas for locations for elements in your design.

If your apartment includes any outdoor areas, show them in your map. For example, your apartment or town home may have a door that opens to the outside, with some sidewalk, porch, and a bit of yard included in "your" territory. Describe that area on your map.

Community Base Map.

The second map you need is a Community Base Map. This shows all the important geographic places in your life at the community level. It doesn't include your parents or friends who might live in another state. This is your ordinary living immediate geography community. The important sites to note on this map include:

– Your house or apartment, condo, town home

– Job or other work place

– Recreation

– Shopping (food, clothing, thrift stores, flea markets, whatever)

– Medical care

– Libraries

– Community amenities that you use (your church if you have one, library, etc.)

– Your school (if a student)

– Entertainment and recreation

– Friends and family in the area

– Whatever else that is important for your regular routines

Map places you actually use. Don't put the library on your personal community map if you never go to a library. If there is a bar you go to every week, mark it on the map.

You should be able to find a map already made for your community to use for this purpose, such as a road map. Check Google Maps online. This map will probably cover a large territory, since most of us our lifestyle geographies are "all over the place." As you progress in your design work, the area of your personal involvements will possibly shrink a bit as you work on the geographies of your life.

One useful way to display maps is to put pin or tape them onto a rigid surface that is soft enough to accept pins stuck into it. Sheets of cardboard work well for this purpose. Use map pins to mark your destinations and colored ribbons to identify common routes of travel.

Life Base Map

If there are significant aspects and people of your life outside of your immediate geographic area, make a third map which includes everything outside of your immediate geographic area. This could be the locations of your --

– parents,

– siblings,

– close friends

– co-workers,

– places you visit frequently

– other work locations you visit

– other educational locations you visit

– thing else important to you, outside of your immediate geographic area

This should be a printed map, large enough for the purpose. If your life is within one country, you can use a national road map. If you are a world person, you will need a world map, or maybe a globe would be a better choice.

Developing the Information for the Maps

I live in a house on a 1/7th acre plot of land in the city. With the help of friends, I made a series of freehand sketches of my whole property and its various sections. We used a measuring tape (thus the need for a 2nd person) and sited the various elements of my yards and house based on measurements from the sidewalks and other prominent features on the property. We measured each item from at least two fixed landmarks on the property.

If you have access to a measuring wheel (a/k/a a surveyor's wheel), it will help you measure distances. I didn't have one, so I made a traditional measuring tool known as a "Jacob's Staff." Get some non-stretch rope, a length convenient to use and which fits the scale of the area you need to measure. If your growing area is about 50' long, don't make a 200' long Jacob's Staff. If your growing area is about 15 meters long, don't make a 100 meter Jacob's Staff. Mark the rope clearly at a convenient measuring unit – usually a foot for outdoor measurements, here in the United States, in metric measures for those elsewhere. Use a marker with an ink that won't run if it gets wet.

Attach the "far end" (the highest measurement) of the rope to a stick or staff, and wrap the rope around the stick. Have someone hold it at the anchor point, and walk down the side and when you get to the end, you know the distance measurement. A Jacob's Staff is particularly useful for measuring non-straight lines (curves etc.) and over rough terrain.

Diagrams

From time to time you may find it useful to make a diagram of some aspect of your

observation, evaluation, or design work. For example, you could make a diagram showing your sources of food, or that describes your personal transportation or energy system. If you are a visual person, these will be helpful. You could make a series of diagrams for a particular purpose. You could diagram the present status of your food system, the future goal of your personal food system, and some of the intermediate/transition steps.

What you will learn from maps and diagrams.

Maps document the particular places of your lifestyle design, written in the language of maps. They show you where you are right now with your geographies. These are the places from which your journey begins. You have to know where you are at the beginning, in order to find routes for your journeys.

During your permaculture journeys, you will make decisions that impact the reality of your life.

If you don't know the actual reality of your life, you may make irrational decisions, or choose things that are counterproductive, or which cause major negative problems, the list of which could be long, annoying, and expensive to fix.

Measure twice, cut once, my grandfathers used to say. When I would help them, they would often say "Did you measure that twice, Bobby Max?" They knew that I am notoriously likely to just rush into something without measuring properly or with measuring with an eye of achieving a certain result. They told me over and over, "Measure twice, cut once." Measure your life twice, here at the beginning, and avoid regrets later.

Later you will rewrite the language of that map, in your first attempt to describe your permaculture design that will be implemented in reality.

Good information leads to good decisions.

Bad information leads to bad decisions.

So be in touch with all of the realities of your places of design – this is your life!

Document it!

Online resources for drafting materials/templates:

http://www.timelytemplates.com/ | http://www.draftingsteals.com/

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00181 Life Inventory Questions (the Basics)

You can see a lot by just looking. --Yogi Berra

These questions relate to the basics of who and where you are. Each section has an inventory document with further questions relating to the topic of the section. The numbering system starts with the number of the section.

Good observation lays the foundation for excellent design. Poor observation is the precursor of bad design. If you don't know where you are and where you want to be, you can't know the way to get there. If by some random chance you arrive somewhere, you won't know where you are.

So you need to come to some understanding with yourself and your immediate household/family regarding who you are and where you want to go. With this info, you can design a way to get where you want to go.

Start a word processing or spreadsheet document for your answers. Copy these questions and paste them there and fill them in as you develop the information.

If you don't find this kind of inventory useful for your situation, that's fine.

Develop some other way to do a detailed observation of your life.

Your basic information

Who are you at this moment in your history?

– Name

– Address

– Work and/or school

– Attained education

– Annual income

– Source(s) of income

– Job skills (related to your work)

– Life skills (related to life, make it as extensive a list as you can – e.g. as simple as balancing your checkbook, as complex as a knowledge of Renaissance music)

– What is your purpose in life?

– Who are your heroes/heroines?

You in your household

– Family or roommates, housemates or significant other(s)

– Their work and/or school status

– Their attained education

– Their income(s)

– Their income source(s)

– Their job skills

– Their life skills

– Their permaculture skills

– Roles that everyone plays in the household.

– Is your present household temporary (roommates and such who come and go)? Or is it a long-term/permanent family arrangement?

– Who do you have commitments to?

– What kind of commitments do you have?

You and your family of origin

– List your parents, grandparents, and great-grandparents, and the places they lived (as much as you can). If you can go further back, that's all to the good.

– List your aunts, uncles, and cousins (the purpose of these two lists is to visualize your extended biological family).

You and your geography

– What is your ecological region? (A/k/a your bioregion.)

– What is this ecological place in the geography of your life? That is, what are the neighboring bio-regions? What political boundaries divide and unite your area?

– What are the characteristics of your area? More detail is better than less.

– How long have you lived here?

– How long do you expect to live here?

– If you plan to leave, where will you go?

– What is your climate? You need, in all cases, at least 10 years of climate data that includes monthly records of maximum and minimum temperatures, amount and type of precipitation. Average temperatures and rainfall amounts are not useful. More years are better than less. Somewhere you can probably find a 100 year record of droughts and floods. Find it and use it!

You and your future

– What are your goals for your life?

– How will you achieve those goals?

If you are in school. . .

– What are your plans for after you leave school?

– Do you have a plan for a career?

– How long will you remain in school?

– Do you like your school?

– Will you have a large student debt when you leave school?

– What are your job prospects post-college?

If you already are out of school and have a career . . .

– Do you plan to pursue this same career until you retire?

– Do you like this career? If so, why? If not, why? If not, what do you plan to do about the unhappiness with your career choice?

If you don't have a career, but do have a job. . .

– Do you like this job?

– Why do you like it?

– If you don't like it, why do you dislike it?

– How long do you plan to keep this present job?

– If you don't like this job, what are your plans for finding another job?

– Do you need more education or skill training to get another job?

Longer-term issues

The younger you are, the harder it will be to answer these next few questions. The older you are, the more important these questions become.

– What are your plans for retirement? – Where will you live during retirement?

– How much will it cost your to live?

– What income will you have during retirement?

– If you do not plan to retire, will your work change as you grow older?

You in the present situation

– How do the four threats of political criminality, economic irrationality, climate instability, and peak energy impact you?

– How will those impacts change as the situation unfolds and evolves?

Additional Useful Information

Your written observations include lists –

– resources available,

– resources needed,

– functions needed (food, water, shelter, etc.)

– any particular problems, challenges or hazards,

– your skills, knowledge, and abilities and of others who are part of your life,

– your desires and goals for the future,

– the impacts of the invisible structures of government and community on you and your life.

– limiting factors (anything that may be a problem in realizing your goals and dreams)

If you have land that goes with your dwelling or business, a **PASTE** list may be useful –

– Plants

– Animals

– Structures and Soils

– Tools/Resources

– Events

Goals

What are your short-term goals (up to one year)?

What are your medium term goals (one to five years)?

What are your longer term goals (five years and more)?

What goals do you have for your study of permaculture design?

When you think of goals, don't be afraid to set "SMART" goals. These are –

– Specific

– Measurable

– Attainable

– Relevant

– Timely

Maps

Maps are a necessity in permaculture design – although we know that "the map is not the territory." It is a map maker's interpretation of the territory. Maps need to clearly indicate existing features of a community or a particular part of that community.

Overlays can be used to show proposed changes in the geographies of your life and/or the sites of your life.

Since the object of our design work is your own life, you need to a map of your life. This could be a diagram with you at the center. Use the Simple Critical Infrastructure Map system described in section 9 to describe the various layers of infrastructure that protect you from the six

ways to die, which are illness, injury, heat, cold, hunger, and thirst. Shelter protects us from heat and cold; Supply protects us from hunger and thirst, and Safety shields us from illness and injury. These three sets of essential services operate on seven layers of infrastructure:

– person/individual,

– household,

– community (village/neighborhood),

– town,

– region,

– country,

– world.

More is better than less.

The more you can know yourself – and describe that on paper – the better your ultimate design will be. Please resist the temptation to rush through this. We don't have time to be in a hurry, so take your time and linger over your observations. One possible exercise is to interview others about you, as if you were a third party reporter doing a story about your life.

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00191 Accidental or Intentional?

Don't think you're on the right road just because it’s a well-beaten path.

– No one is an island. No action is without consequences

– Our inactions can be as critical (for good or for ill) as our actions.

– Design or be designed?

Too many people lead “accidental lives.” That’s the default option of the Excess Consumption System Design. We go forward out and about without a lot of thought as to the ways and means of our daily doings. We do things because –

– that’s the way we’ve always done things,

– our family, our neighbors, our friends, or advertising campaigns influence us.

If we want water, we turn on the tap and out gushes pure water. If we want heat, we turn up the thermostat. If we want cool, we turn on the air conditioner. We don’t spend even a moment thinking of the context of our actions.

No one is an island. No action is without consequences.

No action exists in and of itself, by itself, without consequences. Each human action sets in motion a chain of events.

Turning on the water draws down the city water supply, which causes pumps to move more water, and purification systems to increase their activity and energy loads. Pumps and purification systems require electricity and machinery, and their maintenance and capital investment set in motion another chain of manufacturing, transportation, and energy events extending to the far corners and deep depths of the earth.

Turning up the thermostat in winter, or turning on the AC in the summer, increases the load on energy production and distribution systems. These activities require fuel, workers, resources, capital investments and maintenance, each of which sets in motion a myriad chains of far-reaching events that delve deep into the earth and stretch across the continents.

Our **inactions can be as critical** (for good or for ill) as our actions.

Sometimes the things **we don’t do have as much**, perhaps even more, impact as the things we actually do.

– When we don’t support the supermarket standard diet, we don’t contribute to the ecological devastation it causes.

– When we don’t conserve energy, we increase the pollution burdens on the biosphere.

– When we don’t eat pesticided and herbicided vegetables, we protect our health and safety.

– When we don’t eat organic and local or organic and fair-traded foods, we subsidize pollution and social injustice.

Design or be designed?

There is no option to not follow a design pattern in your life.

The question is – will you follow the default Excess Consumption System Design pattern prescribed by the invisible structures that impact us (politics – culture – economics)?

Or will you, as a matter of personal ethics, compassion, wisdom, and enlightened self-interest, develop and follow a conscious design for your ways and manners of living that cares for the Earth, cares for people, and cares for the future?

iPermie is potentially your first step toward a conscious permaculture design for your life that you will develop together with other people who are meaningful to you.

A Comment about the Chapters to Follow

In the chapters that follow, you will meet permaculture ethics, principles, concepts, methods, strategies, techniques, and tools. At first glance, it seems somewhat complicated and the question is obvious: why do we need all this stuff? That's a fair question and it deserves an answer before we jump off the diving board into the pool and go for a permaculture swim. Here are four reasons:

We want to be systematic. We don't want to miss anything. We want to cover all the bases, find and solve the problems, and create energy conservative and regenerative systems that operate in accordance with the permaculture ethics. We need structures to take us through the process to make sure we don't miss anything.

We need to be holistic. We have to see the whole picture, not just the parts. The various concepts we will meet over the next few chapters help us to this. Principles, concepts, aspects, and methods help us see the whole picture.

We don't want to reinvent the wheel or the flat tire. These design concepts embody the learned experience of permaculture communities over the past forty years and incorporate wisdom handed down over thousands of years.

We need to observe and understand nature and replicate its methods in human structures and systems. If we carefully observe and come to understand nature, it will be easier for us to replicate nature's successes in our design work. Permaculture design offers us tools to help us do this.

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00201 The Permaculture Design for your Life

How wonderful it is that nobody need wait a single moment before starting to improve the world. - *Ann Frank*

Events – happenings -- always follow patterns.

If rain falls on a hill, it will accumulate in ravines carved by previous rains and run down the hill through those ravines.

You came into this world as a baby. As you grew, your development followed a pattern. As a child, you did not grow up to be an oak tree. You did not become a kangaroo. Your body's development followed that of the human species and today you are a human being, Homo Sapiens, a thinking being.

The permaculture designer **looks for and recognizes patterns** that govern the ways we do things.

If we don't like the end results of the existing set of patterns of our lives, we need new patterns.

New and different arrangements of patterns = new results.

Permaculture is about **the intelligent arrangement of patterns to bring about desired consequences and ends.**

Permaculture design is a system of assembling conceptual, material, and strategic components in a pattern which functions to benefit life in all its forms. It seeks to provide a sustainable and secure place for living things on this earth. Bill Mollison, Permaculture Design Manual, p 36.

As a design system, permaculture concentrates on **function.**

> "By resourceful design, we keep the number and scope of our actions to a minimum required to meet human needs, provide a quality life, protect and (if necessary) heal the ambient ecosystem, all living things that our actions might touch. The less we change to achieve those goals, the better we have designed. Good design is not gaudy, it is efficient, humane, and above all restrained." *Dan Hemenway, Elfin Permaculture, "Appropriate Scale Considerations," July 2009*

This doesn't mean that we ignore aesthetics, only that function is primary.

Mollison wrote in the Design Manual:

> Every component of a design should function in many ways. Every essential function should be supported by many components.

This highlights two important design principles that you might as well go ahead and memorize because they are about as fundamental as it gets in permaculture:

– Every element in a design has many functions. (Stacked functions)

– Many elements and systems support every essential function. (Redundancy)

This is the Design Manual's definition of the permaculture design:

> A beneficial assembly of components in their proper relationships.

In permaculture, "design" is both a noun and a verb.

As a verb, it describes the process where, based on observation, study, and evaluation, we **arrange the various aspects of our life into a beneficial system that helps us live in accordance with the permaculture ethics.**

As a noun, it refers to a **written document containing a description of the beneficial system (assemblies of components) in their proper relationships.**

Everything has a relationship to everything else in your life. Nothing in your life exists by itself. **Things** (elements, components) **connect**. These connections fall into **patterns**. When we speak of relationships, we refer to how elements in your life connect to each other, to you, to other people, and to the surrounding ecology.

In the past, most permaculture design focused on physical locations -- "sites" as we know them -- and a design was specific to a particular geographic location.

The iPermie Hacking Permaculture Project expands the definition of "design site" to include – encompass – involve! – **your entire life.**

This is a particularly important concept for people who have no land, such as folks who live in apartments, condos, town homes etc. in cities, and for people who live in group situations such as college dormitories.

The permaculture design is a **written guide as to how you will meet your human needs** in accordance with the ethics of permaculture:

-- care for people,

-- care for the earth,

-- have a care for the future by incorporating voluntary limits and justly sharing surplus.

A permaculture design organizes your life so that you experience more beauty, enjoyment, wisdom, security, and cooperation – with less work, consumption, conflict, danger, and waste.

Four aspects of design.

The Permaculture Design Manual describes four aspects of design:

– Technique – how we do something.

– Strategies – Adds time to technique. We use strategies to achieve future goals. It has a value orientation. Some things are better than others so we encourage the good and discourage or eliminate the bad, as a matter of permaculture strategy.

– Materials – things we make things with. This includes energy.

– Assemblies – the combination of elements to make more complex structures. Often referred to as "systems."

Suppose we want to design a more sustainable urban food system. We observe the situation, and we identify the necessary resources we need as follows:

Techniques – container gardening, market gardening, vermicomposting, vertical gardening, it's a long list, it goes on for pages.

Strategies – cooperative business structures, local orientation, biological preference, rural/urban partnerships. This is another long list.

Materials – potting soil, seeds, containers for container gardening, worm bins, worms, food scraps for vermicomposting, a marketplace, tables and advertising for a farmers' market, etc.

Assemblies – grocery coop, farmers' market, balcony herb/salad green garden, community gardens, local food promotion organization, website listing food availabilities, prices, and delivery date, etc.

During your design process, you study and evaluate the lists you made during your observations.

You look for connections. You'd like for everything to do several things and for

each function to have several supports for it. So you pick “local food cooperative” as part of your design, because

– a local food coop makes it easy for people in cities to buy food directly from farmers,

– It is a structure of social justice and fair distribution, since it makes it possible for even small producers to access an urban market, and it has low entrance barriers so even poor people could start a small enterprise and enter the market,

– It promotes ecological healing because it provide a market encouragement for producers who use organic and sustainable production practices.

– It takes money out of the international economy and puts it into the local economy.

Since food production is important, you pick several elements that contribute to it:

– Food coop

– Roadside stands

– CSAs

– Community gardens

– Container gardens

– Growing rooms in apartment complexes

– Concrete gardens,

And that process goes on, and on, until you have a complete, workable, understandable, practical, plan.

Based on this process of observation and evaluation, you write a permaculture design that would describe this process in detail and make specific decisions on how to organize the development and implementation of the decisions.

Much more will be said about this process in the rest of the documents of this section.

Location of Design.

For most of its history, permaculture has focused on the situations and needs of people living on rural or peri-urban small holdings, who wanted to produce a substantial amount of their household’s needs from their own land and/or to do market gardening.

Because of this rural and peri-urban focus, permaculture design sites have typically been dwellings with some amount of land attached, or land on which a dwelling will be built, or land intended for food production.

That is important work and it continues today.

But everyone does not live in a rural or peri-urban or suburban situation where they can access enough land to grow a substantial amount of their own food. Many live in apartments in cities or in dormitories on college campuses and have little or no land on which to grow food.

Therefore, we need permaculture design work for people who live in cities or other situations where they have no land or small land. Many people these days don’t have permanent homes. They are young. They are in college. They live in apartments and dormitories. They may migrate several times before they find a place to live more permanently, if indeed they actually settle down somewhere.

Permaculture has potential for everyone, whether or not they have land, whether they are nomadic or ready to settle down in one place. We ask –

> what is the site that is the object of permaculture design for people who have no land of their own?

That is a simple question to answer.

The site of a permaculture design for a person or family/household without land is the life of the person, family, or other household living arrangement.

The goal of iPermie is to enable you to write a permaculture design for your own life.

This expansion of the concept of design site to encompass an entire life is possible for people who have land too.

Permaculture works for people in rural areas with houses and lands, and it works equally well for someone living in a high rise apartment in a dense central city, or who lives in a dormitory on campus.

A Living Document.

A design project like this is never actually "finished." Since you can't see everything that will happen to you going forward at this point in your life . . .

. . . You see what you can, and understand what you can, and do the best that you can to describe a way forward.

You must always be ready to revise your plan in light of changing circumstances and new knowledge.

A permaculture design for your life is a living document that changes and evolves as your life changes and develops.

Organizing the report.

It's your report. Organize it in a way that makes sense to you –

-- Cover the subjects outlined in iPermie sections.

-- Add additional chapters or sections if needed based on the unique situation of you and your household at this time and space.

-- Use a system to reference each design decision so that you can discuss and refer to them elsewhere in the text of the report.

In each section, **describe your goals and the changes you need to make in your life and/or the actions/steps you need to complete** to achieve those goals. In general, you make a separate numbered decision for each change you want to make in your life.

You want separate design decisions, and you want them numbered, because in the staging section you will list all of the changes in the order in which you will implement them.

Numbering the decisions helps you keep track of what you do and when you will do it. You will refer to them in other parts of the text, so a number for each decision is helpful.

Each design decision includes a short explanation. Without the short explanation as to why you make this decision, you might come back to this later, scratch your head, and say "what was I thinking of?" If someone else reads your design, you want them to understand your thinking.

Four components of a permaculture design.

We've seen that four aspects of a permaculture design are **techniques, strategies, materials, and assemblies (systems).**

Now let's add the **four components of a permaculture design**, as described by Mollison:

– Site

– Energy

– Abstract

– Social

Site includes:

– Water
– Earth, Landscape and Plants
– Climate
– Geography
– Housing
– Work
– Education
– Stuff

When designing in situations where people don't have any land, the **design site is the life of a person.** It may or may not include a larger household. Since people who don't have land remain

dependent upon land, only removed one or more iterations from personal use, geography and landscape remain important in all designs, "Earth" and "landscape" can therefore be understood as aspects of community geography.

For lifestyle permaculture design, we add Housing, Work, Education, and Stuff to the components of the "site" which is the life and the style of the life of the person doing this design work.

Energy issues are:

– Technologies
– Structures
– Sources
– Connections

Urban areas are dependent upon long supply chains for energy supplies. The goal of permaculture design in urban areas is first and foremost demand destruction (learning how to live well with less energy). As we learn to live better with less energy, we begin to develop resilience systems that can reliably provide energy to urban households through the challenges of the future.

Technologies drive our need for energy and the availability of cheap energy drives the developments of energy-hungry technologies. That is bad design run rampant.

Structures are systems, economics, businesses, political organizations, etc., that regulate and govern our access and need for energy.

Sources are the energies available for our use.

Connections unite the various elements of energy production and distribution systems.

Social components are:

– Legal aids
– Invisible structures
– People
– Culture
– Trade and finance

In permaculture, "invisible structures" are organizations, businesses, religions, belief systems, laws, regulations, governments – any kind of system or structure that influences the way we live. When doing design for urban areas, social components are primary issues and take more prominence than the traditional permaculture focus toward on-site food production. Since urban people may not have access to any land for food production, meeting urban food needs in sustainable methods requires recourse to invisible structures such as food cooperatives and partnerships with farmers.

Abstract concepts are:

– Timing
– Data
– Ethics

Timing is everything they say, and this is no less true for permaculture design in urban areas. Timing relates to succession, where first things are first. Then come second things and third things. Each new "thing" depends upon the development contributed by its predecessors. It is a matter of pulses that regulate growth and development. We accumulate data as part of our observations and data is important for making design decisions. Everything we do grows from the ethics of permaculture.

Sections of the Design Report.

Before we say more about the actual process of design, I want to talk just a bit about the written design itself.

You need a way to systematically refer to your design decisions. I used a descriptive word (like one of the titles of section) followed by a number – Food 1, Food 2, Food 3, etc. to identify each design decision. Always include a short explanation/justification for each decision.

Basics
Introduce yourself, as if describing yourself to a stranger for the first time. You might be surprised what you can

learn about yourself by simply writing about yourself as if you were telling someone a story. Include all members of your household. Even if roommates are transient and temporary, they have something to say about you and about how the household operates. People with whom you live with that you have some level of commitment (based on biology, adoption, close friendship, etc.) need a more intense involvement with your observation process..

Describe the place that you live. Include the ecoregion, political descriptions, and actual premises of wherever it is you live, even if you are in temporary lodgings. As time passes, and you migrate and move, add additional sections describing your new locations. Over time, your permaculture design becomes a permanent record of where you have lived. In a sense, it is a story-map of your life, where you've been, where you are now, and where you want to go in the future.

Invisible Structures
This section of your report designs your relationships with the invisible structures that influence your life. This section comes first because your attitudes and beliefs determine your actions. For people living in urban areas, invisible structures are a primary way of meeting their basic human needs. Structures involved with your life can make it easier, or harder, for you to do what needs to be done. You may want to make decisions about ending your participation in some invisible structures and becoming involved with new ones. You almost certainly will need to participate in organizing some new invisible structures in your area that do not exist at present. In designs for urban lifestyles, work with invisible structures is a major aspect of design because of the communitarian nature of urban living.

Food
Everyone needs nutrition and in this section you describe how you will meet that basic need using permaculture ethics and principles to guide you as your design your personal food plan. You can't raise all of your own food, so you need a sustainable system to provide you – and your neighbors – with wholesome and nutritious food. That sustainable system is a work of invisible structures.

Energy
Peak energy is a reality that will complicate almost everything you do for decades to come. Here you design your way through the energy minefield of the future and develop your personal energy plan as you decide how you will live better with less energy.

Shelter
What changes are needed at your dwelling so that it cares for people, cares for the planet, and has a care for the future?

Water
Water will be as big an issue going forward as energy. How will you conserve this scarce resource? What does a sustainable water system for your community look like?

Geography, Access and Transportation
There and back again, and points between. How do the geographies and places of your life relate to each other? Do you need to move? Change jobs? Adjust your geographies to meet energy realities?

Community
What is the role of your place – its geography and culture – in your future? How are you interdependent upon your community? How can you make it a better place?

Economics
In this chapter you look at macro and micro issues regarding your personal and household economics. You consider the costs of implementation of your design. How will you pay for what you need and want to do?

Resilience
When the feces hit the ventilating device, what will you do? Even better – how do you keep the feces away from the ventilating device in the first place?

Health
Your health has a major impact on the quality – and the expense – of your life. In this chapter you describe how you will support your health by lifestyle choices and actions. This is perhaps the most important section of your design.

Education
There is education, and then there is school. Sometimes they are one and the same, sometimes not. In this section, you write about the education you need going forward through your life.

Walking you talk.
First things first. Second things second. Third things third. In this chapter, you look at all of your design work and you organize it for implementation. While the goal is to write the permaculture design, a written design is a useless exercise if you do not implement it. Here you decide how the implementation of your plan will proceed.

Appendices
Here you can put extra information that is useful for and relevant to the implementation of your design. This includes charts of climate observations, various kinds of lists, and inventories of skills and stuff.

Don't forget to back-up your work regularly and to keep backups off-site in case of on-site disaster.

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00211 Permaculture Ethics

We can tell our values by looking at our checkbook stubs. -- *Gloria Steinem*

What is permaculture?

The Permaculture Design Manual takes 574 pages to answer it. iPermie has 380,000+ words on the subject and its ancillary topics. Here is the short definition by Bill Mollison, who together with David Holmgren developed the discipline of permaculture:

> Permaculture design is a system of assembling conceptual, material, and strategic components in a pattern which functions to benefit life in all its forms. *Permaculture Design Manual*

He follows this definition with the Prime Directive of Permaculture.

> "The only ethical decision is to take responsibility for our own existence and that of our children. Make it now." *Permaculture Design Manual*

Sometimes I think it is easier to describe what permaculture does, thus my definition at the beginning of iPermie –

> Permaculture helps you design your life so you can experience more beauty, health, happiness, freedom, security, and cooperation, with less work, consumption, injustice, conflict, stress, danger, and waste.

We could approach this by looking at what permaculture involves, the approach I used in 00021 "Hacking Permaculture in 350 words."

As we see here at the beginning, **permaculture is not gardening class.** I belabor this point, here and elsewhere, because to many people, permaculture has somehow become synonymous with perennial agriculture – planting fruit and nut trees, cane fruit, perennial herbs, etc.

Permaculture is a design system. It is not perennial agriculture. It is not gardening. It is not passive solar. All of these are good ideas and depending on the situation, they may be parts of a permaculture design. These good ideas are not permaculture. Permaculture is design, pure and simple, used to achieve goals in our lives. Good ideas are good ideas. Reskilling class is reskilling class. Best practices are best practices. All are important and all are what they are. Permaculture is what it is – a design system that promotes sustainability and transformative change inspired by the ethics of permaculture. It's not helpful if we try to make permaculture something other than what it is.

Permaculture is founded upon your willingness to take personal responsibility for our actions.

My personal definition:

> Permaculture designs more sustainable human lifestyles and systems that care for people, care for the planet, and have a care for the future by accepting and designing limits on our personal and communal behaviors and allowing surplus to circulate for the benefit of all.

Getting into permaculture design is like giving sight to the blind. We may think we have a good handle on "all that is," at least as it impacts us and those we love. Yet, in a moment, that illusion can be

swept away and we may find ourselves in what appears to be a completely different situation. I think that all permaculture education materials should include a disclaimer . . . "WARNING: The study of permaculture design may be hazardous to your complacency, indifference, and lack of personal responsibility."

People tell a story of three persons who examined an elephant in the dark and then attempted to describe what the animal looked like.

The man who touched the tail said the elephant was like a snake. The one who felt the tusk said it was like a plow. The third who felt the ear said it was like a fan.

When they turned the lights on, the examiners learned the truth, and are undoubtedly surprised by how big and comprehensive that truth was. Consider how different the real reality was from what they had previously thought to be "real."

The question of the hour is – how shall we live on this planet, with our fellow human beings and all the other creatures of Earth?

The answer begins with **a personal ethical decision to take responsibility for our actions.**

In other words, we turn on the lights and open our eyes and see everything as it is. That includes the impacts and consequences of our actions upon the Earth, our fellow humans, the planetary biosphere, the Earth's creatures, and ourselves as individual persons.

There are any number of voices out there these days which marginalize the importance of personal effort. They cite Jevon's Paradox (the claim that increased efficiency in the use of a resource will inevitably increase the utilization of the resource) to discourage energy conservation. People say that personal efforts and lifestyle changes have minimal impact compared to large industrial uses.

The response of permaculture is – so what?

We got into the **present situation as myriads of people made bad decisions over long periods of time.** It would be nice to find a shortcut to get us out of the present situation quickly, a magic permacultural wand that could be waved and make all things better. Thus far nothing appears to fit that bill. We are left with the thought that we will get out of our problems the way we got into them – **myriads of people making good, better, and best decisions over long periods of time.**

So never let anyone tell you that what you do doesn't matter, because it does.

What you do matters to you, to those who care for you, to your community, and to the planet and all of its associated ecologies and watersheds and bioregions.

The legitimacy of hope

We humans often overestimate our ability to peer into the future and determine the outcomes of our actions (for good and for ill). There are limits and boundaries to what we can discern from the present situation. Indeed, there are limits and boundaries to what we can know about any situation. Reality is that complex. Perhaps I should say, our shared realities are that complex.

This of course doesn't stop us from attempting to predict the consequences of our actions, at least, it has never stopped me from doing so.

But this knowledge dilemma does inject enough uncertainty into all the current predictions of doom that we can legitimately maintain an attitude of hope even as we blunder our way into the future. We may yet figure things out enough to deflect a fate of horror and replace it with a future of hope.

Complex systems are, well, complex. Making small tweaks here and there can have unpredictable consequences. Results

may be way out of proportion to the tweak. The results can be bad or they can be good. So we roll the dice.

The limits of governmental action

A better future comes from the willingness of people to take personal responsibility for their actions. If we think we can trust the government to do the right thing, in the present cultural and political environment, well, that's a waaaay skitzy thought. Moreover, there are certain dangers to relying on government as the source of our salvation from the consequences of our own actions, at the present moment.

Government actions, which compel large numbers of people to act in certain ways, have major impacts. If the compelled action is benign, the consequences are good. If not, then not, and on a big and dangerous scale. Government mistakes wreck entire civilizations, and have done so frequently in human history.

I am in favor of the government doing good and I oppose the government doing evil. The tricky thing is to discern between the two, as one person's "good" may be another person's "bad." Perhaps a better way to formulate this is to say that **government should protect and enhance the common good of people, the planet, and the future.** Government action becomes most productive when it is in the context of mass action by families and households who change the way they live so that they also protect the common good of people, the planet, and the future, can do little to solve our problems.

This process starts with our own personal lives or we don't start at all.

When the government begins to do the right thing, it will only be because millions and millions of people have started to do the right thing in their own households.

If tens and hundreds of millions of people remain mired in lifestyles of acquisition and consumption, **it is folly to think that the government would ever legislate anything other than more acquisition and more consumption.**

It didn't happen at Easter Island, nor with the Chacoans, Mayans, or Romans. It didn't happen in 1789, or 1917 and it won't happen with us either.

It's **broad scale individual/household action** that leads to a **grassroots political and economic revolution** or it is **environmental catastrophe and die-off**. Those are the only choices.

As we come to the tipping point where hundreds of millions of people worldwide begin to do the right thing for the ecology, it will become possible for the governments of this planet to do the right thing, in a serious way, for the planet. This will put a capstone on an arch of hope for the future.

In the meantime, it's best to have minimal expectations of what the government can do. We should always fight against egregious violations of ecology and justice, work to restrain the rapaciousness of corporate actors, and make as many tweaks to the rules as we can to make it easier for people to do the right thing. This kind of work though should never distract us from the real work for the future, which goes on at the grassroots.

As we go lower on the governance ladder, more diverse possibilities open up. It is easier to get right action out of a local municipal government than it is out of a national government. More about this will be said at much greater length in section 1, Invisible Structures.

Lessons of the Civil Rights movement

Why was the Civil Rights movement successful in ending legally mandated racial segregation and discrimination? Because millions of people came to understand that racial injustice was a social evil that could no longer be tolerated as a juridical reality in our society. It wasn't everyone, and many people opposed the movement, but it was

"enough." It became a **critical mass.** The targets of the oppression – African Americans -- withdrew their consent and refused to participate in their own oppression. So it came to pass that as people's attitudes and actions changed, so did the laws, and we are better today because of this.

While racial problems remain, the willingness of people 50 years ago to leave aside what they had been taught about the "proper relationships of the races," led by courageous people who refused their consent to the system, created space for governmental action that ended that particular structure of social oppression and opened doors of justice and opportunity for millions of people.

This level of understanding and acceptance of responsibility is what the present moment calls us to. We can therefore reasonably ask ourselves, "Now what do we do?"

When we answer that question, another immediately presents – "What's next?"

And so on and so forth, until you have completed the first draft of your permaculture design.

That is what permaculture design is for – to help us decide what we should do with our lives of responsibility and awareness.

We proceed from the general to the particular, and **we begin with ethics**.

Ethics of permaculture.

There are three ethics of permaculture:

– Care for the **Earth**

– Care for **People**

– Care for the **Future** through designing and accepting voluntary limits on personal and communal behavior, and ensuring that surplus circulates and does not concentrate or centralize.

This is the fundamental ethical pattern of permaculture.

It replaces other patterns of greed, violence, and gluttony that drive us towards ecological catastrophe.

Secular and universal.

These are secular ethics. They are not tied to any particular religion or moral system or philosophy. They transcend all such human boundaries and categories. This isn't to say that our individual religious and moral beliefs are not important, because they obviously are to many of us. It is to say that we can come together, in our diversity, at a common "table of ethical fellowship," in the face of our shared destiny as human beings.

Permaculture ethics are the basic minimum of personal behavior that transcends human differences of culture, politics, philosophies, and religions. They can govern our interrelationships as individuals, families or households, races, religions, nations, peoples. Permaculture ethics are an aspect of natural law.

All people – be they Buddhist, Catholic, Hindu, Animist, or Atheist, and all points in between – can care for the Earth, care for people, and care for the future.

All people – whatever their politics – can care for the Earth, care for people, and care for the future.

All people, be they European or Asian, African or Polynesian, and all points in between – can care for the Earth, care for people, and care for the future.

This doesn't mean that Buddhism isn't important to Buddhists, or Catholicism isn't important to Catholics. It means that we can agree in our common humanity to care for the Earth, care for people, and care for the future.

Care of the Earth

The Earth is our home. It's the only one we have. We cannot exist apart from the natural systems of the planet and its biosphere. We've tried – the Biosphere experiment in Arizona was hopefully to be the first step toward designing human

habits that could operate independently of their surroundings, without re-supply. Presumably, this was to be applied in the context of space travel and colonies on the Moon or other planets like Mars.

However, the project failed and ended early. While this isn't definitive proof of the impossibility of the hypothesis, it was a valiant try (in scientific and human terms) that incorporated a lot of research and design effort and resources. We learned that the Earth's biosphere is more complex than we previously thought and recreating it in a closed environment is not easy.

Long-term thinking about consequences of our actions to the planet and its ecologies is essential to permaculture design.

We often read of the "Seven Generations" principle followed by Native Americans, where they evaluated decisions based on their impact as far as seven generations into the future.

That kind of thinking is utterly foreign to the modern just-in-time mind set.

The permaculture ethic of Care of the Earth starts us on a journey that leads in the direction of understanding that the impact of our actions propagates far beyond our households and even our life spans. I say "starts . . . leads . . . direction . . . understanding . . . " because this isn't something that happens overnight.

It is a seed of a tree that starts small and grows large and magnificent with time and nurture. -

Care of People

Based on the first ethic, we can say that permaculture is earth-centric. Permaculture is also human-centric, in that we use it to make design decisions that govern our lives and that mitigate the impact of our lifestyles of the proud and powerful upon our planetary neighbors.

We are beings who are consciously aware of our existence and are capable of making decisions that have enormous impacts – for good or for ill – upon everything that is around us. We can remember our history and we can learn lessons from it. "Those who do not learn from the mistakes of history are doomed to repeat them." While people honor this more in rhetoric than in reality, the ability to formulate the concept suggests there remains hope.

If there is anything evident from human history, it is that if we want to care for the planet, we must work for human justice and peace. Throughout our history, economic irrationality, oppression, coercion, and war have driven grave harm to our planet's biosphere.

The words of this song – "Renunciation" – from the "Little Red Songbook" of the Industrial Workers of the World, illustrate this better than I can, I think. Sing them to the tune "Auld Lang Syne"; the lyrics are by Joachim Raucher:

When hungry millions are unfed
And the little orphans weep,
I cannot eat in peace my bread,
Nor sing my grief to sleep.
When thoughts arising from the heart
Are hampered in their flight,
I cannot sit and muse apart
Upon a dreamy height.

When craven lies oft seek to blind
The eyes of blazing Truth,
I cannot turn my maddened mind
To songs of love and youth,
Nor can I sing in lyric strains
Of private, little woes,
When Greed is reaping golden gains
From bloody seeds it sows.

The sad and tragic fact of modern life is that our lifestyles are possible because our governments use violence to assure access to the cheap resources and cheap labor that makes our nations prosperous. While some may deny this reality, that does not change the actual modern realities of our economic and military systems. A is A, it is not B nor is it C. Imperial despotism is imperial despotism, even if we dress it up with flowery language. All the lipstick in

the world will not improve that pig nor change its essential nature.

Write this design decision into your plan –

I will stop killing poor people in poor countries with my lifestyle.

That is the beginning of learning to care for people.

Care for the Future

In many permaculture teaching lineages, the wording of the third ethic abandons the formulation "Care of" and speaks instead of sharing surplus and accepting limits. I do not disagree that the third ethic is about surplus and limits. I agree with others in the movement who formulate the third ethic positively as "Care for the Future," with an explanation that this requires understanding that there are limits and surplus should circulate for the benefit of the community.

The question is not whether the present lifestyle of peoples in the developed world will be limited or not. "Non-limitation" is not an option. Either we will voluntarily limit our consumption or our consumption will be constrained by our future circumstances. A much better plan is to conserve and curb your consumption in advance of the constraint of our circumstances.

I think that in permaculture there is an aspect of "Caring for the Past."

We have to look backwards as much as we look forwards, in part to conserve the good things our ancestors bequeathed to us, and to understand the mistakes and problems our ancestors gave to us. Those who do not learn the mistakes of history will repeat them.

Distributive Justice.

Distributive justice is an integral aspect of the third ethic of permaculture. If we want a sustainable society, there must be justice in the distribution of the goods of the earth. If a permaculturist looks at a given community or nation or civilization, and sees people deprived of a sufficiency of food, water, shelter, while others live indulgent, privileged lives, while natural systems that support the people are in decline, we see design problems resulting in social, ecological, and environmental injustice. Some people have too much. Others have too little. Not enough surplus circulates to care for people and care for the planet. Here in a nutshell, is our problem:

World Distribution of Income

Richest 20% controls
82.7% of world income.

Second 20% controls
11.7% of world income.

Third 20% controls
2.3% of world income.

Fourth 20% controls
1.9% of world income.

Fifth 20th% controls
1.4% of world income.

So its 82.7% for 20%, and 17.3% for 80%. Even worse, 60% of the world's population only receives 5.6% of world income.

It is politically fashionable to blame the poor for their own situation. And of course, in any particular situation there can be a complex series of factors and issues that combine to drive poverty. Those who advance the "poor people are personally irresponsible and bring their problems on themselves" propaganda don't see all the realities of our modern systems.

We in the United States are part of the top 20%. We work hard and we work smart. We use our economic and military power to ensure that a steady stream of resources from throughout the world flows into our economic systems, thereby provisioning our gluttony and consumption. \

Because we (and our allies in the other developed countries)take so much, and use our military and economic power to suppress the economic opportunities of

others, 80% of the world's population only receive 17.3% of the world's income.

One example of this process at work was the recent energy crisis, which drove food riots in poor countries. Food costs rose due to the increased price of energy and the diversion of food grains to biofuel enterprises. People elsewhere went hungry so that we in the United States could shave a few cents off the price of a gallon of gasoline by burning corn for fuel instead of making it available as food.

Note that this isn't a claim that any particular system "should" be politically enacted to redress this situation. Instead, it is an observation that systems that breed poverty and centralize wealth are defective at the systemic level. Better design will produce better results.

Lest there be any confusion: the system of politics and economics throughout the world, including the United States, is defective at the systemic level because it does not care for people, it does not care for the planet, nor does it have a care for the future. The income distribution chart in this chapter is only the beginning of those sorrows.

A second clarification is that "circulation of surplus" can happen by different methods. It can be shared via gift or grant, by investment, by starting an enterprise and hiring workers, by making deposits in a credit union that makes loans in the local economy, by buying shares of stock, etc. The methods don't really matter as long as surplus circulates in the community and does not concentrate.

Some may say, "Well, the rich invest their money, so isn't that the circulating of surplus?" The short answer is "No." Because of systemic design defects, wealth is centralizing. This is unnatural and contrary to the common good. Wealth concentrates at the top in the present system because that is how we designed our system to work.

The problem of greed

Caring for the future with limits on personal and communal behaviors and distributive justice suggests that human beings should not grab all the available resources for ourselves. We are not the only creatures on the planet, and there should be room for all of Creation. If the existential purpose of human beings is to turn the planet into a giant landfill, poison the waters and atmosphere, and kill off all other living creatures, we should get a better existential purpose, quickly. If we think we can get by without our fellow creatures of the air, land, water, and soil, we are delusional.

All economic activity has its roots in nature. A surplus of agricultural production makes the division of labor possible. Without agricultural production, no economic activity is possible. Our **systemic economic problems worldwide derive from our exploitation and degradation of nature.**

If we change our thinking so that there is room for all, this must inevitably have an impact on our actions, the way we live. Informing the ethics of permaculture is the "Life Ethic" which teaches us that all creatures are not just means to our ends. They are ends in and of themselves. While **they have instrumental value to each other and to human beings, they also have intrinsic worth.**

The choice to be made.

We aren't born with our ethics. We don't always give a lot of thought to how we get our ethics. With permaculture design, we have an opportunity to make ethical decisions that will echo down the corridors of our personal time lines as living beings and well into the future of our descendants.

It is a choice of life or death.

Permaculture design gives us tools, informed by ethical concepts, to direct our actions. As we become willing to accept our ethical responsibilities, we voluntarily choose to care for the earth, care for people, and care for the future through

acceptance of boundaries and limits in our lives so that there can be justice in the distribution of surplus. Thus it comes to pass that our lives fill with beauty, enjoyment, wisdom, security, and cooperation – while work, consumption, conflict, danger, and waste dwindle.

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00221 Permaculture principles

Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius - and a lot of courage - to move in the opposite direction. -- *E.F. Schumacher*

Permaculture is a holistic discipline that provides tools to design more sustainable human lifestyles and systems that incorporate the three permaculture ethics:

– Care for people.

– Care for the planet.

– Care for the future through the acceptance of voluntary limits and fair distribution of surplus

(See 00211 Ethics for a more in depth examination of the ethics of permaculture.)

These three ethics inform all of our permaculture design work. Taken together, they offer a secular ethical framework that transcends the traditional divisions/categories of human organization.

Permaculture has universal applicability. It works for people in cities and for people in rural areas and all points in between. It is useful for people with acreages, small city lots, or who live in high-rise apartments.

This is not a top-down enterprise. It can't be imposed by the government or an international bureaucracy. It can only grow from the ground up, in ways that mimic the natural creation.

A pasture does not transform itself to a mature forest overnight – that transformation does not occur in one grand revolutionary change. By a process of natural succession, a prairie can evolve into a forest and then evolve back to a prairie. Each change is part of a process that grows organically from the previous and is a response to the ever-changing aspects of the biosphere that are larger than any given place.

Rational and Objective, Artistic and Intuitive

Permaculture is rational. It involves all that we know about all that is. It begins with long and thoughtful observation. We take our knowledge and observations and work out plans to live more in accordance with the permaculture ethics.

It is also intuitive and artistic, in that since there is so much we don't know, the application of permaculture in real life inevitably involves judgment calls in which intuition plays a role.

Permaculture teaching is a decentralized system.

Permaculture does not have a pope. It is a decentralized system of grassroots education that continues to evolve as the planetary situation develops. It originates in the work of Bill Mollison and David Holmgren. The movement is very loosely organized around a series of permaculture teaching lineages that mostly derive from people trained by Mollison in the late 1970s and early 1980s who went on to develop and train other permaculture teachers.

The iPermie permaculture lineage comes through my teacher, Dan Hemenway, who was one of the first practitioners authorized to offer permaculture training in North America by Bill Mollison. I have been influenced by the work of permaculturist and polymath Vinay Gupta of the UK. This formal training is an overlay on me, Bobby Max Waldrop –

who comes to permaculture as a redneck from the Red River region of southwest Oklahoma, a man with an education, an attitude, and an internet connection.

Permaculture is a human cultural artifact.

It derives from our observations of nature and our perceptions and understanding of the history of our species. It attempts to describe natural processes in human terms. I say "attempt" because anything we can formulate verbally about natural processes will be inherently incomplete.

The plan is that as we learn how the natural systems work, or perhaps rather, "how the systems appear to work from our viewing platforms," we will make intelligent, conscious interventions that will bring to fruition a beneficial future consistent with the permaculture ethics.

Permaculture and music theory.

So as it turns out, permaculture is like music theory, which is a set of principles derived from observations of what constitutes "beautiful music" in various cultures. There is no original Board of Musical Theory that developed the rules about part writing and parallel fifths and etc. that we learn about when we study music. In other words, first we sang and then we attempted an explanation of why what we sang sounded beautiful. That explanation is what we know as music theory.

We study music theory because it works.

I began piano lessons at age six in 1958. I didn't actually study much music theory beyond the basics until 1994, when I enrolled at Oklahoma City University's school of music. After studying musical theory, I became a much better musician, because I understood more about why the music that I thought was beautiful sounded the way that it did. I learned of its characteristics, structure, acoustics, dynamics, forms, and much more. I learned enough to know that the rules of music theory while normative, are not absolutes. There can be discernment in making exceptions to the normative rules of music theory.

In 1994, I was already a musician. I had been playing the piano for 36 years and the organ for 32 years. Through the study of musical theory, I was able to take those years of experience and understand them as newly as if I had been given a different set of ears and eyes. I remember my theory teacher, Professor Payne, telling us that music theory would change the way we listen to music forever and that if we didn't want that, we should get out of the class immediately. In other words, if a student was truly satisfied with his or her previous "listening" to music, they might be upset when music theory turns that upside down and gives them an entirely new way to hear and understand music.

Permaculture and "sustainable living."

When I came to the formal study of permaculture in 2005, I already had 30 years of experience in trying to live a more simple, sustainable, and frugal life. In 1975 I bought my first issue of Mother Earth News, browsed the Whole Earth Catalog and started reading Co-Evolution Quarterly. I bought a hand crank grain mill at a flea market early in the 1980s and used it to grind grain to make flour to bake bread. Dumpster diving, organic gardening, alternative energies . . . poverty gave me opportunities to learn more about frugal and alternative living.

I was lucky that I had friends who knew about being poor and they taught me what they knew. So I learned how to make sourdough bread, because I didn't have any money to buy yeast. It was a learning and friendship community of mutual support and care.

When I came to the formal study of permaculture, I found tools and concepts that helped me take my life's experiences to a new level, going forward as a matter of conscious design. Hit or miss is a fine thing, as long as there is excess money

and time and resources to make up for all the misses. As the money, time, and resources dwindle, however, it becomes ever more important to look before you leap, to think before you act, and to learn patience.

To take this back to permaculture –

– We observed what worked in nature.

– We observed how humanity harmed the ecology.

From these observations and much work, we developed permaculture design to explain how we could --

– avoid further harm,

– heal existing harm, and

– take us forward into a future that would not include a catastrophic die-off of the human race and the consequent devastation to the planetary environment.

We study permaculture because it works.

Whatever experience in simple, frugal, and sustainable living that people bring to their permaculture learning community will be enhanced and strengthened and enriched by what they learn here about permaculture design.

Permaculture Principles:

We should first ask – why do we need or want a list of permaculture principles?

We are human beings.

We like to categorize things.

We like to make lists of things we have categorized.

Permaculture principles **help us study and evaluate our observations of reality and facilitate making good design decisions.**

In other words, if we categorize principles, make lists and study them, everyone does not have to reinvent the wheel when it comes to turning our observations into designs.

A list is never a complete expression of reality. It's like a map in that regard. Lists can be helpful for us as long as we always remember their inherent limitations.

Below you will find four different lists of permaculture principles. The number of principles in these lists ranges from three to 34. None of these lists are necessarily "the list." No one carved them in granite and brought them down from a mountaintop. Because there isn't a permaculture pope, and there are different teaching styles and emphases, not everybody gives the same list of principles, strategies, and techniques, although all such lists are similar.

One person may say X is a principle, while another teacher will call it a strategy, and a third will speak of something else. Our human categories don't necessarily fit exactly onto natural processes. Nature is not organized into neat and discrete little boxes.

So there's a certain messiness our categories and lists. Life is that way. Since permaculture derives from life, you'll find some of that life messiness in permaculture too.

As a matter of practical design work, we use our lists of permaculture ethics, principles, strategies, techniques, tools, and tactics **to turn our observations and evaluations into concrete plans for action** and implementation to meet our goals in ways that are consistent with the permaculture ethics.

Permaculture principles help us solve problems.

Scott Pittman's List

Scott Pittman is one of the first generation of permaculture teachers in the United States and is the founder of the Permaculture Institute in New Mexico. He has the most succinct list, identifying three fundamental permaculture principles:

– Everything connects to everything else (the holistic principle).

– Many elements support every function. (principle of redundancy).

– Every element should serve many functions (principle of stacked functions).

Dan Hemenway's List

Dan Hemenway is another one of the first generation of permaculture teachers in the United States. He describes four disciplines and 12 principles of permaculture in his article "Living Lovingly," which was originally published in 1982 in the International Permaculture Species Yearbook. After 20 years of further work and reflection, he revised it considerably and published it online at http://www.barkingfrogspermaculture.org/livinglovingly.pdf. (The list that follows is his. The commentary here is mine.)

Disciplines

– *Observe.*
Long and thoughtful observation is the beginning (and the continuation and integral to the implementation) of permaculture design. We must know the place where we begin, and the place we want to go, so we can make good design decisions on how to get there.

– *Trust yourself.*
We live in an era which exalts the "expert" and devalues the individual person. Yet, all too often experts speak as the voice of powerful interests who seek to preserve the Excess Consumption System Design patterns that destroy the earth and disempower human communities. An "expert" at most is an information resource, never an "authority." You are the primary authority on your own life.

– *Respect and honor every being and situation as a unique part of Creation.*
The Excess Consumption System Design pattern values people only for their ability to consume and ranks things on their consumable value to human beings. Permaculture honors everyone as unique persons and all things and creatures as unique aspects of creation.

– *See everything as part of a whole.*
The default design of the world assigns everything and everyone to a category and gives meaning to people and things only insofar as they fit into a neat category. The real world is a whole system, however, everything works together. Permaculture seeks to develop designs that mimic nature, including its ability to work together.

Principles

As we evaluate our observations, and make our design decisions, we do so in accordance with principles like these.

If it isn't broken, don't fix it. Do only what is necessary. Conserve.
We never do anything just for the sake of doing something or to appear busy. We do things – make changes in the way we live -- only after a design process which identifies what is necessary and then designs the minimum way to get there. In other words, if it isn't broken, don't fix it. If something breaks, be smart in your fixing.

Many hands make light work. Never do anything for only one reason (stack functions)
This is a principle of energy conservation. The Permaculture Design Manual refers to this as "stacking functions." It's about doing more with less.

Don't put all your eggs in one basket. Be redundant. Meet needs in multiple ways.
If something is important, like fertility, backup systems are necessary. In my garden I apply compost, I mulch, I sometimes use compost teas, and I plant nitrogen fixing plants.

Don't bite off more than you can chew. Design, and act, on an appropriate scale.
Actions and systems should be

appropriate to the scale of the situation. We wouldn't build a large nuclear reactor to provide electrical power to an isolated home.

A well-beaten path does not always mark the right road. Work with edges.
Human settlements love to cluster at edges and boundaries – alongside rivers, on the coasts, in valleys in the mountains, at places where two or more ecosystems meld together. Edges are places where energies and goods transfer

Beauty is in the eye of the beholder. Everything (almost) potentially has value to something/someone else.
In a forest, the waste of one element is food for another. The surplus of one is the necessary of another. This works according to its own rhythms without the intervention of a gardener. I suppose that there are some exceptions to this, like the neutron bomb. There aren't many.

No one is an island. Everything needs something else.
None of the elements of biological nature – people, birds, animals, worms, plants – can exist in isolation. All living beings are part of intricate communities of support, care, and challenge.

Variety is the spice of life. Promote and preserve diversity.
In permaculture, diversity refers to the beneficial connections that characterize a system, not a mere numerical diversity.

One thing leads to another. No condition, action, or inaction is without consequence.
You can never do just one thing (or just one inaction). You can try. You will fail. As pebbles in a pond set up a pattern of outgoing waves, so do the actions and inactions of your life have impacts for beyond what you can see or even understand.

The apple doesn't fall far from the tree. Energy follows the pattern.
A pattern is a guide. If you want to make a dress, you use a dress pattern. You don't use a pattern for a shoe or a hat. In permaculture, we look for the patterns that produce the circumstances that need to change. Then we consider how to change the patterns to get different results.

What goes around comes around. Everything works both ways.
A window that lets light in will let heat out. It lets heat in, depending on the season. Thus, we must always be wary of consequences, intended or unintended.

Love will find a way. It is the harmony between giving and receiving.
What goes around, always comes around. We can't receive if we don't give. If we give, we must receive. It's the way things are structured.

David Holmgren's List

David Holmgren is one of the cofounders of permaculture design. In his book, Permaculture: Principles and Pathways Beyond Sustainability, Holmgren identifies 12 principles:

1. Observe and interact.
2. Catch and store energy.
3. Obtain a yield.
4. Apply self regulation and accept feedback.
5. Use and value renewable resources and services.
6. Produce no waste.
7. Design from patterns to details.
8. Integrate rather than segregate.
9. Use small and slow solutions.
10. Use and value diversity.
11. Use edges and value the marginal.
12. Creatively use and respond to change.

Bill Mollison's List

His is the longest list of them all, compiled from the Permaculture Design Manual. He says that these are "universally applicable guidelines" to be used in design.

1. Relative Location: Components placed in a system are viewed relatively, not in isolation.

2. Functional Relationship between components: Everything is connected to everything else.

3. Recognize functional relationships between elements: Every function is supported by many elements.

4. Redundancy: Good design ensures that all important functions can withstand the failure of one or more element. Design backups.

5. Every element is supported by many functions: Each element we include is a system, chosen and placed so that it performs as many functions as possible.

6. Local Focus: "Think globally - Act locally" Grow your own food, cooperate with neighbors. Community efficiency not self-sufficiency.

7. Diversity: As a general rule, as sustainable systems mature they become increasingly diverse in both space and time. What is important is the complexity of the functional relationships that exist between elements not the number of elements.

8. Use Biological Resources: We know living things reproduce and build up their availability over time, assisted by their interaction with other compatible elements. Use and reserve biological intelligence.

9. One Calorie In/One Calorie Out: Do not consume or export more biomass than carbon fixed by the solar budget.

10. Stocking: Finding the balance of various elements to keep one from overpowering another over time. How much of an element needs to be produced in order to fulfill the need of whole system?

11. Stacking: Multilevel functions for any single element (stacking functions). Multilevel garden design, i.e., trellising, forest garden, vines, ground covers, etc.

12. Succession: Recognize that certain elements prepare the way for systems to support other elements in the future, i.e., succession planting.

13. Use Onsite Resources: Determine what resources are available and entering the system on their own and maximize their use.

14. Edge Effect: Ecotones are the most diverse and fertile area in a system. Two ecosystems come together to form a third which has more diversity than either of the other two, i.e., edges of ponds, forests, meadows, currents etc.

15. Energy Recycling: Yields from system designed to supply onsite needs and/or needs of a local region.

16. Small Scale: Intensive Systems start small and create a system that is manageable and produces a high yield.

17. Make Least Change for the Greatest Effect: The less change that is generated, the less embedded energy is used to endow the system.

18. Planting Strategy: 1st-natives, 2nd-proven exotics, 3rd – unproven exotics - carefully on small scale with lots of observation.

19. Work Within Nature: Aiding the natural cycles results in higher yields and less work. A little support goes a long way.

20. Appropriate Technology: The same principles apply to cooking, lighting, transportation, heating, sewage treatment, water and other utilities.

21. Law of Return: Whatever we take, we must return Every object must responsibly provide for its replacement.

22. Stress and Harmony: Stress here may be defined as either prevention of natural function, or of forced function. Harmony may be defined as the integration of chosen and natural functions, and the easy supply of essential needs.

23. The Problem is the solution: We are the problem, we are the solution. Turn constraints into resources. Mistakes are tools for learning.

24. The yield of a system is theoretically unlimited: The only limit on the number of uses of a resource possible is the limit of information and imagination of designer.

25. Dispersal of Yield Over Time: Principal of seven generations. We can use energy to construct these systems, providing that in their lifetime, they store or conserve more energy that we use to construct them or to maintain them.

26. A Policy of Responsibility (to relinquish power): The role of successful design is to create a self-managed system.

27. Principle of Disorder: Order and harmony produce energy for other uses. Disorder consumes energy to no useful end. Tidiness is maintained disorder. Chaos has form but is not predictable. The amplification of small fluctuations.

28. Entropy: In complex systems, disorder is an increasing result. Entropy and life-force are a stable pair that maintain the universe to infinity.

29. Metastability: For a complex system to remain stable, there must be small pockets of disorder.

30. Entelechy: Principal of genetic intelligence. I.e., The rose has thorns to protect itself.

31. Observation: Protracted & thoughtful observation rather than protracted and thoughtless labor.

32. We are surrounded by insurmountable opportunities.

33. Wait one year: (See #31, above)

34. Hold water and fertility as high (in elevation) on the landscape as possible. It's all downhill from there.

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00231 Design Concepts for Permaculture

We are at a critical threshold in the psycho-social development of our species.
All of us have already started changing and have wondered about what to do next;
how to dare to do it; and how to find allies and resources to help us. Further
sustainable change will be achieved not through mega-projects, but by each
of us individually and in small mutually supportive and collaborative groups,
taking small, meaningful, locally-relevant actions, and by sharing the processes
involved making them contagious; and by publicly celebrating the outcomes.
I can do this. I want to do this. I will do this. *Dr. Stuart Hill*

This chapter describes seven important design concepts used in permaculture. Now is a good time to have a permaculture learning community since you can discuss this with the group and apply your united brainpower toward understanding their relevance to design work. Some permaculture concepts simply take time and experience to understand in their totality.

First, a quick review:

Five steps to the design process:
--Observe,
-- Study and Evaluate,
-- Design,
-- Implement

Four aspects of design

-- Techniques,
-- Strategies,
-- Materials,
-- Assemblies

Four components of design:

Site (your life and its geographies),
Energy,
Abstract,
Social

Now we meet **seven important design concepts:**

– Self-regulation
– Sources of work and pollution
– Resources as energy storages
– Entropy
– Chaos and disorder
-- Succession
-- Guilds

Self-Regulation

Mollison describes a Principle of Self-Regulation:

> The purpose of a functional and self-regulating design is to place elements or components in such a way that each serves the needs, and accepts the products, of other elements.

Think of a forest or a prairie.

No one turns on a sprinkler to water the trees in a forest. No one mows the grass in a prairie. There is no gardener to scatter

mulch and plant green manures. These natural ecosystems work by themselves, for themselves, as self-regulating and balancing feedback systems.

"Sustainable" means that a system provides for its own needs and contributes to the needs of others in the context and community in which you live. You are not an island; you are dependent on others, and others are dependent upon you.

In a self-regulating system, there is a just sharing of resources that works over time. We know it works because the forest and the prairie continue in their existence.

In human terms, we speak of distributing surplus or distributive justice.

If you produce a surplus within your lifestyle – more resources than what you need for life – you can make resources available to your community to support the community's needs which in turn support you in a collection of interdependent relationships.

You cannot make it through life on your own, by yourself. You need a community. Your community would be decreased and not as fruitful without you. The structures for this kind of sharing are contingent upon the context – that is, they will vary based on the unique circumstances of each situation on the ground.

"Sharing resources" refers to any method of moving resources around. It can include paying and receiving wages, making and receiving investments, depositing money in accounts that is then lent in the community, buying shares in a cooperative or enterprise, or making outright donations and gifts to others.

Don't delude yourself into thinking that this is easy or quick because it isn't easy and it isn't quick. How long did it take that forest to get where it is today? It didn't happen in a week or two. Forests and prairies think in decades and centuries.

When we apply this concept in **rural and peri-urban permaculture –**

-- Instead of importing fertility and water for the garden, you compost organic materials and harvest rainwater. Activities of the local system provide fertility (mulch, compost, cover crops, green manures, animal husbandry, etc.)

-- When products of elements on the site supply other elements on the site, and each has its needs supplied by other onsite elements, surplus circulates and cares for people and the planet's ecologies.

When we apply this concept in an **urban or college lifestyle context –**

-- The various activities of your life, household, and community interact in ways that incorporate many beneficial connections of interdependency.

-- The various elements of the lifestyles and actions of members, associations, and structures of your community supply the needs of the community.

For example – maybe you get food from a farmers' market, CSA, or food coop that accepts contributions from you of your compostable organic materials. You pay for your food with a combination of labor and money.

Thus it comes to pass that surplus circulates through such a system and meets the needs of people and the area's ecologies. A system like this is sustainable over time.

This is not necessarily a system limited to a local geographical area. In the modern era, systems like this may be large.

The fact that such systems are difficult to reproduce by human intervention with our present knowledge and experience does not change the goal. While for now it is

always an error to speak of "sustainable human systems," we can legitimately work toward a state of being "more sustainable," or "more self-regulating."

As we will see, succession is an important aspect of this process.

The Sources of Work and Pollution

When the various activities of your life, household, and community--

– do not interact in ways that incorporate beneficial connections of interdependency,

– so that the different elements of your lifestyle and the members/associations/structures of your community do not supply the various needs of the community,

– you are stuck in a system that generates waste and causes unnecessary work. That costs all concerned time, energy, money, and resources.

In such a system, there won't be any surplus to distribute. The community depends upon inputs from outside (subsidies) to keep going.

That's how we create work and pollution.

Pollution equals resources that we aren't using well.

If we don't use them well, we waste them. Mollison wrote in the Design Manual –

> A POLLUTANT is an output of any system component that is not being used productively by any other component of the system. EXTRA WORK is the result of an input not automatically provided by another component of the system.

When there aren't enough resources cycling through the community so that the community is not able to support all of its members, you get unnecessary work and pollution and dependence upon outside resources.

This dependency, work, and waste costs energy of all kinds – human, fossil fuel, alternative, etc.

Permaculture design allows you to avoid pollution and unnecessary work. Our goal is a system that minimizes pollution and work for your life. Permaculture will help you –

– Minimize work and maximize cooperation;

– Minimize consumption and maximize beauty;

– Minimize waste and maximize enjoyment;

-- minimize danger and maximize security;

– Minimize conflict and maximize wisdom.

We aren't afraid of work. Work is healthy. We don't want work for the sake of work. We especially **don't want unnecessary work.**

Our goal is not a dingy-gray lifestyle of endless drudgery in service of some unobtainable Ideal. **Leisure time is good.** Most of us need more of it and we work too hard, not by choice, but by necessity. Why is this true?

Because that's the way we design our systems to work! We –

– maximize work,

– maximize competition,

-- maximize danger,

– maximize consumption, and

– maximize waste as a matter of system design.

Our goal is to do better – to learn to design to minimize the problems and maximize the benefits.

Note that throughout these discussions, "community" may be a geographic neighborhood, or it may be a community

based on some other structure (an invisible structure like an enterprise, a cooperative, a religion, an eco-village, etc.)

Resources as Energy Storages

How is it that our forests or prairies can do what they do without the support of outside intervention by gardeners and farmers? The answer in part is –

– every element serves more than one function,

– many elements serve every important function, and,

– every element stores energy.

Forests have energy storages:

– A tree is many things. One of them is "energy storage." Its leaves fall, compost on the floor, and provide nutrients (energy) to other living things. When the tree dies, it falls onto the floor of the forest, many things eat the stored energy of its wood and roots.

– Herbs use deep taproots to bring up nutrients (energy) from the subsoil, store them in leaves and branches, and feed browsing animals as they nibble on their growth.

– The browsing animals (herbivores) are energy storages for the carnivores, and also for worms and other micro flora and micro fauna that feed on decaying carcasses.

Think of the resources of your life and community as forms of energy storage.

In traditional rural and peri-urban permaculture, we identify these kinds of elements as storages –

– water in a pond or barrel,

– compost in a pile,

– food in a pantry,

– hay in a barn.

– Etc.

In the urban context, energy storages include –

– Networks of mutual support and trade with farmers and local artisans that supply the community,

– Home food and water storage,

– Savings and investments

– Community structures that support resilience in the face of community challenge

Of course, these urban storages also work in rural areas, and the rural area examples work in cities too except that there are not many hay barns downtown.

Permaculture designs systems that increase energy storages in a system.

Entropy and Affinity.

Entropy wants to –

– empty the barrel,

– scatter the hay,

– spoil the food,

– disrupt the network,

– destroy community structures.

We harness the energy of entropy with our design work that encourages **affinity** so that –

– we don't scatter the hay,

– we don't spoil the food,

– we only empty the barrel by our intention

– we strengthen the local food and artisan networks,

– we preserve home food and water storage, and

– we strengthen and expand our community structures.

Good design creates storages that meet the needs of people as well as other biological elements in the community, whether that be –

– crops,

– trees,

– animals,

– insects,

– birds

– associations

– networks

– structures

The more diverse the community, the more stable the lifestyle and community become. Permaculture diversity is not simply a matter of the multiplication of individual elements. We want to maximize the beneficial connections between the various elements in a system.

Chaos and Disorder

If we add resources into a system beyond its ability to manage those resources, chaos and disorder result. That's not good for all concerned. Disorder is the opposite of harmony, and inevitably causes waste.

Entropy constantly drains away the resources you have available. It does this by pouring them down sinks. In permaculture terms, a sink is a place where a resource disappears.

Sometimes a sink is a sink – when you run water in your kitchen sink, it goes down the drain and into your city's sewer system and it is no longer useful or available to you.

Sometimes **a sink is a system** – the Pentagon's budget consumes hundreds of billions of dollars and produces no useful products.

For design, this means:

-- Only incorporate resources and energy that can be **productively used** in that system, and

-- Build harmony and cooperation into the workings of the system(s) so that elements **use the products of their neighbors** and provide useful services/products to their neighbors.

Succession.

First things first. Second things second. If you want to build a house, you start with the foundation, not the roof. If you want a food forest, you don't plant trees "first thing." First you improve the fertility of the soil with nitrogen fixing, beneficial insect attracting, and nutrient accumulator plants. After working on this for about a year or so, plant a tree. Succession can be easily observed in nature and if we harness its power in our designs, we will have better results. 00371 discusses this concept in more detail.

Guilds in Permaculture

A gathering of mutually beneficial plants, systems, communities, etc. is referred to in permaculture as a guild. To date most research and work with guilds has been biological. In my garden, I plant a tomato guild consisting of these plants:

> tomatoes (multiple varieties), hot peppers (multiple varieties), asparagus, basil, mints.

Guilds however not only work with gardens, they can also work with invisible structures. In fact, the word "guild" derives from medieval organizations in Europe that provided protective safety net services, employment, and work training to their members. Modern unions and fraternal organizations are direct descendants of the medieval guilds.

Summary

Self-regulation. We like it. We want more of it. Getting there is difficult and takes time.

Sources of work and pollution. Bad design is the source of work and pollution. We always try to design to eliminate unnecessary work and pollution.

Resources as energy storages. We like them and we want and need more of them.

Entropy. This is everywhere and we counter it with **affinity**.

Chaos and disorder. Look for sinks and eliminate or regulate them. Only bring in that which can be actually used. Harmony and cooperation help.

Succession. One thing always leads to another. Since this is a tendency of things in general, use it in your design work to make your life and work easier.

Guilds. We like 'em and need more research to develop best practices for guilds, both biological and cultural/invisible structures.

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00241 Patterns in Permaculture

Because we have not made our lives to fit our places, the forests are ruined, the fields eroded, the streams polluted, the mountains overturned. *Wendell Berry*

Understanding patterns is critical to learning permaculture design. This is a bit of an issue for most of us since we don't often consciously think about reality as a series of patterns.

Many of us see reality as a series of apparently random events, one thing following another, without any actual apparent causes linking them. Stuff just happens, we think. Sometimes it's good stuff. Yee haw! Sometimes it's bad stuff. Too bad, so sad.

The problem with the Apparently Random Causation model is that whatever it is, it ain't reality. **Our realities derive from the interactions of patterns** – behaviors, systems, genetic codes -- the **components of reality list is long and complex**. Every thing that happens arises from previous causes, including things that really do seem random and out-of-nowhere.

One thing always leads to another. Or, you cannot do just one thing.

Differences may create stress. If too much wealth accumulates in one group in society, stress builds up and eventually people revolt and scatter (decentralize) the wealth. That pattern sets another series of events into motion, which in turn continues in waves to set other things in motion. Mollison says:

> There are no new orders of events, just a discovery of existing events. Every event we can detect is a result of a preceding event, and gives rise to subsequent events.

We should call that the Permaculture Principle of Causality.

We can't let the Excess Consumption System's Apparently Random Causation model continue to initiate problems in our lives so now is the time to learn about the reality of patterns.

Speaking of learning something new – how do we learn something new? One learning technique is to practice. The first time I attempted to play a C major scale on the piano, using the correct fingerings, it was slow and most clumsy.

It would have been easy to just give that up. I didn't do that. I practiced the C major scale. The more I practiced it, the better I became at it. The notes sounded easier and more fluid. Now I can play a four-octave C major scale with both hands with my eyes closed, at a rapid tempo. In fact, I can play through all of the major scales either chromatically or via the Circle of 5ths. That's the virtue of musical practice at work.

This same principle holds true for learning about patterns and everything else in permaculture design. Long and thoughtful observation is a necessary prerequisite for permaculture design. Looking for patterns is an essential aspect of observation.

This may seem complex at first but by the time you have –

– read it a dozen times,

– discussed it for a few hours with your permaculture learning community,

– spent some time looking for patterns in your life, and in the natural surroundings of your life

– patterns will become more understandable and their practical applications easier to manage and design.

In other words. . . Don't worry! Be happy! Save yourself and your planet! Learn about patterns in permaculture!

The difference between pattern and design.

There is a difference between pattern and design. One example used by my permaculture teacher Dan Hemenway is the human hand.

You have four fingers and a thumb on each hand. The fingers have a pattern -- three bones connecting and they open inward. The fingers have different lengths, though, and the thumb joint is aligned with the knuckles. The way those patterns interact is design for specific functions. The pattern is not the design, and the design is not the pattern. While pattern and design are two different things, they obviously work together "hand in hand."

Patterns in Permaculture Design

Patterns are everywhere.

Everything in nature follows patterns and so does our world of technology, work, and supply. Think about the basic design pattern that these three – apparently separate and unrelated – systems share:

– a river system and its tributaries,

– the human body's circulatory system,

– a system of gathering supplies and resources to supply manufacturing plants connected to distribution systems for the end products.

Patterns result when **events set in motion the evolution of forms.**

We could refer to this as "The General Pattern model of Events."

Drop a pebble in a pool of water, and a series of concentric waves move out from the center point of impact. In this spirit, in the Design Manual Mollison identifies eight patterns in nature that replicate in human actions and structures. These are important because we observe them everywhere in nature. Their ubiquity suggests that they would be useful for permaculture design:

Waves. We see these on waters, and in solid forms as sand dunes and sandstone. Watch the patterns exhibited by large crowds of people moving into or out of a space.

Streamlines. Visualize the currents in flowing rivers and streams, often signaled by lines of foam on the water. Look at traffic on a freeway at rush hour.

Cloud forms. Look at the clouds in the air, and look at the shape of trees and cotton candy.

Spirals. These are everywhere. The galaxy, flowers, whirlpools, cities.

Lobes. Mushrooms and reefs. Watches and cell phones. Rounded stones by a river.

Branches. Rivers. Highway systems.

Scatters. Islands. Lichens on rocks. Farmsteads. Clumps of trees on prairies. People focused on laptops in parks. Clumps of people in a large plaza or park.

Networks. Honeycombs. The internet. Cell phone systems.

Landscapes and cityscapes are **patterns of patterns.**

When patterns intersect with each other – like pieces of a jigsaw puzzle – we call this **tessellation.** Cities within a metropolitan area are examples of tessellation. You could cut the map apart along the boundaries of the cities and put it back together like a jigsaw puzzle using those same boundary lines because the

city boundary lines tessellate with each other.

When patterns nestle within each other – like bowls stacked on a shelf, one inside the other – we call this **annidation.** Your city, county, state, and federal governments are examples of structural annidation. The national government incorporates all of the state governments, which in turn incorporate county governments, who in turn incorporate city and town governments. It's not completely uniform, of course. Cities cross county and metropolitan areas cross state boundaries all the time. It's a close enough analogy for our purposes.

When patterns lay over each other – such as a flower petal pattern – we call this **superimposition.** The various requirements and demands of government on an individual or household are examples of superimposition. I am subject to the property maintenance code of Oklahoma City, the taxing authorities of the county public health department, library, local school system, City of Oklahoma City, state of Oklahoma, and the federal Internal Revenue Service.

Patterns in motion.

Since nothing in nature (or in the built environment) stays where you put it, patterns show motion and thus exhibit expansion and contraction.

Waves are an example of expansion patterns.

Nets (visualize the patterns created by drying a wet solid) are examples of contraction patterns.

All of the expansion and contraction patterns incorporate fuzzy edges, which produce edge harmonics. "Harmonics" refers to healthy interactions between elements in a system.

A wave of immigration expands the population of a given geography.

This transforms an area from an ethnic monoculture to a multiethnic system.

If the immigrants mostly settle in ethnic enclaves, the immigrants tessellate with the native population.

If the immigrants mostly integrate into the existing population, without forming their own neighborhoods, the immigration wave is an example of annidation, the nestling of the immigrants within the original population.

If the immigration was a military conquest, with the new group ruling over the original inhabitants, that's an example of superimposition.

Relationships of the groups may be positive or negative.

The increased diversity could become a fertile ground of diverse beneficial connections weaving the different cultures together in a mutually self-supporting system.

If the groups are antagonistic to each other, the migration process could create conflict and competition for resources.

Positive outcomes are more likely if there are appropriate structures of translation and trade (discussed below). These allow differences to become productive connections.

If there are no translation and trade structures, negative outcomes are more likely.

Energy Follows the Pattern

Patterns give shape and definition to situations and systems.

Energy always follows the patterns laid out for it.

Rushing water will course down a hill following a predetermined pattern (which we refer to as a "gully") until it flows into a creek, which in turn empties into a lake or ocean or joins up with a river. Thus the original energy from the top of a hill

(rain) finds its way, by predetermined patterns, to the sea. The energy of the rain followed the pattern of the gully and the creek and the river to a sink (the lake or the ocean).

We see these patterns at work in human systems. If you set up a corporation, your energy will develop a hierarchy, even if you are a rabid individualist anarchist – because the corporation is a hierarchal pattern.

As you begin to learn and practice design, give careful thought to the patterns that develop in your design.

Never attempt to use a bad pattern to produce a good end, because bad patterns won't produce good ends.

A pattern develops what the pattern is. If the pattern is "bad" (however we define "bad" in that context, whether it be wasteful, immoral, violent, or whatever), the end result will be a bad end. Nothing else can come of it, just as water rushing down a hill after a rain will follow no path other than the one that laid down for it. As water flows into the gully pattern, it will not magically reverse itself and flow gently uphill to water our flowers just because, you know, that's what we want. The pattern of the gully takes the water down the hill. That's the only result it will give.

In permaculture, we don't get what we want, **we get what we design.**

If we want to get what we want (and need), **we design to get what we want and need.**

If we don't design for that, **we won't get it.**

Desirable Patterns

The most desirable patterns are those that –

– stack functions,

– provide redundancy,

– offer many beneficial connections,

– use natural methods, featuring the biological, the small, and the slow,

– are conservative of all forms of stuff (resources, energy, money, etc.),

– are conservative in their demands on people,

– regenerate resources, systems, energies

Boundaries and their Importance in Design

Everything that exists has certain characteristics, one of which is a boundary that separates it from other things. For the human body, the boundary is both the skin and an invisible structure we know as "personal space," which varies from person to person (and culture to culture) in terms of its size in relation to its center, the person. These are the boundary conditions of the human person.

Boundaries are places where events happen.

A handshake occurs at the boundary of two human beings. Skin touches skin – personal space mingles together. There can be a lot riding on that simple handshake. It might seal an economic deal impacting thousands of people. It might be the beginning of a relationship that will result in two people falling in love and forming a new family. Sometimes a handshake is just a handshake, a perfunctory social amenity that we use when going through the motions. Sometimes a simple handshake can lead to great things.

A hug occurs at the boundary of two (or more) human beings. It involves more physical touching and more mingling of personal space. People who will shake hands may not be willing to hug. A hug

suggests more intimacy than some people will offer as a result of a casual meeting or to someone whom they do not know well.

Boundaries give meaning.

In any given situation, there will be different kinds and types of things and systems. The boundaries of a thing or situation or system help define what it is. In a workplace, for example, we might find:

– The building structure

– The building's location in a community.

– The site of your work in the building.

– The heating and cooling systems of the building.

– The human structures within the building.

– The patterns of authority and domination/subordination within the human structures.

– The impact of weather on the building and the work that goes on there.

– The impact of external invisible structures on the building and the work done there.

– Patterns of information flow within the workspaces of the building.

– The ages and sexes and conjugal arrangements of the people in the building.

– Etc.

Each of these things (referred to in permaculture as *elements*) and systems has a set of characteristics that identify it as what it is. That definition includes boundary conditions. Every boundary offers opportunities for intervention using permaculture design to grow a system --

– that creates little or no waste,

– that justly distributes surplus, and

– is sustainable over time.

Each place where these elements and conditions and systems intersect is rife with opportunities. Mollison identifies this as the Boundary/Edge Design Strategy:

> The creation of complex boundary conditions is a basic design strategy for creating spatial and temporal niches.

Bring together diverse items/situations/systems to create new spaces for goodness, beauty, wisdom, and sustainability to flourish.

Edging of Boundaries and their Reactions

Everyone is well-practiced in the art of boundary discrimination, whether or not we realize it as such.

Everyone knows what they like and they don't like and how to recognize what's what. We know the difference between a silk purse and a pig's ear.

People are well-acquainted with the potential of boundaries to cause problems. Consider the history of race relations. Or international relations between empires and states.

While boundary reactions are not always as extreme as those presented by race or war, in every situation where boundaries come into contact with each other, there is some reaction – for good, for ill, or for indifference.

Continuing to think in broad terms . . . there are two kinds of boundary interactions:

-- **Flows along boundaries**, where the boundaries don't actually cross each other but to a greater or lesser extent move along side by side, and

Flows across boundaries, which may have to penetrate defenses erected by the "other side."

Rain falls on your skin and flows off onto the ground. My skin is a defense of the inner body parts against the world. Injecting a medicine into my body involves penetrating my skin with a needle and puncturing a vein. The needle is a structure that penetrates that external defense so I can benefit from the medicine.

Or die of a lethal injection.

As a result, in nature and in human communities, boundaries are places that are fertile and productive. They are also rife with opportunities for problems and conflict:

– Boundaries can act as a **net or wall against which stuff can accumulate.**

– The boundary interaction may create **new spaces into which stuff accretes.**

– The supplies and components of two (or more) systems are **brought into contact with each other** at or close by the boundary.

– Boundaries may be fuzzy and variable (cf. personal space). In the space where they meet, the **intersection of boundaries can create something entirely new.**

Two atoms of hydrogen with one atom of oxygen meet at their boundaries and create one molecule of water, something new and completely different from the oxygen and hydrogen.

In design, we speak of the fertility of boundary areas as the **edge effect.**

It is one reason why cities and universities are such exciting places.

Many different kinds of people, structures, and media come into contact with each other in such geographies, creating a myriad of boundary zones/edges which are fertile and productive. Edge means that the participants experience more potential beauty and fertility and/or more potential conflict and competition. The design opportunities are:

-- How do we design with existing boundaries?

-- Do we need to make some new boundaries to increase the opportunities for edge effects?

--Do our existing or newly created boundaries need **crenellations**? These are indentations and their corresponding notches – think of the top of a castle wall or a jigsaw puzzle – which increase the boundary spaces and provide opportunities for parts to fit together smoothly to make a greater whole (tessellation, in other words).

--How can we create opportunities for different elements and systems to diffuse and intermingle? This has the effect of diminishing the impact of boundaries and creates new spaces composed of something of both, offering opportunities for both annidation and superimposition.

-- Do we need structures or systems to **carry resources across boundarie**s? Consider bees carrying pollen and traders moving goods.

-- How can we place elements based on their compatibility with each other? How do we keep those who are antagonistic to each other apart?

-- Can we use boundaries as nets or harvesting structures where stuff can accumulate without much (or any) work? People like the idea of reducing work while maintaining profit. We may not see much opportunity in a fence that catches tumbleweeds except that it illustrates the concept. What else can we do with this?

Creating Boundary Conditions

Keeping our goals in mind for each given situation, we design boundary conditions to help achieve those goals and avoid problems and conflicts

If we want something to move swiftly and quickly while keeping together (such as

water through a pipe) then our boundaries are smooth and clean and do not obstruct the flow.

If we want to catch fish, we will introduce some deliberate turbulence in the form of fish traps or nets in the stream.

Lobes and notches offer sheltered spaces where resources can accumulate and microclimates can be nurtured.

If we want to accumulate stuff, we can make a boundary difficult to cross so the boundary itself becomes like a net or filter.

Look at a map of a large geographic area. Consider how cities locate next to big waters and rivers. If we aren't living next to water, we're piling up in places where forests meet the plains and there are ecosystems in transition. We the humans, at some really deep level, are beachcombers.

The design principle is:

Use differences as a strategy to build resources.

Every system seeks to acquire the things that it lacks. All boundaries have systems and structures of translation and trade.

Translating structures and systems help mediate flow along and across boundaries and can help resolve conflicts.

In nature, trees are translating structures that take in carbon dioxide at their leaf/sunlight boundary and yield oxygen, leaves, fruit, forage, and other resources. Coral fills a similar roll in oceans and reefs.

In human systems, since ancient times traders have moved along and through boundaries moving resources to places they are wanted and needed and exchanging value across borders.

Permaculture itself is a translating structure that brings different elements together and enables them to work productively with each other.

Translating structures and systems are important. The more diverse a cultural, social, and ethnic ecology, the more need there will be for effective translating structures and systems. Don't think this is only about verbal language, although that is often a need. It is about helping people to realize, at a practical level, the ideal enunciated in the motto of the United States of America: "E Pluribus Unum" – from many, come one. As hydrogen and oxygen react to produce something new – water – a diverse cultural and economic ecology can interact to become something new.

Human history is, in part, a history of conflict. In the modern world, we have to some extent substituted due process for violence, yet due process often accomplishes violent and unjust ends so by itself it is not a panacea. We have to be careful in matching the ends we want with the appropriate means that can achieve our desired ends, in the multiple realities that we find in urban areas.

Results of Boundary Interactions

There are six possible results when two systems meet at a boundary:

1. There is no change to either system (0,0)

2. One side loses, the other benefits (+,-)

3. Both gain – Win-win (+,+)

4. Both lose – Lose-lose (-,-)

5. One wins, the other doesn't change (+,0)

6. One loses, the other doesn't change (-,0)

If we have two incompatible items or systems bumping up against each other and causing problems, we look for something that will give **mutual aid to both of the competing systems and we put it in the middle.**

We want to design as many win-win situations in all our diverse situations.

The second most desirable interaction condition is that there is no change on either side.

The third desirable is one wins, the other doesn't change.

The three undesirable outcomes are ranked:

Most undesirable – both lose,

2nd undesirable – one loses, the other benefits,

Least undesirable – one loses, the other doesn't change.

Avoiding Monoculture!

Mosaics are great. A mosaic is a network of neighborhoods, where subcultures congregate in specific neighborhoods. The subcultures get what they need – which is a safe space to be who they are – while at the same time taking advantage of the multitudes of boundaries and edges to create new and exciting happenings, commerce, entertainment, whatever arises in the spaces where people meet.

We design communities as patterns that minimize incompatibility and maximize interdependence. We place compatible items/systems together so that they give mutual aid to each other.

Mollison describes the Stupidity Principle as –

Stupidity is an attempt to iron out all differences, and not to use or value them creatively.

This is a big issue in urban design, because urban planners and developers are always trying to design urban spaces as monocultures! Only One Thing Allowed!

Mollison's Golden Rule of Design: Keep it small, and keep it varied.

Timing really is everything. How timing shapes events.

It's one thing to see how an event happens, another to describe how the event unfolds, either shaping itself or being influenced by others.

Events happen as a series of pulses, of greater or lesser duration and velocity.

Pulsers are elements or systems or structures that organize the timing and velocity of events. The interaction of pulse and pattern give rise to the shape of events.

Pulsers may be biological, structural, or mechanical.

– A traffic light pulses traffic.

– Biological functions in your body regulate your heart beat (your "pulse.")

– The election cycles of a government is a series of pulses that regulates the flows of governance.

Shapes result from the interaction of patterns and pulsers.

The genetic code for a species is its pattern.

How it grows into that shape is a result of the action of biological pulsers controlling growth and development. Your adult hand did not grow on your baby body. Your hand doesn't have its own brain so it doesn't know when it is time to grow an adult hand. This happens because pulsers in your body regulated your growth so that when the time came that you needed an adult sized hand, your hand grew to the appropriate size. The shape of your hand today is a result of the intersection of a pattern with a pulse.

Timing, Patterns and Invisible Structures

Timing (pulsers) plus patterns yield shapes.

Invisible structures are formed of patterns such as the "corporation" pattern which dominates in economic matters. When we

connect time to the corporation pattern, we get a shape, something like Exxon, fully capable of producing an Exxon Valdez tragedy, or BP and its catastrophe in the Gulf of Mexico.

If we use a different pattern, or set of patterns – like waves, networks, scatters – we get something different, like the permaculture movement.

People always wonder why the permaculture movement doesn't select a pope, or at least start holding national conferences and establishing this and that which we "need" for our movement to be a success. The top-down hierarchal pattern common in human structures is the root of their questions. If we want something different, and in permaculture we definitely want something different, we must reach out for different patterns.

While invisible structures are important in all permaculture designs, they have an additional level of importance in urban and college permaculture.

People who are in college and who live in urban areas are unlikely to be able to grow all of their own food. Yet, their need for food is there and will not go away. Permaculture design offers options to provide for those needs in ways that care for the earth, care for people, and have a care for the future.

The World as the Tessellation, Annidation, and Superimposition of Events

Let's review –

When patterns intersect with each other – like pieces of a jigsaw puzzle – we have **tessellation.**

When patterns nestle within each other – like bowls stacked on a shelf, one inside the other – this is **annidation.**

When patterns lay over each other – such as a flower petal pattern – we know this as **superimposition.**

This, one could say, is the World According to Permaculture.

Bill Mollison wrote in the Design Manual –

> Patterning is the way we frame our designs, the template into which we fit the information, entities, and objects assembled from observation, map overlays, the analytic divination of connections, and the selection of specific materials and technologies. It is this patterning that permits our elements to flow and function in beneficial relationships. The pattern is design, and design is the subject of permaculture.

Two Aspects of Pattern in Design

When it comes to permaculture design, there are two basic tasks that happen over and over as we develop the design for our lives:

First we understand, by observation and discernment, the existing patterns at play in our lives.

Then we bring other patterns into a situation, system, or place in order to achieve our goal(s).

List of Successful Patterns

Fortunately, you don't have to figure out all of this by yourself. Over the years there has been considerable observation of patterns. One of the in-depth sources of information and knowledge about successful patterns for design is the book **A Pattern Language: Towns, Buildings, Construction.** You can get it through your local library, a local bookstore, or online. Most of the info is also found online at http://www.patternlanguage.com/, although to access all of it you need to sign up for a membership at $5/month. If you don't get the book, either by buying it or from a library, you could pay for one month's membership and learn a lot. The information there is very valuable, particularly when it comes to the **253**

patterns they identify for urban living that you can use to replicate good ideas in your neighborhood.

Start on this page – http://www.patternlanguage.com/leveltwo/patterns.htm and read the Child's History of Pattern Language first. (That's in the free section.)

Here are three examples of the 253 patterns discussed at the website and in the book:

DECENTRALIZATION: Individuals have no effective voice in any community of more than 5000-10,000 persons. Therefore: Decentralize city governments in a way that gives local control to communities of 5,000 to 10,000 persons. As nearly as possible, use natural geographic and historical boundaries to mark these communities. Give each community the power to initiate, decide, and execute the affairs that concern it closely: land use, housing, maintenance, streets, parks, police, schooling, welfare, neighborhood services.

TOWN HALL: Local government of communities and local control by the inhabitants, will only happen if each community has its own physical town hall which forms the nucleus of its political activity. Therefore: To make the political control of local functions real, **establish a small town hall for each community of 7000,** and even for each neighborhood; locate it near the busiest intersection in the community. Give the building three parts: an arena for public discussion, public services around the arena, and space to rent out to ad hoc community projects.

BIG BOX ALTERNATIVE – It is natural and convenient to want a market where all the different foods and household goods you need can be bought under a single roof. But when the market has a single management, like a supermarket, the foods are bland, and there is no joy in going there.

Therefore: Instead of modern supermarkets, establish frequent marketplaces, each one made up of many smaller shops which are autonomous and specialized (cheese, meat, grain, fruit, and so on). Build the structure of the market as a minimum, which provides no more than a roof, columns which define aisles, and basic services. Within this structure allow the different shops to create their own environment, according to their individual taste and needs.

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00251 Design methods

You need to make a series of decisions to build something. Design is about making these decisions.
If made consciously and purposefully, they can help you solve a specific problem. If not, they still happen,
but without a focus and end up clashing with each other. Design is inevitable.
It is better to do it consciously than just let it happen.
Abhijit Nadgouda (software engineer)

Permaculture Basics Thus Far:

Five steps to the design process:
--Observe,
-- Study and Evaluate,
-- Design,
-- Implement

Four aspects of design:

-- *Technique* – how we do something.

-- *Strategies* – Adds time to technique, so that we use strategies to achieve future goals. It has a value orientation (some things are better than others so we encourage the good and discourage or eliminate the bad).

-- *Materials* – things we make things with. This includes energy.

-- *Assemblies* – the combination of elements to make more complex structures. Assemblies can include invisible structures (see section 1 for details on invisible structures). A grocery coop plus farmers market plus balcony herb and salad green garden plus home worm compost bin equals a more sustainable urban food system.

Each design has four components:

– Site (your life and its geographies),

– Energy,

– Abstract,

– Social

Seven important design concepts:

– Self-regulation
– Sources of work and pollution
– Resources as energy storages
– Entropy
– Chaos and disorder
-- Succession
-- Guilds

Methods are a way of doing design that follows specific steps. We are all familiar with this process when it comes to **recipes.** What we need are a series of recipes for sustainable living. That is what iPermie is about. Our approach is to pile up information about you, your situation, your goals, and where you want to go. Then we systematically figure out how you will get there. Since there are multiple goals at play, there are many things that need to be done and journeys that need to be accomplished.

Methods are ways of working on a "design recipe." They suggest a sequence of steps. There isn't one universal method that works for all people in all situations. We play with a variety of methods to achieve our design goals. Sometimes we use one, sometimes we use them all. This isn't all of the possible methods. It is a compilation of some of the most used methods.

This is why it's always useful to pay attention to how you go about solving problems in permaculture so you can share that knowledge with others. You

may find a similar issue some time in the future. Why reinvent a way to resolve it? You can share your experience with others so that they can benefit from your experiences. We need a book of recipes for more sustainable living and everyone has something to contribute to that.

While every permaculture design depends on its context, it is not necessary for everyone to reinvent the tire. Equally important, there is no need for anyone to reinvent the flat tire.

Even though we go through a reductionist process of identifying concepts like five steps, four aspects, four components, and now ten design methods, **permaculture is a holistic process**. None of these topics are discrete and exclusive categories. They are maps, and thus they are not the territory. They remain useful to us as guides.

Consider them the **trees of a forest of design**. There are roots of design, rhizomes of design, climbing vines of design, herbs of design, and so on and so forth. At any given time, you may have several different methods at play in your design work.

The forest of design, as the sum of all its components, is something greater than the actual addition of all the components.

Ten Design Methods

Doing design – and learning permaculture – is a matter of continually drilling down into the information until you get to "very fine details." No one ever depends on only one of these methods and these aren't the only methods. Good design, at one time or another, may use all of these to achieve its goals.

Analysis lists the characteristics of components of the site (which could be your life), a situation, or system. This is where we use tools like lists, spreadsheets, needs and yields charts. Make lists of the activities related to the goals and functions you came up with during your observations. Continue to work on those lists until each one is a comprehensive and holistic look at the topic. Compare lists and look for beneficial connections – the more connections, the more desirable the combination, whatever it may be. You could put this information into a database and carefully assign key words. This allows you to sort your lists to find common links.

Observation designs through careful observation of the situation, lifestyle site, or system. This is essential to all design and shows the holistic nature of the discipline. What do you do? Where do you do it? How do you do life your life? What is necessary for the activities of your life?

When we adopt/manipulate patterns from nature for our permaculture design, we use **deduction from nature.** If we want to distribute goods within a community, we set up a distribution network. It might look like a stream with branches. We like patterns we observe in nature. They evolved over the eons because they are useful and practical.

Sometimes we pile up a collection of options and make decisions among them. This is **options and decisions design.** You could write each option on a sticky note and put it on a white board divided into categories or functions and move things around to see how they look in different combinations. Assign colors to functions and put dots on sticky notes. This can help you visualize stacked functions and redundant systems. The sticky notes with the most dots are your best design bets.

One common technique is to develop **map overlays** to "try out" ideas before actually implementing them. This is known as data overlay. This is particularly useful in permaculture lifestyle design when working on the geographies of your life (the relationship among the necessary locations for work, school, residence, entertainment, community, arts, religion, etc.)

Some may think this whimsical, but another design approach is to look at random arrangements of the elements of the design, to see how things may look and interact. This is **design by random assembly.** Sometimes unexpected connections and practical ideas emerge from this kind of random design work. One way to do this is to write each element or function or system on a card. Shuffle them and divide into two or three stacks. Take one card from each stack and look at the three of them together. Or do two cards at a time. If something seems promising set them aside and take the next two or three. If nothing strikes you about the two or three cards you drew, shuffle them back into your stack. Don't be in a hurry. This kind of design work takes time. It can be fun to do in a group. Invite friends and use this as party game. Other eyes may see things you don't.

Designs for work situations, such as for kitchens and other building interiors, or for systems that produce a certain result, need **flow diagrams,** showing how the work flows and the components interact.

Zone and sector analysis develops provides information for design based on the locations and geographies of the activities and functions of the lifestyle (or the site, situation, or system), based on the expected uses of the items at the site and the impact on your life (or the site, situation, or system) of off-site energies.

Make models. If you need to design a building, or a neighborhood, get some cardboard and scraps of wood and build a model. Get others involved if you doubt your model-making abilities. Models are like maps or diagrams, only they are in three dimensions. Make your mistakes during the model phase. Don't save your mistakes for the actual construction sequence. Models also work for invisible structure issues, only then we refer to what we do as "role playing." While the results are not as certain as making a model of a building or neighborhood, it will be useful nevertheless.

We use **Testing Questions** to judge our design ideas. Testing questions can include ethics, principles, and practical issues. 00381 has examples of testing questions. As your experience develops, and you learn more about yourself, you will probably develop your own set of testing questions to add to these that grows from your own personal experiences..

While this discussion doesn't exhaust all the possibilities for methods of permaculture design, it is a good start!

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00261 Permaculture Toolbox

There is no better designer than nature. — Alexander McQueen

A technique is how we do something.

Strategies add time to technique, we use strategies to achieve future goals. It has a value orientation (some things are better than others; we encourage the good and discourage or eliminate the bad).

The list which follows is my own collection and it is not exhaustive of the possibilities. It is not given in any particular order.

Cooperation instead of competition.
"Cooperation, not competition, is the basis of existing life systems and of future survival." (Bill Mollison, Permaculture Design Manual) While we hear a lot about competition, the success of nature Is more about cooperation – giving and receiving and effectively working together for the common good, whether it is a prairie evolving into a forest, or people creating an invisible structure and calling it a "coop."

Do no harm.
No further destruction/manipulation of wilderness areas. Do all you can to stop any harm your lifestyle does to the planetary biosphere. Do not use chemical pesticides, herbicides, or fungicides in growing food or controlling pests. Minimize the pollution your lifestyle creates. Work towards zero waste/emissions.

Use entropy to achieve desired goals.
Nothing stays where you put it. Everything eventually falls apart. Each time energy changes there is a net loss of energy. The Laws of Thermodynamics are pitiless and inescapable and universal: You can't make a profit, you can't break even, you can't get out of the game. Since we can't escape or avoid entropy, we might as well recover something from the process. Rainwater falls onto your roof, runs off down the street and into the storm drain. Or it can fall onto your roof, and be channeled into a rain harvesting system, which provides water for the household and an aquaculture system. The water from the aquaculture system can flow onto your garden areas to provide nutrient rich moisture that your plants need. This is a much better plan than just letting the rain hit your roof and dispersing its energy into the storm drains.

Make the least change for the greatest effect.
This implements the conservation principle – "do only what needs to be done." If it isn't broken, don't fix it. People often gravitate towards grand solutions that feature much bigness. Nature, on the other hand likes the slow and small. Consider the micro flora and micro fauna that do so much to enrich the soil. You need a microscope to see what's going on. No bigness or grandiosity there. As you consider what changes you want or need in your life, first think small. We start small or we don't start at all.

Energy conservation and efficiency.
All of modern human social, economic, and technological life "as we know it" is possible because for more than a century we had cheap energy. The physical reality of our world, however, is that fossil fuel energy is neither cheap (when a full accounting is made of its costs) nor will it be endlessly available. In the coming

years we will see the rock of the modern lifestyle meet the irresistible force of peak energy, political criminality, climate instability, and economic irrationality. Better get out of the way of that grind while the getting is good. Intelligent energy conservation first begins with household demand destruction and finding non-fossil-fuel powered ways to provide energy needs. It does not start with ordering solar PV panels, although eventually that may be part of a permaculture plan. And when you think about conserving energy, don't forget "human energy." There are design situations where you may decide to invest some energy up front – in either materials or fossil fuels – in order to conserve energy all throughout the life history of the element or function receiving the investment. For example . . You might use earth moving machinery to create a pond or buy a set of cast-iron cookware that you can give to your grandchildren.

Prefer biological solutions.
As one of the great attempts to fool Mother Nature used to say, "It's not nice to fool Mother Nature." (That was in a margarine commercial years ago.) In fact, attempts to fool Mother Nature are inevitably doomed to failure. Yet, we build much of our modern technocracy on attempts to do just that. We build the same house, using the same plans, whether we live in Portland, Maine or Los Angeles, California. We think we can use geo-engineering to finesse the crises of global climate change. We always expect that our technology will allow us to triumph over nature – even so, "consider the tornado" and what it can do to a modern city full of high tech gizmos and doodads. Nature and Biology rule us humans too. We are living creatures. To expect us to act as machines is contrary to our nature and not part of our vision of the future.

Everything cycles, so cycle everything.
Our grandparents told us – waste not, want not – and they were right. Since everything cycles, we need to get with the program. "Everything" does mean "everything." Particular attention must be paid to resource use in general, food, water, energy, and material items. Sometimes this suggests changes in a personal lifestyle to avoid items that are hard or impossible to cycle at present. Or we implement a biological solution. Or we stack and rearrange some functions and elements so that we don't need an item that can't be recycled or continue an unsustainable practice. As they say . . . Reduce, reuse, remake, recycle, make it over, make do, do without. One plant's compost is another plant's fertilizer. One person's trash is another person's treasure.

Design from patterns to details.
When we look at nature, we can see patterns repeating, although the details exhibit considerable variation.

Trees have leaves that grow from branches. There are a wide variety of shapes and functions among those leaves.

Spiders weave webs. No two webs will look exactly alike.

Snowflakes have a six-side pattern, with an infinity of variations within.

Patterns provide structure, enable energy flows, and allow life to exist and perpetuate itself. Humans have our own set of patterns, and as the modern world developed, our patterns became less natural, more contrived, and thus required ever more technology and maintenance to operate correctly. We see lots of patterns of waste, which have an infinity of variations in their details. All of this suggests some ideas to us about our human design work. Avoid unnatural patterns and prefer natural patterns. The best situation is where patterns work together, synergistic and interconnected, just as they are in nature. We can repeat patterns, in an almost infinite number of details.

Relative location
My mother used to say – "a place for everything, and everything in its place." Permaculture uses "zones" as a way of finding a place for everything. Elements

that require frequent maintenance or visits by the household should be placed conveniently. Relative location works for items at your house or apartment and for the geographies of your life. Thus, it's best to live close to work or school and other frequently visited places in your life's geographies.

Reciprocity is the giving and receiving within natural and human systems.

Mollison says, "One calorie in, one calorie out." Dan Hemenway says, "Love is the balance of giving and receiving." The word on the street has always been – what goes around, must come around. We can utilize the yields of each element of a system to meet the needs of other parts of the design. We design so that as we receive, we give. Surplus money can be deposited in a credit union where it can be lent to local farmers who supply a food coop where I get my groceries.

The yield of a system is theoretically unlimited.
Mollison says, "The only limit on the number of uses of a resource is the limit of information and imagination of designer." The mind-orientation that limits our observations to our present time scale is part of our problem. Going forward, design helps us think in broader, more long term, visions. Over seven generations, what will be the yield of this system? I play a pipe organ built in 1865. It has already outlasted two church buildings and will certainly outlast its present home. One hundred years from now, if properly cared for, it will continue to make music. What was the yield of the original organ design and those who, at the end of the Civil War, which was not a prosperous time, paid for the creation of that musical instrument? Except for the external case and electric fan installed during the 20th century in the wind chest, the interior workings and the design of the organ are original to 1865. That fan could easily be pulled out and the bellows reconstructed, if and when electricity is no longer is available, so its design adapts to its context.

Support biodiversity.
Permaculture is not about monocultures, it celebrates the diversity of nature and seeks to enhance, support, and extend the biological diversity of the planet's biosphere. The longer I garden at my house, the more biologically diverse my little 1/7th of an acre becomes. In the beginning, when I moved to my present house in 1999, I thought, "Well, there's not really much room here to do a lot of gardening." Which just goes to show the limits of my own understanding at the time.

Create/use/adapt invisible structures to make it easier to live in accordance with the ethics of permaculture.
If a city has an effective public transportation system, fueled by alternative energy, it will be easier to live without a personal car. If your region has a food cooperative that makes it easy for people in cities to buy food directly from farmers, then households can make more permacultural food choices. If the state has regulations that are unfairly applied to small agricultural producers and limits their access to markets, it will be harder for families to make permacultural food choices. One of the iPermie goals is to "create a world where it is easier to be permacultural." Invisible structures have their limits (as do we all) and they also have their uses.

Grow some food and source other foods from local/regional producers.
We need to minimize the amount of land that it takes to support each human person. Small scale agriculture – all the way down to the garden level – is much more productive than broadacre conventional agriculture. The small plots of the Ecology Action folks in Willits, California, can produce the equivalent of 200 bushels of wheat per acre, a productivity that modern conventional agriculture can repeat. As persons learning permaculture design, we design to increase the biological resources of our communities and to create more sustainable local food systems that do little or no harm to the ecosystem and support the human population. Even

people who don't have any land can often raise a few herbs or some greens and tomatoes in containers in a sunny window. I'm not pretending that people without land can raise a substantial amount of food. I think that raising even a small amount of food is useful and satisfying to residents of urban areas. As an additional beneficial connection, a/k/a as a "stacked function," container plants help keep the indoor air clean and fresh.

Stop subsidizing the destruction of the planet with your time, talents, and money.
Don't buy meat from Concentrated Animal Feeding Operations. Don't buy plastic. As much as possible withdraw your support from invisible structures that drive destructive and unsustainable functions. Don't let the rain erode your topsoil and wash away its nutrients. Get your money out of the big banks and into a credit union. Get your money out of the stock market and invest in local sustainable enterprise. Teach and encourage others to do likewise.

Support/start/join/patronize cooperative business enterprises.
A corporation, by law, has only one value – maximize the return to the stockholders. The domination of our economy by for-profit corporations is one of the primary "invisible structure" problems we face. On the other hand, a cooperative, by law, orients toward meeting the defined needs of its membership. A credit union is a tactic to apply the strategy of "using invisible structures to make it easier to be permacultural" to money and finance. A food cooperative is a tactic to apply that same strategy to food distribution. A worker-owned cooperative is a tactic to give workers security in employment and a fair and just return on their labor.

Hold water and fertility as high on the property as possible.
Gravity is all around us, so you might as well use it. If you catch water at higher elevations (your roof for example) and use it at lower elevations (your garden), the water flows there without pumping. You may not have a choice, as your land may be flat as a pancake. If you do have a choice, catch your fertility and water as high on your land as is practical and thus conserve the amount of energy required to move it around. The applicability of this to people without land is that while urban residents may not have any land personally, they have influence over how their municipality uses the land it has. Some broader-scale permaculture techniques like sculpting land to harvest rainwater can be applied to public properties in urban area, if the citizens organize to push for this. Private businesses can be encouraged to do similar activities with the lands for which they are responsible.

Start small and design systems that are manageable and produce good yields.
The biggest mistake most people make in changing their lives is to attempt too much, too soon. This is actually a response to powerlessness. We are so conditioned to helplessness that when we do try to break out of the standard system, we may set ourselves up to fail by attempting grandiose projects that no one could implement in a reasonable time frame with available resources. Thus we reinforce the false idea that we are helpless in the face of our circumstances and can't change anything.

In permaculture design, it is important to keep our abilities and resources in mind when we do design and be realistic with what we can and can't do. There's no point to an elaborate design if it isn't possible for the person to implement it because it is way beyond their abilities and resources. Small systems are more conservative of resources and productive in their yields. We start small or we don't start at all.

The Keyline system
While most urban residential properties would not be large enough to use its methods, the Keyline system could be applied in parks and other large areas of public responsibility. Governments own a lot of land and how they manage it impacts the local ecosystem. The keyline is where the "ridge meets the valley," and

the Keyline system, first described and published by P.A. Yeomans in the 1950s in Australia, is a method of water harvesting/conservation and land regeneration that resulted from the observation of the ridges and valleys on a property and working with them, rather than against them, to achieve the goals of the farmer or the rancher with more property to work with than most urban residents.

Forest Gardens/perennial food production
A "food forest" offers seven layers of potential food production:

– Mature canopy trees (pecans, chestnuts, oaks, standard varieties of fruit trees),

– Understory trees (redbuds, dwarf and semi-dwarf fruit and nut trees),

– Woody shrubs and cane fruits (bush cherries, Siberian pea shrub, blackberries and etc.)

-- Herbaceous plants (asparagus, bee balm, comfrey, dill, rosemary, sage, flowers, this list is long).

-- Ground covers – (sage, clovers, etc.)

-- Roots – (day lilies, Jerusalem artichokes, potatoes, sweet potatoes, peanuts, etc.)

-- Climbing vines (grapes, passion fruit, kiwi fruit, etc.)

With the cooperation of the building ownership, and there being some available geography for it, you could plant a food forest at your high rise apartment building. Your city could transform its parks into food forests. Streets could be lined with food forests. The grounds of churches and schools could grow food forests. These are communitarian approaches that can develop a diverse local food system.

Create buildings and structures that incorporate permaculture principles, strategies and tactics regarding energy, food production, waste management/cycling, and water as you work your way towards larger designs. Start small, get bigger with time and experience.
Modern buildings generally use energy inefficiently and thus take more resources to operate than is actually necessary. Better design for urban building retrofits is critical to growing more sustainable cities. In becoming more sustainable, it is better to renovate an existing building than to build something entirely new. Use as many recycled and locally sourced materials as possible in renovation or new construction. Meet needs for heating and cooling using passive techniques. Use design and capital investment to minimize operating costs and resources and to maximize on site cycling of resources. Ensure that whatever leaves the property is free of pollution.

The larger the building, the more opportunities it presents for developing more efficient methods of operating the premises.

Create and support invisible structures that promote distributive and social justice.
No one should be left behind for the wolves to devour during the cold winter or the hot summer. Creating and supporting structures that help the poor by empowering them to transcend their challenges and circumstances are important aspects of designing our way into a better future.

Take care of yourself and those you love.
In the modern world, the human person is expendable. People are just replaceable cogs in the world machine. Persons who get interested in permaculture are often busy people and deeply involved with their communities. It is easy to let the vital and necessary "works of justice and peace and sustainability" become as consuming as a life dedicated to the corporation machine. Always reserve time and space for yourself and your household, your family, your tribe or clan, your friends – those who know you and you know them and there is a relationship

of mutual caring and support. Healing and spiritual practices can be important parts of this, as are proper rest, nutrition, exercise, and general attention to wellness and quality of life. In other words, nurture blessings in your life and in the lives of others.

Demonstrate real and practical solidarity with those "far away."

Care for people means, literally, "care for all people," not just those who look like you, live in your neighborhood, and share bonds of culture and tradition. Care for people includes caring for people who are "not you" – not your culture, not your nation, not your religion, not your race, not sharing any of your traditions. Care for people is care for people, it is not getting a cheap psychological rush about thinking about caring for people. "Be a good neighbor" applies in your physical neighborhood and to our world neighborhood.

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00271 Needs and Yields Charts

At a meta level, design connects the dots between mere survival and humanism.
— *Erik Adigard*

One approach to observation, study, and evaluation is to make a chart showing various elements of your life and the household and community where you live listing the needs and yields of each element, and its connections with other aspects of the design.

Yields are useful resources if they are productively utilized by other elements in the system. They are pollution if they not productively used.

If needs are not supplied by the local community, then they have to come from somewhere else.

We therefore require extra energy or work or money (which embodies energy and work) to satisfy those needs. When you create your chart, you will probably find a lot of pollution and extra work in your system – those are areas that need design work.

Example:

Element -- Herb container garden

Needs -- Water, fertility, space, human attention, plants

Yields -- Food, teas, compost materials, habitat for beneficial insects.

Connects -- Personal health, nutrition, soil fertility, beauty, community, local food system

You could add a level of functionality to the spreadsheet by sorting yields and needs into individual columns (one per column). This would enable you to sort your list and find connections in both benefits and needs. One useful column is "Characteristics" where you can put a brief description of the item.

Don't forget inanimate objects, like "Kitchen Equipment." It needs use, storage, cleaning and offers yields – food preparation and maybe even decoration.

Don't forget the systems and invisible structures in your life. This can become complex so you may want more than one spreadsheet, with one dedicated to invisible structures and systems you have or need in your life.

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00281 Zones, Sectors, and Simple Critical Infrastructure Maps

Design is inevitable. The alternative to good design is bad design. To not design is to consciously choose a bad design. . Everyone makes design decisions all the time without realizing it. Good design makes such decisions consciously, at the right time and place, and in conjunction with all the stakeholders. *Douglas Martin (artist and graphic designer)*

Permaculture uses zones and sectors as tools to analyze, evaluate, and design the use of a site. While the concept developed for application to homestead properties, the principles can be applied on any scale where we do permaculture design work. The goal of iPermie is to help you hack permaculture design so that you can produce a plan for your life that works for you. With the right design, you can experience more beauty, health, happiness, freedom, and cooperation – with less work, consumption, conflict, injustice, and waste.

Unless you are a hermit, your life does not happen in one place. Organizing the sites and geographies of your life, and the various elements of those sites, to conserve energy is the primary purpose of zone and sector analysis.

Mollison says . . .

> Zone and sector analysis is a primary energy-conserving placement pattern for the whole site.

For our urban permaculture purposes, we would translate "whole site" as "entire lifestyle." He goes on to identify two kinds of energy sources –

> Energy available on the site itself (people, machines, resources, etc.) and Energy entering/flowing through the site.

The important goal of zone and sector analysis is energy conservation.

People do not have endless time, energy, or other resources. We need to organize things so that we can do what needs to be done with as little work, energy, and resources as is practical for our situation. This is true whether we work a rural farm or live an urban lifestyle.

Zones in urban permaculture design

We base the traditional zone structure on two criteria:

1. How often the element needs intervention from people, and

2. How often the people need to visit the element.

An element is any particular item of a site – traditionally, we think of plants, chicken coops, ponds, gardens, etc. In urban terms, we might think of farmers' markets, bus stops, local shops, place of work, school, etc.

In traditional permaculture, we envision the following zones:

0 -- The house.

1 -- The area closest to the house and/or along frequently traveled pathways through the site. Elements placed here are those that need the most frequent attention from the household's residents and that the residents need to visit often (to either care for the element or harvest something from it). For example, plants like greens and salad makings, and kitchen herbs need a lot of care and people harvest them frequently.

2 -- The area, not quite so close "to the back door of the house," where we put elements which need attention, but not quite as much attention as the Zone 1 elements. These items don't need to be visited as often by people (for either maintenance or harvest) This could include some perennial fruit production (smaller trees, cane fruit, bushes, etc.), compost piles or bins, vermiculture projects, and annuals like corn or beans which don't require daily attention or harvest except for their season.

3 -- A larger area of food production which needs not-so-much attention, e.g., a wheat or hay field or a fruit and nut orchard of larger trees.

4 -- Semi-wild – forage for animals, firewood, semi-managed.

5 -- Wild – undisturbed by human management.

This isn't just a rhetorical construct to make things look tidy. It is an important aspect of energy conservation (remember human energy) for a site that produces food. The zones help us organize the patterns, elements, energies, and wastes of a site for most efficient use. These zones are not concentric circles (although they could be). They may meander around depending on the lay of the land, the size of the site, the typical pathways to and through the site, and the access of the house from the rest of the area or community.

We base zone analysis on **patterns of location and intensity of use**. It means one thing on a farm or peri-urban or suburban plot. For design work in urban areas, zone analysis looks somewhat different.

Zones are relative to the sites, geographies, and activities of your life. They depend on the **central orientation of the observer** and the **purpose of the observation**. For urban permaculture design, you are likely to observe more than one set of zones for the design for your particular life, which may have multiple sites and geographies within it.

So let's look at the zone concept and apply it, at a different scale from the rural/peri-urban, and suburban viewpoint, to your food situation in the city. I say this only as an observation, not a dictation. Your situation may be different from this description, depending on how things are set up.

Zone 0 -- This is your kitchen – in particular, the traditional kitchen "work triangle" of refrigerator, stove, and sink, with a food prep area somewhere along these lines of travel. If you "watch yourself" while working in the kitchen, you will retrace this pattern many times when you prepare food. It includes your food pantry, refrigeration/freezing appliances, and equipment storage. It may involve cooking "stations" that you put together as needed for special projects like food preservation.

Zone 1 -- This is any food growing you do yourself or in conjunction with your household. If you have a yard, this would be your garden. If you have no land, this could be a container garden on a porch or balcony or in a sunny window. Or a plot in a community garden. It could involve gleaning nut and fruit trees in public places or on private plots with the permission of the owner.

Zone 2 -- Your local food systems. This includes farmers' markets, food cooperatives, CSA's, etc., anyplace where you buy food directly, or nearly-directly, from a local farmer (this includes non-food items like health and beauty items).

Zone 3 -- Conventionally-produced foods sourced from locally or regionally owned supermarkets. Where possible, you choose local or regional brands. It includes meals eaten out or take out from locally owned restaurants and fast food locations.

Zone 4 -- The outer zone in permaculture design is the area with least interaction. For the purpose of analyzing your urban food system, the "area of least interaction" should be the nationally

owned supermarkets and franchised restaurants (including fast food) and US produced foods.

Now let's think about transportation and the organization of your life.

An article by Bart Anderson in the Permaculture Activist magazine http://www.permacultureactivist.net/articles/urbnzonsectr.htm suggests travel distance as a way to do zone analysis in urban areas:

Zone 0 -- Home

Zone 1 -- Areas within walking distance, which should be the area of most intense use.

Zone 2 -- Territory within bicycle distance (if you use a bicycle).

Zone 3 -- Places accessible by public transportation or a short drip.

Zone 4 -- Locations that are only accessible by automobile.

Zone 5 -- Destinations requiring long distance travel (auto, trains, buses, airplane)

Using zones in your design.

Zones help you develop a design that is comfortable for your lifestyle and is energy conservative. Mollison says –

> The golden rule is to develop the nearest area first, get it under control,
> and then expand the perimeter.

You will need maps and diagrams to effectively work through the relevant zones for the geographies of your life. These maps will need to be of different scales to work effectively.

To diagram transportation zones, start with a map of your entire community.

To diagram food zones, you need a map of your local food system.

To work on your household food system, you need diagrams of your kitchen and any growing areas you can access.

All of these require different scales based on the extent of their geographies. Your local food system might be 150 miles in diameter around your house. Your transportation zones might be all located within 25 miles of your home. Your kitchen diagram may be only 10-20 feet.

As you develop your plan, you plot the locations for all the elements encompassed by the particular map or diagram.

Use the various zone analyses of your lifestyle to decide where to place elements and activities in your life. A medical specialist that you might visit only twice a year can be further away from you than your regular general practitioner, who needs to be closer at hand since you will visit him or her several times during the year.

You may decide to move closer to the important destinations in your life. Or you may change your job, church, school, or preferred shopping sites to places that are closer to your house, especially the destinations that you frequently visit.

Sectors in urban permaculture design

Sector analysis is a way to govern and control the energies that originate off-site and flow on and through the site. Traditionally, we identify these as --

– sun,

– wind,

– rain,

– wildlife,

– fire.

We think of these energies as arrows zinging their way to and through our lives to dwellings and activities.

Some of them we like and can use.

Some of them we don't like, so we develop and deploy –

Shields – to block the incoming energy (shade that protects us from sunlight in the summer),

Deflectors – to channel it for a useful result (such as rain directed to water plants), and/or

Collectors – to soak up all we can (like sunlight in the winter)

All of the traditional permaculture sectors (solar, wind, etc.) impact your urban lifestyle. In addition, cities have other energy sectors that impact our urban lifestyles. Here is my take on the additional sectors of concern for urban permaculture design besides the traditional permaculture sun, wind, rain, wildlife, fire:

Planetary energies

– Climate, includes weather (and the traditional permaculture sectors of sun, wind, and rain), but it is more than weather. It is the sum of your area's weather experiences over periods of time. Climate energies impact every human, whether or not you own land.

Grid energies

– electric,

-- piped-in water,

-- natural gas,

-- waste disposal,

-- sewage,

-- communications

These energies come and/or go from elsewhere. They move around via grids of pipes and wire. While we find these useful, they don't come to us free of charge. They cost money and they have environmental impacts. Sewage, for example, is a system for creating waste and pollution. We need to minimize our dependence upon these and provide more sustainable alternatives. These grid-dependent energies require long supply lines that may be fragile as the cardinal threats (peak oil, climate instability, economic irrationality, political criminality) come upon us.

Fetched or delivered energies

– gasoline,

-- propane,

-- wood,

-- food

The user must go and get these energies for them to be of use or they may be delivered to the site of use. Some grid energies may appear in your life as fetched or delivered energies. They could include electric, water, natural gas.

Invisible energies

– the effects of invisible structures on you (laws, crime, education etc.)

Invisible energies result from the actions of invisible structures, such as governments, bureaucracies, criminal gangs, and cultures. In urban areas, your design choices are to a greater or lesser extent dictated or limited, expanded or enabled by these invisible energies. They are as real (and often as dangerous) as the wind and the weather.

With all of these sector energies, our goal is to shield ourselves from any negative impacts, and to soak up all the beneficial effects we can get. We may redirect energies to achieve goals elsewhere.

We do this with the use of shields, deflectors, and collectors.

These are structures, things, or systems that we deploy to **protect** us from danger (shields), **direct** energies toward places

they can be profitably used (deflectors), and in some cases **soak up** all we can (collectors).

In traditional permaculture, sectors point to compass directions from which we expect influences. For example, winds blowing from the north during the winter are cold. To protect ourselves from the impact of these winds, we can plant a windbreak of evergreen trees on the north side of the house to block the cold winter north winds (shields).

In urban and college permaculture, sectors may develop from geographic compass points, or they may come at us from --

– institutions,

– organizations,

– corporations,

– laws,

– regulations,

– economics,

– etc.

Simple Critical Infrastructure Maps

One useful tool for understanding our dependencies is the Simple Critical Infrastructure Map system developed by permaculture thinker Vinay Gupta. I discuss this concept in greater depth in section 9 on resilience.

His analysis rests on these simple observations:

(1) There are six primary ways to die – heat, cold, hunger, thirst, injury, illness.

(2) Three sets of essential services protect us from the six ways to die – Shelter (too hot, too cold), Supply (hunger, thirst), Safety (illness, injury).

(3) These essential services come to us through seven layers of infrastructure: person/individual, household, village/neighborhood, town, region, country, world. We can speak of these as zones of infrastructure.

(4) Four tiers of cooperation provide infrastructure – individual, group, organization, government.

(5) There are six major problems in maintaining infrastructure – neglect, time and wear, availability of operators/skilled personnel, availability of necessary system externalities (such as fuel for a power plant), economics, violence/disaster.

(6) There are three effects of infrastructure failure –

– services become unavailable,

– service prices rise,

– service standards drop (e.g., dirty water, random blackouts).

The intensity of these effects ranges from minor inconvenience to mass death.

(7) There are four primary infrastructure delivery paths –

– produce on site,

– grid services,

– delivery,

– fetch/carry.

See http://butteredsidedown.co.uk/scim.html for pictures of diagrams that illustrate how you can use this system to analyze your sectors of risk and develop resilient backups. We will return to these concepts several more times as we work our way through iPermie.

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00291 Permaculture Wisdom Sayings

Wisdom is to live in the present, plan for the future and profit from the past.
Found on the internet.

Wisdom sayings are important ways to convey knowledge and truth. The first six are attributed to Bill Mollison. The seventh is from Dan Hemenway. The eighth is a traditional wisdom saying that is particularly applicable to permaculture design.

Wait one year.
We are a species in a hurry. The idea of waiting "a whole year" for something we greatly desire is a foreign concept for many. Yet, observation is the first stage of permaculture design and good observation takes time. You can't just drop in on a situation and watch things for a few hours and come away with a complete understanding of what we need. A situation needs to be observed through all the seasons of the year to understand how it interacts with its surroundings. "Wait one year" is a counsel of patience.

We are surrounded by insurmountable opportunities.
For all of our sometimes gloomy talk about the problems of this world, permaculture as a design discipline is inherently optimistic. Sure we are in a deep hole. Our first job now is to stop digging the hole deeper, and to design ways out of the hole. This makes the situation better. Every step toward a better future is a step toward a better future. That, by definition, and by practical action, is good.

Mistakes are tools for learning.
Sometimes we freeze ourselves into inaction, or languish in procrastination, because we are afraid to make a mistake. I have some personal pride about the list of plants that grow on my former lawns. There is another longer list of plants I tried to grow but that did not survive. No one is capable of perfect understanding in any situation. So just expect that you will make mistakes. Practice the ability to recognize your mistakes and get out of them quickly. Don't continue to make the mistake, over and over and over again, just because, you know, you made that decision and now figure you have to stick with it. When the evidence mounts that it was the wrong thing at the wrong time in the wrong place, change your course!

The problem often contains the solution.
The Oklahoma Food Cooperative is an excellent example of this wisdom saying. There we were in 2002, with limited access to local foods. Out of that problem, with the actual application of a permaculture design process (although we didn't really think of it as such in those days), grew the Oklahoma Food Cooperative, providing better access to local foods for hundreds of families every month.

Everything gardens.
Just think about this one for a while.

Start at your doorstep.
Begin at the beginning. Look in the mirror to find the leader you have been waiting for. You will have your greatest impact on that which is closest to you, and through this work you can do your part to change the world. Start literally at your doorstep to do design.

We don't have time to be in a rush.
This is a quote from Dan Hemenway, and it is one of the hardest wisdoms for

modern people to learn. We swim in a sea of crises, and this drives an adrenaline "fight or flight" rush at every turn. We think that in response to the onrushing doom that we must act quickly or we will all die. Well, acting quickly without much thought is one of the primary ways we got into the present situation. We won't get out of it by acting quickly without much thought. What we need now is "think first, then act, slowly and carefully." Measure twice, cut once.

Don't let the perfect become the enemy of the good.
This is a saying that illustrates the principle of natural succession. I often think of meat directly from local producers who practice humane systems of natural agriculture. If that isn't possible, a good choice would be to minimize meat in the diet and perhaps even go vegetarian until a local food system can take root and throw up a few green shoots to nibble on. This can go the other way too, seeing a different set of decisions as bad, "badder," and worst.

Additional Traditional Wisdom Sayings Useful for Permaculture

Waste not, want not.

A stitch in time saves nine.

We start small or we don't start at all.

Don't bite off more than you can chew.

An ounce of prevention is worth a pound of cure.

Sow not in furrows of injustice lest you reap a sevenfold harvest.

Dig the well before you are thirsty.

The time to build the cellar is before the tornado hits.

You never know the worth of water until your well runs dry.

It wasn't raining when Noah built the ark.

Work is the mother of luck.

Wisdom makes light the darkness of ignorance.

Procrastination is the thief of time.

Lies ride on debt's back.

The borrower is the slave of the lender.

If you always do what you always do, you will always get what you always get.

Do what you can, with what you have, where you are.

Look before you leap.

If it isn't broken, don't fix it.

Measure twice, cut once.

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00301 Ideal City-Scapes

Cities can become more sustainable if they model their systems on natural processes. . .
The characteristics of ecosystems include diversity, adaptiveness, interconnectedness,
resilience, regenerative capacity, and symbiosis. *Peter Newman; Isabella Jennings.*
Cities as Sustainable Ecosystems: Principles and Practices

iPermie includes three pamphlets by Bill Mollison:

00301.1 Humid landscapes

00301.2 Arid landscapes

00301.3 Islands landscapes

These three chapters/pamphlets may be downloaded at http://www.ipermie.net for free.

While every landscape has unique aspects, there are common characteristics of the patterns within humid, arid, and island landscapes that are useful for learning permaculture design. Permaculture classifies landscapes in general as arid, island, and humid.

We can also note common patterns in urban landscapes.

Inner Core – the "downtown" area and its immediate environs.
The larger the urban area, the more high rise buildings will be found in the central downtown core. It's as if the surrounding territory exerts a pressure that extrudes tall buildings in the central area. Downtown may be a place with a vibrant diverse community or it may be a stagnant zone of poverty and decay with little commercial or entertainment action. It is often a nexus of transportation and communication networks.

Urban Interior – the suburbs of the pre-freeway eras, often patterned by the mass transit systems of those years (typically street cars).
These are often the most diverse and interesting areas of the city. Because they predate zoning and its mandated single use neighborhoods, they are not monocultures! They incorporate a mosaic of residential and commercial uses. The dwellings are owner occupied, rentals, duplexes, tri-plexes, four-plexes, attic, basement, and garage apartments. Due to their location close to downtown, and the fondness of American transit planners for "hub and spoke" systems, these areas will have the best access to whatever mass transit options are available in the area. They are diverse in race, ethnicity, and economic status.

Suburbs – areas of development outside of the Urban Interior that resulted from the transportation patterns of the 1950s-1990s (the construction of the interstate and intra-urban freeways and toll roads).
The newer the suburbs, the more extreme the architectural and community monocultures. Entire neighborhoods may have only a handful of basic plans for the dwellings. Single family occupancy is the general rule. We limit apartments to carefully zoned ghettoes. Zoning laws often outlaw building small apartments ancillary to single family housing (such as attic, basement, and garage apartments). Most have poor access to urban transit systems and are automobile-dependent.

The end result is to strictly segregate neighborhoods by economic class.

Peri-urban – the transition zone between urban and rural.
These are fun zones where rednecks in self-built homes with chicken coops and pig pens on land inherited from their grandparents may be next door neighbors to millionaires in expensive custom-built homes. Both keep animals. The rednecks prefer pigs and cattle and horses and dogs and chickens. The wealthy favor horses and dogs and cats. This is often a zone of culture clash where the rich attempt to buy out, or failing that, use the law to drive out the original residents and convert the area for upscale use and comfortably segregate the neighborhood by economic class.

Urban land use patterns

Urban landscapes can be characterized by the general use of land. In most areas (there are a few exceptions) central planning systems dictate the land uses. When zoning is rational, it can be very good. When it serves the needs and wishes of special interests, at the expense of the common good, it is bad for urban areas. One of the most pernicious effects of zoning is the segregation of neighborhoods by economic class.

Older Retail.
Before the advent of zoning, the demarcation between business and residential areas was much more fluid and most residential areas had shops that catered to the needs of the area residents. Shopkeepers often lived above their stores. Small shops and home enterprises were a common feature in the more residential parts of town. Decades of devotion to "single use" planning schemes has for all practical intents and purposes destroyed this kind of spontaneous urban land use pattern and replaced it with sterile monocultures with strict boundaries delimiting residential and commercial areas.

Residential.
The older residential areas exhibit the most variety and diversity. The newer the suburb, the more extreme the monoculture. Newer residential areas are always by law segregated by economic class. This is a change from the pattern of economically integrated neighborhoods of previous years. It is tragedy for our society that as racial segregation of housing declined, economic segregation increased. Economic segregation mandated by law is as stupid a public policy as racial segregation mandated by law.

Commercial.
Outside of the downtown areas and the urban interior, these commercial areas were mostly built up in recent decades. The primary land use is blocks of offices and commercial premises, retail etc. Strip malls are ubiquitous in urban life, in both old and new neighborhoods. I file "government buildings" under commercial, as they typically locate in government ghettoes or in other commercial space.

Industrial.
Because of the general decline in manufacturing, many industrial properties have been abandoned. Even so, industrial uses remain in urban areas. Some of these properties are cesspits of industrial contamination.

Institutional.
Institutional territories differ from commercial or industrial in that people live there – voluntarily (as in college dormitories, monasteries, and convents) or involuntarily (as in prisons and jails) – or the purpose is non-profit and communitarian-oriented. Hospitals and long-term care centers are somewhere between voluntary and involuntarily, and residence there is generally based on physical or mental need. Other institutional uses include places of religious worship, which may or may not have a residential component, and schools.

Communal.
Despite the moves to privatize everything,

there remains space in urban areas for communal purposes – parks, public gardens, and spaces for other civil society activities and associations.

Brownfields
Areas where the presence of toxic pollution, left over from previous industrial uses, complicates the possibility of reusing the property for other purposes. This designation may overlap other uses.

The Problems of Zoning

The zoning structures of modern cities enormously complicate our goal of living more sustainably because current zoning laws mandate unsustainable urban practices. They create automobile dependent neighborhoods. Combined with transportation policies, they may make situations where it is actually unsafe to walk or ride a bicycle. Segregation of neighborhoods by economic class promotes a decline in solidarity and is a form of class warfare.

As we think of structures that will help us live more permaculturally, zoning laws should be greatly reformed or simply abolished in their entirety. One of the things history teaches us is that it can be dangerous to give people certain kinds of power. Zoning is a good example of **the evil that can be done when we use coercive government structures for corrupt ends.**

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00311 Entropy and Affinity

Left to themselves, things go from bad to worse. *A corollary to Murphy's Law.*

If someone remade the Star Trek franchise using permaculture principles, there would probably be an episode – "The trouble with entropies and affinities."

Gravity is an attractive force that holds everything together and in place. It is a force of affinity (the drawing together).

Entropy is the opposite "dispersive force" that funnels energy and resources into sinks where it disperses and becomes useless to us. Entropy is "scattering apart."

When you pour hot water down the drain, the heat and the energy of the flowing water disperse and dissipate and can be of no further use to the household.

When the wind blows, its disperses and dissipates its energy.

When the rain falls on a roof, and runs off onto the ground and down into the storm sewer, the householders who built the roof lose the potential energy and value of the rainwater.

In other words – everything falls apart. Often apparently spontaneously. Get used to it. And you might as well take advantage of the process since it can't be stopped.

But everything somehow comes together.

The sun slowly deconstructs itself as it sends energy radiating out into the universe, demonstrating entropy on a large scale,

Some of that energy comes together on planet Earth and makes life possible thus demonstrating the affinity of solar energy and biological life.

The solar energy falling upon open waters causes evaporation. The water rises into the atmosphere and disperses – entropy at work. Affinity draws part of the vapor back together around bits of dust or pollen and the water falls back to earth as rain, causing the process to begin again. Each aspect of the hydrological cycle is entropy and affinity at work, fueled by a much larger process centered on the Sun and the affinity of solar energy with biological life.

Entropy and Affinity are not physical entities. You can't see them, feel them, smell them, or touch them.

But we can certainly observe their effects and actions. We can take advantage of the energies that dissipate and disperse by imposing patterns we create into the entropy flows in order to use affinity to harvest energy and use or store it.

Energy always follows the pattern. So we build windmills, which have an affinity for wind, and put them where entropy sends particularly strong winds on regular intervals. Maybe we charge some batteries with the electricity, since electricity has an affinity with batteries, or use the electricity to manufacture something.

We build dams to hold water at higher elevations so we can take advantage of the energy of it falling to a lower level. We use rainwater run-off to grow vegetables and thus store some solar

energy that way. Rainwater, like solar energy, has an affinity with biological life.

We can make big mistakes with entropy.

Our dams may break and the sudden release of the energy of the stored water can be enormously destructive. We build social and political hierarchies that concentrate large amounts of energy and wealth at ever-higher levels, so much so that the rest of the system becomes dysfunctional due to lack of energy and resources. Then you get something like the French or Russian revolutions, and a lot of people get killed and wealth is both destroyed and dissipated.

So you have to be careful with any affinity pattern you place in a flow of entropy.

Consider the difference between peacefully watering your garden with rainwater and the impact of a raging flood crashing onto your garden caused by a break in the dam pattern inserted into a river upstream of your house. When subjected to stress/energy it wasn't designed to withstand, the dam failed. This flood destroyed your house, garden, and maybe your life and the lives of other people.

Since everything falls apart, and this is going to happen, always and everywhere, often seemingly spontaneously, you might as well plan for that and use affinity patterns in your life to use/direct/store the energy being dissipated by entropy into as much useful work as you can get so that it hangs around for a while and helps you get stuff done and/or store some of the energy by using patterns to convert it to form.

For example, capture the energy of rain with a rainwater harvesting system (which is a "pattern"), and use it to grow vegetables. Or purify it and drink it. Etc.

While this wonderful design work happens, be careful that the patterns you create to use/store the energy are strong enough to resist the expected flows plus potential surges.

In other words, don't ever attempt to urinate into the wind.

As we learn permaculture design, we carefully observe "what falls apart around us." Where are the energies/resources flowing? Into what sinks do these energies and resources disappear, never to be seen again?

Hot water down the drain is a literal example of an energy/resource sink.

So is a landfill.

A sink is a place or situation where energies and resources go to dissipate/disappear/disaggregate so they are no longer useful to us.

How strong are the flows to these sinks? What is the quantity over a given time?

If your rainwater harvest system, which waters your garden, holds 5,000 gallons, and the tanks are full, what happens if a sudden heavy cloudburst creates more rain than your system of gutters and trunk pipes that feed your tanks can handle? Where does that water/energy go? Will it go there destructively, or productively?

Energy comes at you from all directions and generally we just let it dissipate wherever "it" wills. We don't even notice the sinks where energy disappear.

In the winter, free sun hits our south-facing windows. We may not even bother opening the curtains so the sun doesn't shine in and we get no free passive solar heat to make our homes comfortable. Much of our modern construction has been completed without even a single thought about using the sun to heat and cool the building. We just hook ourselves up to a fossil-fueled energy system and spend a lot of money to achieve what good design and the sun can give us for free.

In modern capitalistic terminology -- the universe throws money at us all the time and we don't even stop to pick up the

hundred dollar bills that rain down around us before the wind blows them or they decay in the leaf clutter. We don't even notice the piles where they slowly decompose. Thus, we harvest none of them and gain no yield or advantage or work from the situation.

We are able to do this, unlike previous generations who had to pay attention to such things, because of the cheap and easy and seemingly abundant availability of fossil fuels. It doesn't matter if you pour hot water down the drain in the winter, thereby wasting the BTUs that you spent money to put into the water (either by cooking or by heating a hot water tank), because we all think – even me, Mr. Wannabee Energy Conservation Man – on a subconscious level that there are plenty more BTUs out there that I can get just by flipping a switch so I don't have to seriously conserve.

Alas for that idea . . . the days of abundant and cheap and reliable fossil fuels are history. Our Ascent Years are past, now come the Decline Years, and the Ascent strategies which seemingly served us so well will be positively toxic to us as individuals and as a species in the future.

Winter is coming . . .

If you always do what you always do, you will always get what you always get.

If we continue to ignore entropy and pretend that we can somehow fool Mother Nature with our fossil fuel addiction, we will get what we always get, which is entropy-driven waste and destruction. Only there won't be abundant fossil fuels to pull our chestnuts out of the fire, and so it could come to pass that "the center cannot hold."

We need to do something different to yield a different result. In other words, "do what you can, with what you have, where you are."

"What you have" includes all the energy that flows into your life.

Do what you can" with it.

"Where you are" -- always remember where you are, in place and time.

We'll never get all of it, the laws of thermodynamics will always intervene, especially the 2nd -- "You can't break even." Every time energy changes there is a net loss.

Design Application

Observe the ways that entropy is a factor in your life. Find the sources of energy and resources, and the sinks where they disappear/dissipate.

Observe the ways that affinity is a factor in your life. What draws things together around you?

Study and Evaluate the potential for capturing the energy released by entropy in your life. What kind of patterns could you create to use/capture some of that energy to do useful work for you or transform into yield/useful stuff?

Design your response, using appropriate patterns to develop energy storages in your life and gain a yield/harvest.

Stage your implementation response according to your determined schedule.

Appropriate scale is always a consideration, since –

– the more moving parts you have,

– the more maintenance you need,

– the more work you require,

– the more energy that must be expended,

– the more sinks that will be present,

– the more opportunities present for entropy to do its thing.

A house doesn't maintain itself, mine certainly doesn't, and my office is a great example of this.

A tree is more self-maintaining and is certainly useful in urban design. However, location is everything. Don't plant a tree right over the waterline that connects your house to the city water system. Don't plant a tree over your sewer line either. You may need to dig up those pipes to repair them. If there is a mature tree sitting on top of the pipe, well, that complicates things. The relevant permaculture maxim would be -- "prefer biological solutions." Why? Because with proper design, you can recover and store resources that would otherwise be lost.

With improper design, though, like the tree over the waterline, you run the risk of creating extra work, which is most certainly not the point of this exercise.

Designing to harness the powers of entropy and affinity are among the most useful tools in the permaculture designer's toolkit.

From a design viewpoint, entropy and affinity are resources, some of the most abundant resources available to us, which is why "design to use entropy" and "design to use affinity" are useful to the permaculture designer. If we don't harness the energy released by entropy (by patterns that yield constructive results), it just runs amok. The rain that falls on our roofs, instead of peacefully watering our vegetables, erodes the soil and washes nutrients into the gutter.

So – "use it, or lose it!"

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00321 Diversity

Diversity plays a significant role in sustaining resilience in ecosystems." Functional redundancy and response diversity appear to be crucial. Functional redundancy refers to the presence of a number of species performing the same function. It provides `biological insurance' against the disruptive effects of environmental fluctuations on ecosystem functioning. Within these functional groups, response diversity, whereby certain species will respond | better to a disturbance and be able to sustain or restore a function, is also important.
Carl Folke, Resilience and Sustainable Development

When permaculturists speak of diversity, we refer to a diversity of functions and connections, not a numeric list of items at the site a/k/a “numerical diversity” –

– Many elements support every function.

– Every element should serve many functions.

Numeric diversity is fine and we should design for it but a diversity of functions and connections is more important.

Most of my yard space is on a street (I am on a corner lot), and the buildings are right up against the east property line. As a result, even though there is a small "back yard," most of my space is "out front" for everyone to see.

So as I began to play with some garden ideas before I got involved with the formal study of permaculture, we had a major ice storm and two old mature elm trees splintered, one of them actually falling over. Within a couple of days, we heard buzz saws outside and ran out and a city crew had cut the one that hadn't fallen over, and it fell over as we ran out shouting "no, no, stop, stop.” Confused by our outcry, they expressed astonishment when we refused to allow them to haul away any of the limbs. So we just left the two large trunk logs laying where they fell. One was right along the edge of the sidewalk, the other along one side of the driveway.

One day the code inspector comes out and he says those two dead trees are code violations, because they were "trash and debris.” He handed me the notice and I read the definition which was something along the lines of "items strewn across the property, abandoned, or otherwise having no function.”

I said -- wait a minute. These logs do have functions. They are not casually strewn about. I put them where they are for specific purposes:

1. I sat down on one log and said -- "I like to sit here and watch my garden, so it is a garden chair."

2. I stood up and said -- "It is slowly decaying and releasing nutrients into the soil."

3. "It is a habitat for beneficial insects."

4. "Mushrooms grow on it."

5. "Those two bushes next to it are Oregon grape, they are forest plants, so they need some dead wood laying around on the land around them."

6. About that time my cat jumped up on the log and I petted it and I finished with, "And they serve as a cat petting perch."

When I got to point 3, the inspector rolled his eyes and shook his head. When I

finished, he took the notice back and tore it in half.

So it comes to pass that a dead tree laying on the ground was busy doing six different kinds of work for me. That's numeric diversity.

But wait – there is more. Let's look at this list a second time and this time add in the beneficial connections.

1. Garden chair. Connects with the spiritual and psychological health of my lifestyle.

2. Support for fertility. Connects with my household food system and also my household system for disposing/repurposing/recycling items no longer used for their original purposes.

3. Beneficial insect habitat. Connects with the ethical need to care for the planet AND my food system (attracting and sustaining beneficial insects) AND my duty to preserve biodiversity.

4. Mushroom production. Connects with my household food system. Reduces my need to travel to buy food.

5. Connects with personal health since Oregon grape are natural sources of antibiotics. Provides beauty during the winter (lovely copper colored winter foliage). Winter beauty pleases the neighbors and that's good too.

6. Making the cats happy makes me happy.

So we see that the functions of these dead trees connect to useful functions for people and for growing things and for household pets. The people, growing systems, and pets in turn connect with other functions and elements of the site. The knee bone connected to the thigh bone . . . That's permaculture diversity.

Nutrient management is a critical function in permaculture. What possibilities are available to support the fertility of an edible landscape? Let us count the ways --

1. Compost in place (under the mulch around growing plants) and with a compost pile. Connects with the household food system by providing nutrients and a place to cycle food leftovers.

2. Water with urine diluted in water (one part urine to 10 parts water). Connects with reducing our demand on the city's sewage and water system and supports fertility.

3. Plant green manure crops (such as crimson clover and hairy vetch) in the fall that will grow over the winter. Supports fertility, supports household food system, winter beauty, supports psychological and spiritual health.

4. Vermiculture! Could be a "worm farm" and/or worms in your container plants and worms in your garden. Provides a place to cycle leftover food, supports fertility, supports household food system.

5. Nutrient accumulator plants (dandelions, comfrey, lemon balm, dill). These have long taproots that go deep and bring minerals to the surface in their leaves. When they die or shed their leaves, the nutrients become available to the surrounding plants. There is a long list of these plants. Many of these plants have uses as food, insect attractors, and medicine. Connects with household food and health systems.

6. Nitrogen fixing plants and trees (black-eyed peas, various clovers, alfalfa, redbud, this is a long list). Many of these plants have uses as food, insect attractors, and medicine. Connects with household food and health systems.

7. Wood ashes if available. Connects with the backup home heating system by providing a place to cycle ashes from the wood fired heater.

8. Using logs as landscape elements provides another source of fertility, as the logs slowly decompose and release their nutrients into the soil. Mulch slowly decays and feeds the soils. See previous

commentary on the multiple functions of dead logs in the landscape.

9. Greywater cycled from your shower, bath, laundry, or kitchen. Connects with household food system by providing nutrients. Reduces demand on city water and sewage systems.

10. Compost tea. Supports fertility and household food systems.

So the critical function of nutrient management could be supported by ten elements, all of which connect with each other and to multiple other functions and elements on the site. The thigh bone connected to the hip bone . . . That's permaculture diversity.

I live in an urban area. I can't get all of my food from my own property. My own food system consists of the following redundant systems –

1. Food I grow myself.

2. Food grown in the local area that I buy through the Oklahoma Food Coop.

3. Food grown in the local area that I buy at farmers markets.

4. Food grown in the local area that I buy from locally owned stores.

5. Food grown in the local area that I buy directly from farmers at some other location.

6. Food from outside of this area that I buy at locally owned stores.

7. Food storage in case there is a problem with any of these systems.

I don't buy national brands and I don't shop at nationally owned chain stores. If I lived in an area without diverse shopping options, I might have to shop at a place like that. I am fortunate to live in an area of grocery diversity and to be a member of the Oklahoma Food Cooperative, which links me with 120 different Oklahoma farmers, ranchers, and non-food product producers..

The design relevance early on is -- as you identify critical functions, design backups to the backups. As you design, look for elements that do more than one thing. Connect functions, as a diversity of such connections builds resilience into the fabric of the design.

This diversity of beneficial connections is the most important thing about diversity for the permaculture designer. Yes we can simply multiply varieties -- we really like hot peppers, so we grow habaneros and Scotch bonnets and jalapenos and Serrano and cayenne. With permaculture design, we want to reinforce functions with multiple backups, establish numerous connections between elements, and show good conservation of energy and resources by multiplying the functions of individual elements.

The design questions you constantly will ask are –

How can I maximize the beneficial connections of this element?

How many elements can support this function?

How many functions can each element support?

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00331 Appropriate Scale

There is an appropriate scale to every human activity and it is the scale of personal responsibility. *Andrew Kern*

On a more personal level, I think that much frustration in life comes from living at an inappropriate scale. Minimalism is gaining attention because minimalists say "Scale down!" while the rest of our culture is saying "Scale up!" Minimalists provide a valuable counterweight, but they can be a bit extreme. As Milton Glaser pointed out, less isn't more, just enough is more. Instead of simply scaling up or down, we should find an appropriate scale. *John Cook*

We define Appropriate Scale as an element, system, action, or technology appropriate to a situation in its complete context. It is often easier to get at the definition by thinking of examples:

Not appropriate scale:

– Building a nuclear reactor to provide electricity to a house.

– Using a bulldozer to build a raised garden bed.

Appropriate scale:

– Installing a wind generator and PV cells to provide electricity to a house.

– Using a hoe and shovel to build a raised garden bed.

– Using a bulldozer to build a dam for a lake.

In any situation, there are **seven layers of infrastructure** present that can provide technology, resources, services, and work that constitute, safety, shelter, and supply They are:

– Personal

– Household

– Neighborhood/Village

– Town/City

– Region

– Nation

– World

The closer the infrastructure, tool, or resource is to the person, the more robust and resilient it is, and the more control can be exercised over it by the individual households.

The further away – higher up – the infrastructure, the more brittle and less resilient the tech/resource, and less control can be exercised over it by the individual or household.

Our design goal is to **provide what we need** – supply, safety, and shelter – at the most **appropriate scale for each function.**

We don't want to design any nuclear power plants to provide energy for our apartment building.

One of the psychological quirks of modern life is a certain tendency toward the grandiose when we think about changing our lives. This is a subtle way the system has trained us so that we constantly set ourselves up for failure. We don't think in a scale appropriate to our abilities and lifestyle. Instead, we come up with something that is virtually impossible for our situation. When we

fail, that little demon sitting on our shoulder whispers in our ear, “See, I told you so, you can’t do this. Sit back, continue to consume and excrete, just like the television teaches you. Forget all that permaculture nonsense.”

Your designs should be of an appropriate scale for your life. When you begin to work with others in your community on designs that will make your community better, you work at a scale appropriate for the context.

Appropriate scale is essential for good permaculture design.

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00341 A Permaculture Fable

If stories come to you, care for them. And learn to give them away where they are needed.
Sometimes a person needs a story more than food to stay alive.
– *Barry Lopez, in Crow and Weasel*

Appropriate Scale, Entropy, Affinity, and Diversity walked into a bar owned by Permaculture Designer.

Diversity ordered a drink with 24 liquors, many of which were made in the bar by the Designer's family from materials grown in the area. It poured into a glass made from recycled bottles, stirred with a spoon made from recycled metals, on a bar made with recycled wood, while sitting in a chair made by the same folks who made the bottles. They financed their operations with a loan from a credit union in which – thanks to Affinity – Permaculture Designer, Appropriate Scale, Entropy, and Diversity were all members.

Appropriate Scale wondered if that was too much Diversity, especially since they hadn't had anything to eat? Affinity replied that the drink was perfectly balanced in its flavors so we shouldn't be worried, and Diversity piped up and said, "Look at all those beneficial connections!"

But the question was moot because Entropy went behind the bar and spilled the drink on the counter!

Never fear! This bar's designer knew that Entropy would be a regular guest.

So the liquor flowed into a little gutter . . .

. . . which dripped the liquor into a jar . . .

. . . in which the Permaculture Designer candied some peaches . . .

. . . which the family harvested from the Designer's orchard . . .

. . . which the family ate with great relish . . .

. . . even though Entropy tried to make the peaches go bad and had made an attempt to break the canning jar by arranging things so that while carrying the peaches, the Permaculture Designer slipped on a banana peel that had not made it to the kitchen compost pail . . .

. . . which had been nicely designed by Permaculture Designer except . . .

. . . that Permaculture Designer didn't listen to Appropriate Scale or Affinity and being more under the influence of Entropy . . .

. . . Permaculture Designer designed the mouth of the container so that it wasn't quite wide enough to catch something thrown at it from the counter. Oops.

This was obviously a Type 1 error so Permaculture Designer immediately went to work and consulted with Affinity and redesigned the jar and added some other functions to reinforce the container element.

Anyway, as stated, the family enjoyed the candied peaches and as such things go went on to have great bowel movements . . .

. . . which went into a biogas digester designed by Appropriate Scale to make household methane.

They resisted Entropy's urging to get away from the stink and just flush the toilet with the assistance of Diversity's reminder of their need for beneficial connections and Affinity's reminder of how useful methane would be.

So they decided to use onsite yields to meet onsite needs, and thus increased the resilience of the entire system.

The methane heated a still, to make more alcohol, which permaculture designer sold in her bar. The family enjoyed the rest of the ethanol, who (as a result) urinated into jugs which, after being diluted with ten parts water for each one part urine, fertilized vegetables for the bar's antipasto appetizers and side dishes.

After composting, the family distributed the solids from the digester around the Diversity-designed orchard, where with the assistance of Entropy and Affinity, it contributed to the fertility of the soils. Thanks to Diversity, Entropy, and Affinity, they produced an even better crop of peaches the following year, also plums, apples, apricots, mulberries, but not boysenberries or elderberries because they didn't make a crop that year which was not a tragedy because this was a redundant orchard so they had other fruits available.

Entropy had something to do with that crop failure although it wasn't as much of an issue as might have been the case if Diversity and Affinity hadn't been in on the orchard design team.

Rain watered the orchard, since Permaculture Designer had placed patterns to capture the rainfall and direct it where it was needed. Entropy, Affinity, and Gravity assisted in this process. They are always around, even if not mentioned in the beginning. When it rained, the water rolled off the roof into a Diversity-designed and Appropriate scale/Affinity-influenced series of swales. The swales fed ponds and wetlands, where again with the assistance of Gravity, Affinity, and Entropy, the water loaded up with various nutrients and in that way Entropy and Affinity fertilized and watered the fruit trees . . .

. . . which fed the people,

. . . who made the alcohol,

. . . which filled the drink,

. . . which Entropy spilled back at the beginning. (See how things connect?)

The name of the bar?

The House Ouroboros, of course!

How could it be otherwise?

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00351 Type 1 Errors

A stitch in time saves nine. An ounce of prevention is worth a pound of cure.

A type 1 error is anything that creates more work, expense, and hassle than it is worth or puts you or others at risk of hazard and harm.

Years ago in a fit of enthusiasm, I rushed out and planted a persimmon tree. I didn't give good thought as to its location and I planted it right over the water line that connected the city's water main to my house. That was a Type 1 error, which I realized when we had to replace part of the water line. Oops.

Attempting to use a technology beyond the scope of the site and the abilities of those who live there is a Type 1 error.

Sloppy observation, leading to poor design decisions, is a Type 1 error.

Using permaculture for an evil end is a Type 1 error. (Don't use permaculture to design a factory that makes biological warfare weapons.)

Designing systems, routines, or structures that create hazards for you and your household is a Type 1 error.

Arming governments with nuclear weapons is a Type 1 error.

A basic rule of permaculture design is "Avoid all Type 1 errors."

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00361 Systems Thinking and Permaculture

Systems thinking is the process of understanding how things influence one another within a whole. In nature, systems thinking examples include ecosystems in which various elements such as air, water, movement, plants, and animals work together to survive or perish. In organizations, systems consist of people, structures, and processes that work together to make an organization healthy or unhealthy. *Wikipedia*

A forest is a self-organizing and self-regulating system. If it works, it works. If it stops working as a forest, it evolves into something else, like a grassland savannah or an arid desert.

Systems thinkers study the individual characteristics of parts and their relationships to other parts of the system or structure. Indeed, the relationships of the parts are a primary direction of study and inquiry.

Problems can only be understood and resolved by **considering them in relation to the whole system** which they disturb. The **individual parts** of a system – and the **links that unite discrete parts into a whole system** – are critical to finding resolutions for perceived problems.

The difficulty of this should not be discounted.

As people come to these concepts, we generally approach a problem by first making detailed studies of its various "parts." After this we study the way those parts relate to each other. Finally, we consider how they operate as a "whole."

Systems thinking helps us understand the problem of unintended consequences.

We do something over here – and later we find that it has a pronounced negative effect some place else, maybe something we hadn't even considered.

A recent example of this is the regime change the Western nations sponsored in Libya. This resulted in an invasion of Mali by soldiers who previously worked for Gadhafi. They linked up with Al Qaida and as of the publication of this book, they run the northern part of Mali where they have imposed a harsh interpretation of Sharia law and persecute Christians.

Because of this well known problem of unintended consequences, systems design promotes communication among all levels, links, and elements of an organization or system. This helps avoid the problem of information sinks, where important information disappears and is not available to the rest of the system.

Since good decisions require good data, imperfect or missing data can contribute to less-than-optimal decisions and to catastrophes of all kinds and magnitudes

One characteristic information sink is known as the "information silo."

On a farm, a silo is a tall building, that stores grain. In an information silo system, news and data move up and down vertical channels, where managers serve as gatekeepers with the power to restrict or enhance the flow of information. The walls of the information channels limit lateral communication. If a manager makes a mistake, and withholds certain data, problems may proliferate throughout the organization. A system locked in an information silo simply can't communicate with other systems or components.

Solving Problems.

The problem contains the solution. This is true because a larger whole contains the problem and the problem is thus an integral part of the whole. It is a tree in the forest. To find the best resolution, we look at the larger system. All too often, however, people just look for symptomatic relief and don't worry about the larger issues. This creates more problems down the line as the problem continues to grow since no one ever gets to the heart of the matter.

Permaculture problem solving involves designing holistic systems that work. The permaculture ethics of caring for people, caring for the planet, and having a care for the future guide our design work. .

Wikipedia on Systems –

Science systems thinkers consider that:

– a system is a dynamic and complex whole, interacting as a structured functional unit;

– energy, material and information flow among the different elements that compose the system;

– a system is a community situated within an environment;

– energy, material and information flow from and to the surrounding environment via semipermeable membranes or boundaries;

– systems are often composed of entities seeking equilibrium but can exhibit oscillating, chaotic, or exponential behavior.

Systems thinking incorporates:

– Holistic thinking. It's not really possible to adequately describe an object by only an examination of its constituent parts. Parts are important, as are the links and relationships that unite the discrete parts into a whole whatever. In other words, the whole is greater than the sum of its parts.

– Feedback. Some system of regulation must exist for the system to maintain itself and accomplish its purposes. Feedback can be reinforcing or it can be correcting. Too much of something will initiate an ecological response. So will too little of something or a sudden degradation of a system.

– Imports and Exports. A closed system has no external imports and does not export to its environment. An open system has additional imports and also exports to its environment.

– Entropy. Always present and active.

– Complexity. Smaller subsystems build up to larger complex systems.

– Specialization. There is often a differentiation of functions within the system, where subsystems are responsible for certain activities/tasks that benefit themselves and the whole system.

– Interdependence. Systems and the objects and systems that compose them, relate to and depend upon each other.

– Teleology. The systems interactions move it toward a goal.

– Transformation. Imports become exports in fulfillment of

the teleological purpose.

– Stacked functions. Getting more than one kind of result from the same activities and resources.

– Redundancy. Uses multiple ways to achieve important results/functions.

(End Wikipedia quote.)

Physicist Fritjof Capra on whole systems thinking –

I shall identify five criteria of systems approach...

1. Shift from the parts to the whole. The properties of the parts can be understood only from the dynamics of the whole. In fact, ultimately there are no parts at all.

2. Shift from the structure to the process. In the new paradigm, every structure is seen as a manifestation of an underlying process.

3. Shift from objective to epistemic science. In the new paradigm, it is believed the epistemology - the understanding of the process of knowledge - has to be included explicitly in the description of natural phenomenon...

4. A shift from building to networks as a metaphor of knowledge. In the new paradigm, the metaphor of knowledge as a building is being replaced by that of the network.

5. Shift from truth to approximate descriptions. This insight is crucial to all modern science...in the new paradigm, it is recognized that all scientific concepts and theories are limited and approximate...

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00371 A Hierarchy of Goods, Betters, and Bests

Do what you can, with what you have, where you are.

Never let the perfect become the enemy of the good. Incremental steps that lead to better outcomes than we presently experience are always good. The cumulative effect of **small incremental steps over time can be powerful.**

If you cannot make the best decision, make a better decision.

If you cannot make a better decision, make a good decision.

If you cannot make a good decision, avoid making a bad decision.

If you cannot do the best, do better.

If you cannot do better, do good.

If you cannot do good, don't do bad.

Often, making good decisions develops the ability to make better decisions. Making better decisions enables you to make the best decisions. This is succession at work in your life.

Use Succession to Solve Problems

Sometimes we need a quick fix to a festering problem. If people are hungry, a fix might involve buying groceries from a supermarket and distributing it to those in need. This isn't necessarily the best permaculture practice. As an emergency response it works. It is "good."

Having met the immediate need, we could move on to a second level of response, e.g., teaching people how to cook meals from basic ingredients and maybe moving on to developing capacities like community gardens, tool cooperatives, and processing kitchens at local stores and schools. This is "better."

The final step would be implementing the best approaches – that is, introducing them to and helping them work through all of the steps of local and community food security. This is "best."

However, in this particular design problem . . . we are unlikely to do much with the "best" choice until we have worked through "good" and "better."

Procrastination is the thief of time.

Some of us live in an imaginary future, where we think we will be able to live more permaculturally because, you know, it's safely in the future and we don't have to actually worry about doing something in the now.

The kindest thing I can think of to say about that attitude is that it is an unhealthy psychological trap which serves the purposes of the Excess Consumption System.

Getting out of the problem and into the solution requires that you break out of that land of the future lotus eaters, and ground your experience firmly in the here and now!

Decisions regarding change

This material comes from a presentation by Professor Stuart Hill University of Western Sydney, to the Blue Mountains Permaculture community in June 2011, on

permaculture and the 'inner landscape'. http://youtu.be/mzY1eZLwOdk. It is worth the time to watch the whole presentation.

Appropriate next steps are always deeply personal and highly context specific.

This is why formulaic, centrally directed, and imposed change always fails to achieve its stated aims and invariably causes more problems than it solves. As you think about the next steps in your life, consider these questions:

– What do you stop doing?

– What do you do differently?

– What do you increase/expand?

– What new things to start doing?

– What will it take to do this?

– What are the barriers and what will remove and weaken them?

– What resources are needed and available (particularly local) and how do we get them?

– Prioritize activities and apportion resources.

– Brainstorm and set long, mid, and short-term goals.

– Break goals into meaningful doable actions (no Olympic-size decisions here!)

– Do, reflect, celebrate – do, reflect, celebrate (praxis!).

– Evaluate and redesign as indicated by outcomes and feedback

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00381 Design Process

Good design begins with honesty, asks tough questions, comes from collaboration and from trusting your intuition.— *Freeman Thomas*

Permaculture is a design system for lifestyles, systems, sites, communities, and other objects of our interest and concern. We study a system or a lifestyle or a community or a particular problem, or place, observing how its parts relate to each other and to the whole, looking for connections and patterns and noting places where there are inefficiencies or energy sinks that can be repaired/restored with more sustainable practices or systems. We study and evaluate our observations in light of our experience and knowledge and community-wisdom. After observation, study, and evaluation comes design. If we design effectively, the whole will be greater than the sum of its parts.

This chapter looks at the design process. It unifies a considerable amount of material from this section into one holistic narrative. It will seem complicated. It might even appear chaotic. It is no doubt a dense collection of trees, not to mention the shrubby understory plants and herb plants and ground covers, roots, and climbing vines. Don't get so distracted by all the vegetation that you don't appreciate and understand the whole that is Forest. Think of each of these concepts as a small building block of the permaculture design process.

Look for the forest and see the trees and vines and shrubs and roots and ground covers! Understand the forest and the parts will become comprehensible.

Learn about the trees, micro fauna, micro flora, ground covers, shrubs and cane fruits and in what might be a burst of comprehension you will grok the forest.

What does “grok” mean in this sentence? To “grok” is to become one in comprehension and understanding with the forest in its totality and its parts.

The Jargon File (a/k/a Hacker’s Dictionary) defines grok as:

> When you claim to 'grok' some knowledge or technique, you assert that you have not merely learned it in a detached instrumental way but that it has become part of you, part of your identity.

In other words, it is a holistic understanding. Remember this word because we will meet it again in our iPermie journey.

OSEDI!

We use a five-part process to produce a permaculture design:

Observe! See your realities as they exist around you, uses Lifestyle inventory (00161), Maps (00171), Questions (00181), and question documents from the other sections.

Study and Evaluate! Uses Methods (00251), Ethics (00211), Principles (00221), Sectors and Zones (00281)

Design! Uses Design (00201), Principles (00221), Concepts (00231), Patterns (00241), Methods (00251) Toolbox (00261), Sectors and Zones (00281), Appropriate Scale (00331), Diversity (00321), Entropy and Affinity (00311), Systems Thinking (00361), Write your story (12011), Timelines of your story (12021).

Implement! You begin to actually walk your talk and live your dreams in the midst of your realities.

The acronym that helps us remember this is **OSEDI** – Observe, Study, Evaluate, Design, Implement

OBSERVATION

Permaculture design begins with "long and thoughtful" observation. This is not a quick glance. It is a thorough examination over time. First impressions can be – and often are – deceiving.

Observation does not happen in a hurry. It is intentional. It sees your lifestyle in all of its contexts --

– *Visible* (physical features, resources, structures, your body, etc.)

– *Invisible* (community, laws and regulations, cultural mores, your relationships with others, etc.)

Your observations contain a complete set of your **goals** for this design project – which presumably is your life. Or it could be something more short term if you do a specialized application of permaculture design for a specific purpose. One way to get a list of goals is to brainstorm and do some analysis and ranking of goals that are more important. That process continues until there is a **consensus** among the stakeholders about the goals. If you are the only one, your consensus is just you. If there are others who are part of your life, bring them along on the trip. It may be long, and it may be strange. Company is always welcome.

Consensus doesn't mean everyone enthusiastically agrees. It means that no one disagrees.

Observation includes **identification of the necessary functions** of your life that must be accounted for with your design. This is a slightly different process than goal identification, which involves an aspirational process of formulating your desires and wants for your life. The functions, on the other hand, are the necessaries. Whatever you plan to do with your life, you must eat so you need food and a way to prepare it. You need a dwelling. You need to excrete. And so on and so forth, down the list of necessaries in your life.

As you identify the goals and functions, compile **lists of the activities and elements associated with each goal and each function.** You may notice that you slowly move from the general ("I want a happy life") to the more specific ("I need a place to live with about 750 square feet). Eventually you will become specific and detailed as you move into the design phase.

Commit your observations to **writing.** Don't trust your memory. Make written records of your observations.

To be of practical use, the observations must be recorded, in both a narrative and in the form of other documentation methods such as maps, charts, lists, and databases. You will learn a lot about your situation as you write a narrative about it and make maps and diagrams regarding the places and geographies in your life.

STUDY AND EVALUATION OF THE OBSERVATIONS.

Mollison writes in the Design Manual:

> The purpose of a functional and self-regulating design is to place elements or components in such a way that each serves the needs, and accepts the products, of other elements.

Studying your life.
It's not enough to observe your life. You need to study your life. How did you get to the present places – intellectual, emotional, professional, educational, geographic – of your life? What clues to the future do you find in your history?

As you study, you continue to make notes. You're looking for places of **cooperation and stacked functions** in

your piles of information. You look for places of **competition**. When you find it, look for ways to substitute cooperation so that all benefit. You want all the beneficial connections to flourish. You want to avoid conflict and competition.

Everywhere you look for **beneficial connections**. Three or more connections per function or element is a great place to start. The more beneficial connections, the better, the merrier!

There are various study techniques that can help you find beneficial connections.

Notes. You could assign each goal or function a color and put activities and elements on notes on a board. Mark them with colored pencils in accordance with your color scheme that identifies which element or function they connect to. The notes with the most colors are your best bets for resilient and practical design work.

Keywords. Another technique is to compile a series of keywords early in your observation process. Enter all your information into a database and assign keywords. This allows you to produce reports based on connections. For example, you could produce a report with everything that you found that relates to "Fertility" or "Gardening" or "Transportation."

Start your evaluation with ethics. Since the goal of our design is a lifestyle that is consistent with the permaculture ethics, the first layer of evaluation as we study our observations is ethical. The three permaculture ethics are essential evaluators of all permaculture design ideas and observation:

– Care for the planet.

– Care for people.

– Have a care for the future by being aware of limits and putting surplus into circulation.

If you have other ethics in your life that are important to you – that derive from your spirituality or other beliefs you may have – bring them into this evaluation too. You are who you are and you can't leave anything behind so your spirituality is certainly an aspect of your evaluation of your observations. Spirituality isn't required to do permaculture design. It works for atheists and agnostics as well as believers. The take away is that your evaluation should be holistic. For believers, that includes their spirituality.

As a result of your ethical review. . . There may be some things in our life that you want to **simply eliminate** because they are contradictory to the ethics of permaculture or other beliefs you may have. Get them out of the way early on, so they don't clutter and confuse our design process.

Evaluate your lists and charts.

Mollison wrote:

> RESOURCES are practical and useful energy storages, while INFORMATION is only a potential resource, until it is put to use.

Information is fine and important and we must have it. Besides information, we need the connections that link that information into an integrated whole. Look for beneficial connections – those that exist already and connections you can make in the future by design.

At this point you have some lists of goals and the necessary functions for your life. You have some lists of activities associated with those goals and functions.

Are all of these goals and functions equal? Not likely. Your **goals, activities, and functions need to be prioritized**. What are the most important goals you want for your life? What are the most critical functions? Always start with the most important and critical.

After establishing priorities, look through the lists of activities and decide which activities **need an actual place to happen and which don't need an actual space.**

For example, you probably listed “eating” as one of the necessary functions in your life. Eating at least implies cooking and cooking suggests a kitchen, so that’s something that needs a place.

A goal like “develop more loving relationships” is not place-bound. It can be realized anywhere.

You will use this information as you continue to drill down and become more specific and begin to make design decisions.

Patterns

What patterns do you find in your life and community? How do these patterns interact and relate to and with each other? If you contemplate changes in your life, what patterns do you need to support those changes? You may need lists of patterns that you observe and an evaluation of how they connect and interact with each other

Zones and Sectors

Evaluate your functions and activities requiring places and your geographies to determine how everything locates relative to everything else in your life. If those relationships and locations are not optimum, what needs to happen to optimize them? Examine the sectors to determine the impact of the energies on the systems of your life and community and to decide what you need in the way of collectors, deflectors, and shields that will manage those energies.

Evaluate the zones of your life and all of its sites and geographies. The purpose of this evaluation is to decide about the appropriate placement of elements and geographies of your life.

Evaluate the sectors. What energies impact you and from where? What is useful, what needs to be redirected for more beneficial uses, and what should be blocked in self-protection?

Problems and Hazards

What specific problems did you discover during the observation phase? What are the potential solutions, appropriate to the scale of your lifestyle, to those problems? What would be involved in harnessing the energy and resources that entropy sends through your life before they are entirely dissipated? Since it is hard – if not impossible – to do just one thing, what other impacts/consequences (intended or unintended) will there be on your life by these changes?

The goal is always a holistic evaluation of the entire situation so that design recommendations can be determined and implemented. Don’t be afraid to use your intuition and follow hunches. It’s OK to trust yourself. Examine facts and details carefully. Don't neglect your inner vision! It is of equal importance to the facts on the ground. If something doesn’t “feel” right, keep looking and designing until it does.

DESIGN BASED ON THE STUDY AND EVALUATION OF OBSERVATIONS

Design proceeds, in the context of the observation and evaluation, by the application of permaculture principles, strategies, and techniques to achieve your desired results.

Testing Questions.

These are questions we ask, again and again, during our design work. Their purpose is to help us make decisions among the alternatives available to us. The use of testing questions is not a discrete phase. It is something that happens throughout the process.

– How does this care for the planet?

– How does this care for people?

– How does this have a care for the future?

– How does this connect to other elements in the system?

– How do I maximize the beneficial connections within the various elements of my personal lifestyle?

– How many ways can I meet this important need?

– How many functions can stack on this element or function?

– Do the energy patterns in the situation work for me or against me?

– What is the least change I can make for the greatest effect?

– What are the first things that need to be done in this situation? The second? Third? Fourth? Etc.

When it comes to various things (including systems) in your life, we ask questions like –

– Where do we put this item or system or structure?

– How can it be placed for maximum benefit?

– What beneficial connections exist between this and everything else in my life?

In more detail . . .

– What functions does it serve?

– How are those functions connected with other elements of the design?

– Can additional functions be stacked here?

– Does this harm anyone or anything?

– Where does this go?

– What does entropy do in this situation? How can I use that to the advantage of this system?

Other questions:

– Does this demonstrate solidarity?

– Is there a cooperative way to accomplish this goal?

– Can I find this locally?

– How much can this system productively manage (resources and energy)?

– How many reasons are there for doing this? (How many functions belong to this element?)

– How can I do this with less fossil fuel energy? Do I need to do this at all?

– What are the unintended consequences of this action?

The Spiral of Intervention

If we are in problem-solving mode, the first question is: **What happens if I do nothing?** Will this just go away if I leave it alone? Is it OK to ignore it? Will it get worse? Or will it simply be manageable as it is without further intervention?

If we decide we have to do something, we ask – **can I increase my productivity to compensate** for the losses caused by this problem?

If not, we ask – is there a **biological intervention that will fix** the problem?

If not, we ask – is there a **mechanical solution** to the problem?

If not, we ask (as a last resort) – is there a chemical solution to the problem? If we think we need this option, we need to ask and answer a further question – what are the **unintended consequences** of using a chemical solution? And, what is the least toxic form of chemical intervention that will work?

This is known as the **Spiral of Intervention** and our goal is to always avoid the final chemical option, since there are so many possible unintended consequences of applying chemicals in the environment.

Design is about taking all these seemingly disparate elements and working with them to create a beneficial system that cares for the planet, cares for the people, and cares for the future.

Five Categories of Resources Available for Design

If we have need to satisfy with resources, the decision hierarchy looks something like this:

Resources which increase by modest use. A cut and come again plant like chard. When you use a bit, it grows more. A coppiced tree and a pasture are more examples of this, as is friendship.

Resources unaffected by use. Many people can look at a beautiful view of the landscape, without diminishing the view. Water in a flowing stream used to power a turbine or mill is not affected by using it to run the equipment.

Resources which disappear or degrade if not used. If you don't harvest the garden, the vegetables rot and compost in place.

If no resources are available from these first three categories, we turn to the final two.

Resources which reduced by use. Fossil fuels are an example of this.

Resources which pollute or destroy if used. Fossil fuels are another example, as are herbicides and pesticides. These resources must be used as sparingly as possible and should be avoided as much as possible. A primary goal of all permaculture design must be to reduce the use of fossil fuels.

Design Methods

00251 has a discussion of ten methods of design common in permaculture design. This is where we bring these into play:

– Analysis

– Observation

– Deduction from nature

– Options and decisions design

– Data overlay

– Random assembly

– Flow diagrams

– Zone and sector analysis

– Testing Questions

– Model making and role playing

Design Areas Needing Decisions.

Always start with the goals that you are most passionate about, the most critical of the necessary functions, and the worst problems that need to be resolved. The following list is a comprehensive look at necessary design areas. Think of these as chapters in your plan. Add additional chapters as necessary.

– Food

– Water

– Energy, stuff, resource cycling

– Shelter

– Invisible structures (government, social and economic systems, culture)

– Access/transportation

– Community

– Economics

– Resilience/hazards

– Health

– Education

Suppose you are in a water design process and you observe rain falling on the roof. You want to use it to water your vegetable garden and fruit trees.

What principles and strategies and tactics are helpful in resolving the situation?

What systems/techniques will you need to get the rain from the sky into your garden?

How does your rainwater system interact with other systems on your property?

What connections does it have to other functions on the home place? (More connections = more resilience = more conservation of energy and work.)

Does it do just one thing, or can additional functions be stacked on it?

If it is an important function, is it safe to have only one system to do that, whatever it may be?

Or is there some redundancy that should be designed into the system?

Since cooking food is an essential function, you need more than one way to cook so that "many elements will support essential functions." This could mean – a regular kitchen stove, a solar oven, an outdoor bread oven, a propane camp stove, a wood burning stove, etc., all of which can be used for cooking.

Are there other functions that these five cooking elements can provide? E.g., in the winter, the indoor cooking elements can provide heat to keep the interior comfortable.

A wood-burning stove provides heat, can be used to cook, and the end product is wood ash, which is a useful garden fertilizer.

The garden produces food which may be cooked on the wood stove, creating wood ash, that helps grow more vegetables, and so on and so forth that cycle goes.

Are there any particular problems associated with these five cooking elements? Do any of these problems contain their own solution? The heat created by the indoor cooking elements may be welcome in the winter. It won't be so useful in the summer. In fact, cooking inside will cause you to spend more BTUs which cost money and deplete resources to remove the extra heat and humidity created by the indoor cooking elements. Do you want to move the cooking outside during the hot months? Is there a place to cook outside? And/or eat fewer cooked foods, more salads, sandwiches, etc.? The outdoor bread oven is a great summer cooking element, and produces ash which can be used as fertilizer.

At the beginning of the design, you may not have all the details you will eventually need. That's just fine for now. You don't need to know the exact size of a water tank to know that you need something to catch the rain falling on your roof and divert it to storage so you can use it to water your garden and maybe even take a shower. It is enough to know that getting the rain from the roof to the garden and the shower is an issue that requires a system to resolve it.

Your design analysis doesn't stop there. You take a shower in the water, getting a yield out of it, and you observe the water flowing into the drain -- which includes nutrients from the soaps and bits and pieces of dried skin, hair, etc. -- and you see entropy draining all that energy and resource into the sink of the city's sewer system, so you know that you need another "something" to do "something" with the grey water.

You keep on drilling deeper and becoming more specific. Down the line your design work proceeds, all the way until the last drop of rainwater has soaked into the ground and into the realm of the micro flora and micro fauna and worms or evaporated into the air, or whatever the uses are at the end of the chain of events that begins with a drop of rainfall hitting your roof.

Always look for connections between systems that reinforce the necessary activities, make them more efficient, resilient, and conservative of resources and energy.

Always look for multiple elements to support essential functions.

Always look for opportunities to stack functions.

Always look for biological solutions.

Always examine a problem and seek the solution that may lurk within the problem itself.

Always conserve energy and resources.

Always try to create mutually reinforcing situations (feedback loops).

Always work at a scale appropriate to your life.

Always look not only at the parts. Always see the whole. There is a forest and there are the trees. Individual trees are not the forest, yet the forest does not exist without the trees. The danger is that we see the trees and ignore the forest. Seeing the world and your life as a whole system is not easy. It can be learned, with practice, just like anything else.

Don't forget to count the cost in money and materials and time! Live within your budget – your finances, your access to energy, your time. Don't bankrupt your bank account, your time, or the planet for the sake of your design.

As your design progresses, so does the level of detail.

At the beginning, all you needed to know was that you needed a rainwater harvesting system to provide water for your garden. Before you finish, you will need to know how many gallons you plan to store in how many tanks located at specific places on your property. You will need to know how they connect to each other and what happens if it rains when the tanks are full. As your design progresses, you constantly drill down further to new levels of detail until you know everything you need to know about the design and its various decisions.

Staging.

As you complete your list of decisions, staging comes into play as the final design work. This always happens at the end of your design work. You have worked through your observations and evaluations and created a list of design recommendations for your life and its sites and geographies and systems so that you can achieve your goals.

Now you take that list of recommendations and put them in a rational order for implementation. You decided on priorities early in your design. Now you have to put pen to paper in order to schedule those priorities: first things first, second things second, third things third, to the end of your list.

Some things can be done right away, or without any preparation. Others have prerequisites. You may recommend an outdoor bread oven at a particular place only to find that the wood storage is in the way. You have two decisions – "build an outdoor bread oven" and "move the wood storage." Since you can't build the bread oven until you move the wood storage, schedule "moving the wood storage" before you try to "build an outdoor bread oven." If you plan to construct a house, first you have to build a foundation.

Staging proceeds in small, incremental steps, not as sudden, drastic changes. Don't think that you can do all of this work in one year. You spent your entire life getting to the place you are now. You aren't going to get yourself into a more permacultural situation is just a few months.

One of the biggest mistakes people make is to "bite off more than you can chew." This is a great danger, since failure can be depressing. A better idea is to be realistic about your abilities, time, and resources, and plan a gradual transition over a period of several years to wherever it is you want to be in a more permacultural future.

Implementation.

The final stage of this process is to do the work of implementation, according to the schedule you develop during your design work, and reap the benefits of your effort for yourself, your household, your community, and all of the planet. By definition, implementation involves work. Not gratuitous work for the sake of work, but work directed towards the end result of a better life and the rewards come quickly. This reinforces the process, which is good, because otherwise, we miss out on opportunities because they come disguised as work.

Permaculture design is a useless exercise if you do not do what you decide to do. That's why being prudent in your decision process is so critical to your success. Don't set yourself up for failure by making such grandiose decisions that nobody could do it all.

Observation of feedback is necessary for implementation.. You do something. You make a change in your life or something at your house. What happens? Are the results good, bad, indifferent? If you get negative feedback, this is an opportunity to revisit your design plans and perhaps make different decisions in light of the new knowledge you have based on your personal experience.

Ignoring feedback is always a Type 1 Error.

Dr. Stuart Hill's Testing Questions

> From a presentation by Professor Stuart Hill University of Western Sydney, to the Blue Mountains Permaculture community in June 2011, on permaculture and the 'inner landscape'.
> http://youtu.be/mzY1eZLwOdk

As you work on design decisions, use these questions to test your decisions against permacultural reality.

Testing questions regarding the ecology (Care for the Planet):

Does it support –

– environmental natural capital and sustainability?

– life supporting ecological (maintenance and developmental) processes that enable resilience and well being?

– conserving habits and functional high diversity?

– ecosystem development and co-evolutionary change?

Testing questions regarding human persons (Care for People):

Does it support –

– personal capital and sustainability?

– spontaneity, curiosity, engagement?

– empowerment, awareness, respect of the unknown?

– creative visioning, values, and world view clarification?

– acquisition of essential literacies and competencies?

– building and maintaining vitality, health, and well being?

– caring loving responsible relationships?

– lifelong personal development and responsibility?

Testing questions for design (Care for the Future):

Does it support –

– proactive, whole system design/redesign for enabling well-being and preventing problems?

– small/doable meaningful collaborative initiatives?

– windows of change and use of indicator/integrators?

– attentive to all outcomes and feedback?

Testing questions regarding invisible structures:

Does it support –

– socio/political/cultural capital and sustainability?

– building/maintaining trust, access, collaborative, life-affirming community structures and processes?

– reflective critical, imaginative, celebrational attitudes?

– cultural diversity and respectful , caring, mutualistic relationships?

– cultural development and psycho-social co-evolution?

We need more focus on –

– rehabilitive maintenance activities.

– caring for one another and other species and the environment.

– celebration.

– venting feelings and access to healing/support.

– prioritizing time and resources for these activities.

– sustained productivity emerges from the effective maintenance of whole systems.

PERMACULTURE DESIGN PROCESS SUMMARY

This is a summary of the information presented in this section on permaculture design. It is not everything, only the high points.

> What is a permaculture design?
> A beneficial assembly of components in their proper relationships.

Most important design principles:

– Many elements support every function.

– Every element should serve many functions.

-- Everything is connected.

Five Steps in the Design Process (OSEDI):

– Observe

– Study and Evaluate

– Design

– Implement

Four aspects of design:

– Techniques,

– Strategies,

– Materials,

– Assemblies

Four components of design:

Site – your life and its geographies, water, earth, landscape and plants, climate, geography, housing, work, education, stuff

Energy – technologies, structures, sources, connections

Abstract – timing, data, ethics

Social – legal aids, Invisible structures, people, culture, trade and finance

Eleven important design concepts:

-- Self-regulation and Feedback

– Sources of work and pollution

– Resources as energy storages

– Entropy and Affinity

– Chaos and disorder

– Diversity

– Appropriate Scale

– Type 1 errors

– Zones

– Sectors

– Patterns.

Self-regulation and Feedback. We like it. We want more of it. Getting there is difficult and takes time.

Sources of work and pollution. Bad design causes work and pollution. We always design to eliminate unnecessary work and pollution.

Resources as energy storages. We like them and we want and need more of them.

Entropy. This is everywhere and we counter it with affinity.

Chaos and disorder. Look for sinks and eliminate or regulate them. Only bring in that which can be actually used. Harmony and cooperation help.

Diversity. This refers to a diversity of beneficial connections

Appropriate Scale. An element, system, action, or technology appropriate to a situation in its complete context.

Affinity. Draws us together. Gravity is an affinity process, as is the hydrological cycle.

Type 1 errors. Anything that creates more work, expense, and hassle than it is worth and/or puts you or others at risk of hazard and harm.

Zones. A place for everything and everything in its place, properly located to conserve energy.

Sectors. Wild off-site energies that flow onto the site and into your life.

Patterns in permaculture design:

Everything in nature follows patterns and so does our world of technology, work, and supply.

Patterns result when events set in motion the evolution of forms.

Patterns observed in nature are good models for human designs (waves, nets, lobes, spirals, streamlines, clouds, branches, scatters).

Landscapes and cities are patterns of patterns. Patterns show expansion and contraction.

Energy follows the patterns set for it.

Boundaries (between/among patterns) are places where events happen. Creating complex boundary conditions is a basic design strategy.

Create boundary conditions that maximize edge. Use differences as a strategy to build resources. Stupidity is an attempt to iron out all differences, and not to use or value them creatively.

There are no new orders of events, just a discovery of existing events. Every event we can detect is a result of a preceding event, and gives rise to subsequent events.

Timing shapes events. Timing plus patterns yields shapes.

When patterns intersect with each other – like pieces of a jigsaw puzzle – we refer to this as tessellation.

When patterns nestle within each other – like bowls stacked on a shelf, one inside the other – we know this as annidation.

When patterns lay over each other – such as a flower petal pattern – this is superimposition.

TEN DESIGN METHODS

– Analysis

– Observation

– Deduction from nature.

– Options and decisions design.

– Data overlay.

– Random assembly.

– Flow diagrams

– Zone and sector analysis

– Testing questions

– Making models and role playing

CONCLUSION

I do hope at this point that I have not exploded your brain.

Because . . . If you study and praxis permaculture design, you will help save the planet!

You don't have to understand everything right at the beginning. There is much more to come and as with anything else, the more you study a concept, the better you understand it. You will do some little design problems and that will give you some practice, confidence, and understanding. You will talk about these concepts with others in your study group. You can seek advice online.

These concepts empower you with the tools you need to make a better life for yourself and for all you love. As you do this, you become part of a great movement that will heal our communities and restore the ecologies and watersheds and bioregions of our home, the planet Earth.

With permaculture design . . . Your goals are no longer impossible dreams. Now you can design a way forward to achieve them as you come to understand how to put the situations and activities and necessary functions of your life together into an understandable, harmonious, and practical system. The journey itself becomes filled with all the wonder of a life well lived.

Whatever the future brings, permaculture design equips you with the tools you need to successfully adapt, maneuver, and rise above the issues, challenges, and problems you encounter. Personal confidence, good judgment, and wisdom are among the known consequences of the study of permaculture design.

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00391 About state extension fact sheets.

Tapping your feet to the ceremony just won't do. -- *Eugene Hutz*

Every state in the U.S. has an “Extension” program, usually linked with the leading agricultural research university in the state. These state university extension departments are useful sources of information. They often have local offices at the county level which offer free expert advice on issues like gardening, building, cooking, and home economics topics.

They publish fact sheets on a wide range of topics. Most of these are available online as well as from local and state offices. However, their documents must be read with a certain amount of discretion. Because large universities published these fact sheets, they often recommend the use of chemical pesticides, herbicides, fertilizers, and fungicides. Ignore any anti-permacultural recommendations and instead concentrate on useful information like planting dates, pruning techniques, food preservation and processing, pest identification, etc.

Extension publications do discuss organic options. The rise of interest in organic production makes such publications more important to extension departments.

Don’t hesitate to call your local extension office with questions about gardening, food processing/preserving, or farming.

Your extension office is a great source of localized information, such as varieties of fruit trees suitable for your area, first and last freeze dates, etc. Many extension offices will do pressure tests for canning equipment and calibrate gauges.

Extension offices located in urban counties and cities have information specialized for city situations.

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00401 Additional Resources related to the Basics section

Learn as if you were going to live forever. Live as if you were going to die tomorrow. – *Mahatma Gandhi*

Books

Cousineau, Phil and Zelov, Chris, editors. Design Outlaws on the Ecological Frontier. ISBN 0965030628. Knossus Publishing, 1259 Northampton Street #340, Easton, Pennsylvania 18042. 1997.

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Mollison, Bill. Permaculture Design Manual. ISBN 0908228015. Tagari Publications, 31 Rulla Road, Sisters Creek, Tasmania 7325, Australia.1988.

Owen, David. The Conundrum. Riverhead Books. Reviewed at http://www.motherjones.com/environment/2012/02/book-review-conundrum-owen
.

Union of Concerned Scientists. Cooler, Smarter: Practical Steps for Low-Carbon Living. ISBN 9781610911924X. Island Press. 2012

Wheatman, John. Meditations on Design. ISBN 1573248231. Conari Press, 65 Parker Street #7, Newburyport, Massachusetts 01950. 2000

http://www.ipermie.net has pages of websites relating to the topics of this section.

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00411 Basics section Design Challenges

Design is where science and art break even. Robin Matthew

In permaculture, we learn design by actually doing design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has some small projects that you can work that will help you to develop design skills. Never forget that none of these challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

These are the three design challenges presented in this section:

– Design a way to use iPermie (00071)

– Design a learning community (00081)

– Design a record keeping/observation system for your life inventory. (00161, 00171, 00181)

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00421 About Bob Waldrop

Bob Waldrop holds a certificate in permaculture design from Elfin Permaculture in Florida, and has been a discussion leader in the organization's online Permaculture Design Course since 2007.

Bob is one of the founders of the Oklahoma Food Cooperative, which was America's first cooperative to only sell locally grown and made food and nonfood items. He served as the organization's first president and general manager.

He is the founder of the Oscar Romero Catholic Worker House, which works in food security for low income households. He works as the director of music at the Catholic Church of the Epiphany of the Lord in Oklahoma City. He is vice president of the Oklahoma Alliance for Liturgy and the Arts. He previously served on the Migrants and Refugees Advisory Board for Catholic Charities Oklahoma City.

Bob is the general manager of the Oklahoma Worker Cooperative Network.

He is a member of the Oklahoma Food Policy Council and the Oklahoma Food Safety Task Force.

He is a member of the Advisory Board of the Association for the Study of Peak Oil - USA.

He lives close to downtown Oklahoma City in a densely populated neighborhood. His house is on a 1/7th acre lot, built in 1929, which has been extensively remodeled to be more energy efficient. The house has 9 inches of insulation in its walls and 14 in its attic. The windows have R-20 interior insulated shutters. He landscapes his yard with edible plants and sculpted with earth works to retain and infiltrate rainwater. The house's original utility room is now a solar sunporch.

The primary house heating system is passive solar. There are two back-up heating systems: small, inexpensive (they cost about $50 each) oil-filled electric heaters, and a wood-burning stove. The house does not use natural gas. It is all electric. The household buys wind generated electricity from their utility.

The house is at 106% of the Passive House Institute (US) standard for new construction in terms of total energy used per square meter (the standard allows 120 kwh/sq meter).

In 2004, the Oklahoma Chapter of the Sierra Club honored him with its Earth Care Award for his work in founding the Oklahoma Food Cooperative. That same year the Oklahoma Sustainability Network gave him its Green Shield Award for his efforts to protect Oklahoma's environment by organizing the Oklahoma Food Cooperative.

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00431 Acknowledgments

My life involves many people and you find them here and there in these pages. I would like to acknowledge my intellectual debts and influences relative to this book: However, I do so with some trepidation because inevitably when you make a list like this, it is easy to forget someone.

Dan and Cynthia Hemenway, from whom I learned permaculture design and received a Certificate of Permaculture Design, and with whom I have participated in the Elfin Permaculture Online Permaculture Design Course since 2005.

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Dr. Gene Sharp, founder and senior scholar at the Albert Einstein Institution, for permission to include his Methods of Non-Violent Action.

Ray Barnes, for art for the cover and other decorations, view some of his work at http://www.pixeltrope.net/raybarnes/ .

Lucas Gonsalez, for reading and helping find some textual issues, and general encouragement.

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My housemates Sean, Renay, and Jonathan, who have put up with my experiments in sustainable living and exhortations for more years than should be counted. They heard all the exhortations herein first.

My grandparents, John and Opal Cassidy and Glen and Dovie Waldrop, from whom I learned,at an early age, about the importance of frugality.

Any mistakes, problems, ignorances, errors, and stupidities herein are, alas, all my fault and my fault alone.

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Section 1: Invisible Structures

It is no measure of health to be well adjusted to a profoundly sick society. *Jiddu Krishnamurti*

Justice and power must be brought together, so that whatever is just may be powerful, and whatever is powerful may be just. *Blaise Pascal*

Section List of Chapters

01011 Invisible Structure Basics
Structures, systems, religions, organizations, political and economic systems, all the "software" that makes human societies work. We move towards creating a society where it is easier to care for people, care for the planet, and have a care for the future.

01021 Invisible structures for urban and college permaculture
The special circumstances involving invisible structures of urban and college/university situations.

01031 Design issues in our urban realities
The importance of local governments. 18 urban design imperatives. Problems of cities.

01041 Invisible Structure Toolbox
14 interesting permaculture design tools useful in urban areas.

01051 Zones in Invisible Structures
Memes, habits/behaviors, structures, systems, communities, cultures, peoples, species. Eight zones for permaculture work.

01061 Observations About Invisible Structures
Invisible structures have consequences. Changing invisible structures has consequences. Be careful! The problem of unintended consequences.

01071 Succession and Invisible Structures
Memetic evidence of damaged cultural ecologies, first, second, and third order change agents.

01081 Extended Families, Groups, Organizations
The utility and importance of voluntary cooperation and kinship bonds.

01091 Open Source Resistance and the Occupy Movement
Replicating lessons from the Occupy movement.

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01011 Invisible Structure Basics

Do not go where the path may lead, go instead where there is no path and leave a trail. *Ralph Waldo Emerson*

In permaculture, the "invisible structures" concept describes systems, organizations, ideas, political and economic systems, religions, cultures, etc. that impact our lives and the planet – for better or for worse. Permaculture work with such systems develops out of our observations of the principles and patterns found in nature. Our goal is to design for a permanent culture, founded upon those natural patterns that make it easier for people to do the right thing for the planet and for humanity and for themselves as human persons.

Invisible structures give form to our interactions with each other.

Successful urban permaculture design involves the intelligent and creative use of invisible structures. If you lived in a rural area on an acreage, you could manage and harvest a woodlot for energy. You could grow an energy crop like sunflowers or canola. You could graze livestock for food and cultivate a large kitchen garden. But you live in a city, maybe on a small 1/8th acre plot or in a high rise apartment building or in a duplex or triplex. The go-it-alone-self-sufficiency program won't work for you. It doesn't work for most people in rural areas either, but that's not our focus here.

Harnessing the power of invisible structures to support sustainability will make or break your plan to live more sustainably in the city and do your part to stop our headlong rush towards the ash heap of history.

Clarifying the Invisible Structure Concept

Here are some visible structures, and how invisible structures impact them.

Housing – Building and zoning codes, adopted by government councils and enforced by bureaucratic systems, mandate minimum size, materials, lot sizes, and other design elements. Cultural aesthetics and legal code provisions influence the external appearance of the house and the choice of interior amenities. Economics governs the size of the house and the quality of its furnishings. Politics may destroy housing and give use of the property to others.

Food production – Laws and regulations govern the geographic locations of food growing, the sale of food, its processing and preservation. Some foods are illegal to produce and consume. Government may regulate the price of foods. Cultural and personal preferences, often transmitted through families, define taste, thus dictating what we eat and what we don't eat. The concept of "food" has family, cultural, religious, regulatory, and cultural meanings and definitions.

Landscape – City ordinances can dictate the location of trees, forbid certain plants, place limits on plant growth, arbitrarily forbid planting in certain areas, forbid vegetation larger than an arbitrary size, mandate planting of certain varieties. Governments may prevent building rainwater harvesting structures in landscapes. Governments often mandate segregation of neighborhoods by economic class.

In any given area, three big invisible structure issues are:

(1) control of the land,

(2) control of work,

(3) definition and control of the economic system

The economic system --

– Dictates who controls the land,

– Prescribes a system to enforce that control,

– Regulates work and income,

– Regulates how money may be spent.

The Good, the Bad, the Ugly

Invisible structures may produce consequences that are good, bad, or indifferent.

Some of the invisible structures of the 20th century had catastrophic consequences for hundreds of millions of people (World Wars I and II, colonial repression, oil wars, etc.).

Some of the invisible structures of the 20th century had beneficial consequences for many people. The nonviolent invisible structures that made up the Civil Rights movement of the 1950s-60s in the United States overthrew a system of institutionalized racial segregation.

Invisible structures are like icebergs.

When we look at the physical aspects of reality we only see part of what happens. Much of the work of invisible structures goes on at a subconscious level, where people just "assume" that things are the way they are and they do not question those assumptions that they seemingly have had since birth. What we can see and feel and touch is like an iceberg. Maybe we only can see 1/7th of reality. We find the other 6/7ths of reality amidst the invisible structures of our lives.

Like the iceberg that sank the Titanic, those hidden assumptions of modern life drive the unsustainability of our society. As the Titanic sank, many of its crew and passengers worked frantically to fashion expedient life rafts out of materials they could find. In the modern era, there are other invisible structures at work in the present era to both create life rafts and to heal the unsustainability of our systems before it is too late.

Permaculture ethics are the essential common ground starting place for our work with invisible structures. Bill Mollison, cofounder of permaculture, says –

> Permaculture design is a system of assembling conceptual, material, and strategic components in a pattern which functions to benefit life in all its forms. *Permaculture Design Manual*

He follows this definition with the "Prime Directive of Permaculture."

> The only ethical decision is to take responsibility for our own existence and that of our children. Make it now. Permaculture Design Manual

This begins with a personal ethical decision to take responsibility for our actions. That commitment requires that we "turn on the lights" and open our eyes and see everything as it is – which includes the impacts and consequences of our actions upon the Earth, our fellow humans, the planetary biosphere, and ourselves as individual persons.

We humans often overestimate our ability to peer into the future and determine the outcomes of our actions (for good and for ill). There are limits and boundaries to what we can discern from the present situation, indeed, there are limits and boundaries to what we can know about any situation. Reality is that complex.

This of course doesn't stop us from attempting to predict what the consequences of our actions are, at least, it has never stopped me from doing so. It does – or at least, it should – inject enough uncertainty into all such equations

regarding the “Big Picture” that we can legitimately maintain an attitude of hope that even as we blunder our way into the future, we may yet figure things out enough to redeem the future dooms coming at us with something much better than what appears to be likely at the present moment.

Just as the three ethics inform our work in our gardens and houses, they are the basis for all that we do with invisible structures.

Permaculture says we need —

Societies where our **duties and responsibilities to nature are similar to those of people to people.**

We need an **ethic of right livelihood.** If we work for destruction, we will get destruction. If we shop and spend for destruction, we will get destruction. If we vote for destruction, we will get destruction. We get what we pay for with our work, our money, and our votes. Energy always follows the pattern. If we want something better, the first step is to stop working and shopping and voting for destruction.

We design within a **holistic framework** and reject chopping every thing into neat boxes that can be separately categorized. As we fragment our realities, we lose understanding of what happens to and around us.

We need **conserver societies that reject gluttony** and instead invest in a network of modest, small, well managed, and effective systems.

Emotionally, **striving after status and glory** is a dead end. We enhance the meaning of our lives with action toward common ideals. It is not enough to mean well. **The work must get done.** Not taking action to save the planet is the moral and practical equivalent of chopping down forests and dropping nuclear bombs on cities.

As we mature toward a society that wastes not, and embraces permaculture ethics, then leisure time becomes a plentiful resource.

No one should have to work as hard as we do now. We have to work so hard and so much because the invisible structures of our society promote waste and create pollution. Surplus doesn’t circulate in ways that benefit the common good because of the many systems that take from the many to give to the political elites and their economic allies.

We need **ethical political systems based on cooperation, not competition**. It’s never been clear how to get there. That's not an uncommon problem for human beings, however. No one could predict, by looking at an oak seed, what a mature oak tree would look like. We know that if we don’t plant the oak seed, we will never see the tree. The thing to do is to go ahead and plant the seeds, even if we are clueless about the details of the eventual mature expression of a political system for a population informed by and excited about the ethics of permaculture. Each life, well lived in accordance with the ethics of permaculture, is without a doubt the seed of a political system based on cooperation, not competition.

When I began the process that became the Oklahoma Food Cooperative (America’s first cooperative to only sell locally produced food and nonfood items) I said to myself, I want to start something that makes it easier for people to make good food choices.

That is not a bad place to start when we think about the design challenges of invisible structures:

How do we create structures that make it **easier for people to make good, better, and best choices**?

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01021 The importance of invisible structures for urban and college permaculture.

The less effort, the faster and more powerful you will be. -- *Bruce Lee*

Our particular focus in the iPermie project is on permaculture for people in urban areas and other situations (like colleges and universities) where they don't have land, or have access to only a small amount of land. In general, most permaculture teaching and writing to date has been for people with access to land who will be growing all, or a substantial portion, of their own food.

For people without access to land, growing all of your own food is simply not possible. While it's possible to grow more food than most people think possible in small plots, residents of urban areas will remain dependent upon others for the larger portion of their food supply.

Cities are dependent upon long and intricate supply chains for energy. Enormous amounts of fossil fuels are necessary to allow cities to function. Cities are at risk of collapse if energy and fuel supplies are cut off for any length of time.

Water is necessary for urban life and that is another important resource that may be imported from water sources located significant distances from cities.

Many people, upon first look at these issues, conclude that the solution is to move out of the city to a rural area. Yet, for all their problems, per capita energy use in cities is less than that of rural areas. Another issue with the "move to the country" model is that the countryside is already under severe environmental stress. If half of everyone in our cities packed up and moved to a rural area, the result would be an environmental disaster.

People need secure, safe, and more sustainable lives. They need structures and systems that support those goals. People in cities can't grow all of their own food or their own energy supplies.

Thus, cities and institutions pose special problems for permaculture design.

Anyone doing permaculture design for his or her own life in a city or an academic institution, as opposed to a design for a particular location in a rural, suburban, or peri-urban area, must use invisible structures to create a lifestyle that is more sustainable over the long term than the present options available in urban areas.

If the necessary invisible structures do not exist – and most of them won't at this stage of things – we need to invest design and effort in permaculture community organizing campaigns to create the necessary structures.

Let's look at the three life-necessities of food, water, and energy and imagine how invisible structures could help urban residents live more sustainable and resilient lifestyles in the heart of the city.

A Sustainable Urban Food System

Residents and businesses in and near the city grow all of the vegetables eaten in the city via a complex constellation of market, community, home, and container gardens. People with homes harvest food from their edible landscaping. People in apartments may have some container food plants, like herbs and tomatoes, and may have a plot in a nearby community garden, the commercial market gardens supply the bulk of the produce. Some apartment complexes have contractual

relationships with peri-urban market gardeners.

Nearly everybody does some food preservation. In the spring, summer, and fall, people buy extra and preserve it for eating later in the winter. Most religious organizations and community organizations offer their members the use of their kitchens and kitchen equipment for food preservation purposes. Apartment buildings and neighborhoods have service centers equipped with processing kitchens for use by their residents. People work with other members of their extended family or with neighbors or co-workers to put up jams, jellies, vegetables, salsas, ketchup, and etc. They do some freezing, both of vegetables and prepared foods. Cooking parties are popular – people will use a large church kitchen and get together to prepare several meals for multiple households, which they take home and freeze. Apartment building and neighborhood service centers offer freezer space to area residents. That way people don't have to have a large freezer at home and there are some energy economies of scale available. Some people don't have a freezer at all, only a small refrigerator at home.

People source meats, dairy, and eggs from the city's foodshed, which may extend about 150 miles out from the city. In places like the northeast and southern California, where you have large megalopolises with millions of residents, the food shed includes foods brought from further distances. Water transport – down the Mississippi into the Gulf and then around to the ports on the East Coast or in the case of the New York City metropolitan area, via the renovated Erie Canal – greatly lessens the energy cost of moving this food to urban centers.

The Great Plains remains the source of much of the nation's wheat and grain production. There is less corn and soybean production since grain-feeding of cattle has fallen out of practice almost everywhere. No one wants grain-fed beef anymore. Everyone wants grass-fed and that's good for people and good for the environment.

Cities have evolved away from centralized supermarkets with their 80 acre parking lots and toward a system of small shops and markets in every area of the city. Most of these stores have direct relationships with area farmers and contract for production to sell to their customers. Since the shops are in every neighborhood, people shop more often.

Citrus and bananas, chocolate and coffee, tea and other exotic foods still come to town via a variety of sources. The dominance of big corporations in those markets has been destroyed. These markets now incorporate direct purchase agreements between individual stores and cooperatives with the producers who grow these products and their distribution cooperatives.

The cooperative is a primary form of business organization in the food marketplace.

A More Sustainable Urban Energy System

Cities run on a fraction of the energy they used to require. Demand destruction has been enormous.

Most people don't drive. They walk, ride a bicycle, or take transit. The reformation of the school system, which multiplied the number of schools back down to the neighborhood level, eliminated the need for school buses. People repurposed many of those buses for public transit. Much of the transit system is privately operated. That was a matter of getting rid of the multiple laws, rules, and regulations that kept people from offering transportation services for hire. There was some public investment in transit infrastructure, mostly for tracks for trains and trolleys. The transit systems that run those trains and trolleys are private businesses or in some cases, cooperatives. They pay a fee based on their use of the system which the government uses to keep the tracks in

repair, just as gasoline sales used to be taxed to provide money for road maintenance.

The transit system runs entirely on biological fuels, typically a mixture of units running alcohol and others using biodiesel.

Use of energy for heating and cooling is much less than it used to be. This was mostly a matter of intelligent remodeling that increased insulation, installed passive solar add-ons, and added details like insulated shutters for windows and doors, shady landscaping, sunshades on tall buildings, and many other such innovations. Better design resulted in incredible energy savings across the board throughout the built environment.

Governments used eminent domain to take over the private utilities and converted them into cooperatives owned by their customers. The new energy cooperatives provided attractive financing to their members as well as energy buyback programs that incentivized the installation of photovoltaic solar panels on roofs throughout the city. The sun heats nearly all hot water in the city. Many homes and buildings, especially those without good south-facing orientation, used passive solar and solar air and water heaters for heat in the winter. The energy cooperatives invest strongly in wind generation and solar thermal. Some areas have district heating and cooling.

The city's sewage problem was mostly redirected as one of the solutions to the energy problem. Nearly all the urine and humanure in the city ends up in on site or nearby bio-digesters instead of a sewer system. What doesn't go to a bio-digester goes into a composting toilet as it is illegal to introduce humanure or urine into the City's waste water system. The plan is to eventually shut down the city-wide waste water system in favor of handling any greywater issues on site or nearby in neighborhoods. There are individual house models and digesters that take care of entire buildings. People use the gas for cooking and running refrigerators and freezers. People sell their surplus biogas to aggregators and there is a brisk and competitive market for it. Most buildings open to the public have nice and attractive restrooms and encourage people to use them. There is quite a market with a robust competition among the composting cooperatives for the solids left over after the methane is taken off.

The residential natural gas distribution grid no longer exists in most cities. Between demand destruction and the pollution caused by natural gas production system and the dysfunctional nature of the corporations involved, people decided that natural gas was a heritage fuel that was no longer needed nor wanted. Some of the cooperatives use it as a fuel for electrical generation plants where it has almost entirely replaced coal. It is used in some areas for industrial purposes.

A Vision of More Sustainable City Water Systems

The city's water system has its own energy supply independent of the electrical grid. In many cities, much of the water enters the city by gravity. Once in the system, it moves around by the system's own energy supplies. The primary energy used to power the system is wind-generated mechanical energy, with methane, alcohol fuels, and biodiesel used in the distribution system mostly as backup fuels when the wind doesn't blow and the storages are low. Security and resilience issues dictated the decision to separate the water system's energy supply from the larger area electrical grid.

The City uses its storm water for a multitude of purposes. Many buildings use rainwater to flush toilets and water landscapes. People sculpt the terrain of their parks, yards, and other public and private landscapes with berms and swales to retain water and infiltrate it into the soil.

There are fewer fossil fueled vehicles these days to pollute the storm water so the runoff is cleaner. Before discharge into the watershed, it goes through a natural purification process that feeds hundreds of acres of biologically active wetlands that do work formerly done with energy and chemicals.

The city uses much less water than before. No one irrigates acres of Bermuda grass. Even the golf courses learned to become water frugal. It's amazing what their greens-keepers can do these days. Edible landscaping harvests rainwater. Everyone mulches their landscapes so we need less irrigation. Since most people don't own cars, they don't wash them. The toilets don't need as much water to flush. Everyone is much more water conservative these days. Many industrial processes, which consumed lots of water and generated major pollution, are no longer in play.

One of the critical decisions driving the success of the more sustainable water system was real-world pricing of water, which involved dropping the subsidies for the water system. In the old days, people who were frugal and water conservative effectively subsidized those who used lots of water. By removing the structural subsidies for water supplies, the price of water increased, industries and businesses discovered water conservative ways to operate. Arrangements were made via various mechanisms for the poor.

Getting from here to there.

These are visions of what a mature system of the future could look like. The devil in the details, however, is how we get from here to there. When it comes to water and energy, demand destruction is the place to start. If we want more sustainable systems, we will need to learn frugality and respect for our use of the natural resources of Creation.

Local food systems plant seeds of sustainability everywhere they flourish. In many areas it is no longer hard to find farmers markets, Community Supported Agriculture farms, and food cooperatives.

I will not pretend that I know all the details of the design path from our present situation to where we want to be in the future. We don't need to know that right now. We need to know what the good, better, and best next steps are for us and our situations. Every situation is unique and that's why the first step of all permaculture design is Observation.

There is much that needs to be done about public education and formation of better attitudes and ideas. The good news is that as people live the permaculture ethics in their daily lives, they sow seeds of a humane and ecologically aware future.

In other words, besides starting a food coop, getting water-wise, and ditching your car in favor of a bus pass, we need to be actively involved with the invisible structures of our communities. There may be existing organizations and campaigns that need more support. Your area may need to start new organizations and campaigns.

Your involvement with the invisible structures that impact your life will be a major aspect of the design work that will come together as the permaculture design for your urban life.

For people in urban areas, besides attention to the details of one's personal lifestyle, **invisible structure work is the most important aspect of permaculture design.**

You can't create a sustainable lifestyle in an urban area on your own, by yourself. You need help, allies, friends, networks, community.

To rephrase an old saying . . . It takes an entire city for your household to become more sustainable.

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01031 Design issues in our urban realities.

The best way to predict the future is to invent it. -- *Alan Kay*

A former Speaker of the US House of Representatives, Tip O'Neill, reportedly said, "All politics are local."

In the United States, most people focus their attention on the politics where we, as individuals, have the least impact – the federal elections. The estimate is that $2.5 billion was spent on the 2012 presidential election. Forty-three percent of those eligible to vote did not vote.

For most us, our local city and county elections and their associated governance issues are way down on our list of political priorities. Local elections are typically off year to general elections, and have much lower voter turnouts.

Yet local government has enormous power, for good and for ill, over the sustainability and resilience of our communities. Consider this list of local government services:

– Public safety and rescue (police, emergency medical response, and fire)

– Trash and recycling programs

– Public transit

– Traffic lights

– Bike lanes and policies

– Zoning

– Building codes

– Property maintenance codes

– Schools

In crisis situations, whether the problems localize to a household, a neighborhood, or are big enough to impact the entire region, local government agencies are the first to respond.

All of this adds up to a **permaculture imperative that calls for careful attention to invisible structure issues for all who live in cities.**

Getting involved with your local politics and invisible structures system of you area is more important than planting an organic garden. This doesn't mean that organic gardening is just chopped liver down low on the list of priorities, because it isn't. Organic gardening is a high priority lifestyle activity for those with access to space for growing food. But for those of us resident in cities, work with invisible structures is where much of the action is for or against sustainability in our cities. Even if you have enough room for a garden, you probably won't have enough room to grow all of your own food. So once you have eaten the tomatoes and herbs you grew on your balcony, where does the rest of your food come from? That's where our work with invisible structures pays big dividends.

Cities survive and prosper because of supply chains that bring food, water, and energy in and carry out the waste.

Because of the poor designs of our cities, they require a lot of supply. Better designs for our urban areas will lessen the amount of incoming supply that we require and reduce the outgoing waste that needs disposal.

Twenty Urban Design Imperatives.

1. Food First! Start practicing the Ten Principles of Household and Community Food Security (discussed in 02021). Keep practicing until you get really good at household and community food security. There are three reasons for placing this first: (a) it is the area most under the control of individuals and households, (b) It has immediate positive benefits, and (c) the consequences for the environment are vast and beneficial.

2. Water second! Remove the present subsidies for wasting water and replace them with market pricing where those who use the most pay the most. Implement structures that help low income people adapt to the realities of a water-scarce world. End the common practice of charging less when people buy more water. Strengthen building codes regarding water use and require rainwater harvesting. Make sensible use of all storm water and ensure that any water discharged downstream, whether from storm water or waste water systems, is pure enough to drink from the tap, by using natural processes. Cheap water is an oxymoron, because water is not cheap. When viewed globally, water is a scarce resource and as long as we have a market economy, it should be priced in accordance with market rates with no subsidies except for those that are a matter of social justice for the poor.

3. Focus sustainability efforts on local government. You have more influence at your local level of government than anywhere else in our political system. Your municipal government is in charge of many activities important to sustainability. Sustainability advocates should focus most of their efforts on urban activities for the foreseeable future.

4. Live in fewer square feet of area per person. We can do this by living in smaller spaces or by increasing the number of people living in existing larger spaces, so that we achieve the goal of fewer square feet per person of living space. Taking in roommates or boarders is a great way to earn additional income and to increase the amount of affordable housing in the area. As far as invisible structures, minimize house and apartment size standards should be eliminated. Zoning restrictions that don't allow garage/attic/basement/backyard apartments should be abolished.

5. Live in more densely populated, multi-use neighborhoods. No one expects everyone to pack up and move to a different neighborhood just to achieve this goal. Even so, the goal can be accomplished mostly by natural market mechanisms if we remove restrictions and regulations that prevent property owners from adding rental residential spaces to their properties such as attic, garage, basement, backyard apartments. Cities should permit duplexes and four-plexes in all residential neighborhoods. Many houses are big enough that they could add an apartment simply by adding another door to an extra bedroom and installing a small kitchen for it, thus creating a studio apartment. Dividing existing homes into duplexes should be an easy citizen-friendly regulatory process. One of the best living spaces in my life was a studio apartment in an older home that came complete with a Murphy bed that folded up into the wall when I wasn't sleeping. Older commercial spaces can be converted to apartments and lofts. City ordinances that make it hard for people to open boarding houses should be amended to facilitate this important style of urban living. It should always be legal to work at home and combinations of work and living spaces should be allowed.

Zoning should always allow small retail and hospitality operations around neighborhoods. More densely populated neighborhoods facilitate mass transit planning which facilitates sustainable urban areas.

Another way of adding density is to site larger housing units close to shopping districts and transit stations. This provides a way to rapidly increase the density of areas thus making it possible to jump start retail and other social amenities in the area.

One topic currently in play with urban planners is the concept of Eco-districts. Eco-districts are defined in negotiations among property owners, residents, and government authorities. The stakeholders agree to a variety of neighborhood initiatives designed to accelerate the development towards sustainability. There are examples of such districts built "from the ground up" according to sustainable designs. They often locate in former commercial or industrial areas.

6. Stop subsidizing sprawl. The pattern in most cities is that tax revenues from older, already developed parts of the urban area are used to build infrastructure in new areas. This drains older areas of vital funds necessary to keep infrastructure repaired and makes the general governance and provision of services to the city more difficult and expensive. The market-oriented solution is to require that any new construction must also pay for the infrastructure necessary to support that new construction. In other words, it's time to cut off the welfare checks for the big developers. The outer exurbs of many cities will end up being abandoned, the dwellings torn down and the materials recycled, the land will likely convert in most areas to market gardening to supply the city with food.

7. Regional downtowns for very large cities. One of the attractive things about a city is the magic of denser populations of people that support entertainment, shopping, and working districts like downtowns. However, one gigantic downtown for an entire metropolitan area ends up causing transportation problems as we move people to and from activities. A better pattern for urban areas are is a series of regional downtowns, each serving about 300,000 people. A metropolitan area of one million population should actually have at least three different “downtowns,” thus giving everyone an easier access to the magic that makes cities attractive and exciting.

8. Empower grassroots government. Decentralize some city services to new forms of government that serve 10,000 people or less. Base these new local governments on existing geographic, historic, and/or cultural divisions of the city. Give them control over issues of great concern to residents such as land use, housing, maintenance, streets, parks, police, schooling, welfare, neighborhood services. One of the present problems in urban areas is that because the governments represent so many people, individuals have no real voice in what is going on. Each of these new local governments would have a small town hall located near the busiest intersection of the area. The building needs at least three functional areas: (1) space to rent for community projects, (2) public services for the area, and (3) a place for public forums and discussions.

9. Drive less. Shift the transportation focus from building roads to encouraging transit and developing walkability.

More dense development encourages walking. People like to walk when the walks go through interesting places. Non-interesting and scary places do not promote walkability. The latter include:

-- Any street with more than four lanes total (two each way)/

-- Parking lots. The modern tendency towards strip malls with the parking in front is a sure fire way to destroy people's natural willingness to walk. When people walk in urban areas, they like to window shop. That's not possibility if there's nothing to walk by or through other than one parking lot after another.

-- Places that are deserted or poorly lit at nights/

-- Fast traffic.

-- Narrow sidewalks.

-- Streets without painted crosswalks.

-- lack of trees.

-- lots of litter.

Each city needs a variety of transit options, starting with a system of taxi-like van services. Each of these vans drives a particular route, but they deviate off the route to pick up and drop off people. The vans would carry up to 6 or 8 people. The vans could be privately owned and the drivers could use a cooperatively managed dispatch system as well as picking up at neighborhood transit centers and other stops on the primary routes.

Faster transportation between destinations further apart can be provided via bus rapid transit, which reserves a street lane for bus travel. This is less expensive than rail, which serves a similar purpose.

As a public service, the city would provide multi-modal transfer stations where the various forms of transit connect for the convenience of travelers. These could provide amenities like places for pop-up shops, food carts, and trucks.

Cities need a system of universal transit transfers allowing people to go from one kind of transit to another (e.g. buses to streetcars to vans to trains etc.) This could effectively function as an alternative form of currency, which would facilitate its use among transit options owned by different people/structures.

As the system of multi-modal transit centers develops, enterprise and social activities will develop around the centers. Develop walkable spaces associated with every community that connect major activity areas. If possible, put a major attraction at each end of the walkable areas to keep people moving around.

10. Deploy more energy conservative designs for buildings. The imperatives of the future demand that we become much smarter in our use of energy in our buildings – homes, businesses, offices, industrial. We need better design of private and public buildings so they will remain comfortable while using much less energy. We need best practices, according to the local climates, for both new construction and for retrofits of existing construction.

Local building codes should mandate the American Passive House standard for new construction.

11. Use less stuff and make less waste. Deploy better designs in urban areas that create less waste and pollution. Compost, recycle, repair, and reuse more. Develop a conserver society. Trash is a big issue in urban areas. While urban areas offer opportunities to support more sustainable living, urban areas concentrate problems such as waste and trash. Start with the no-brainer stuff like never buying and drinking bottled water and soda pop.

12. Create structures and systems that make it easier for people to live more sustainably and harder to live less sustainably. Develop ethical political and economic systems based on collaboration and cooperation, not competition, that support our species' movement toward sustainability and halt the slide toward collapse and the ash heap of history. It is presently easy to live in gluttony and selfishness and that destroys the planet and kills life. That's what the present world system does. We get the instructions at an early age. Just browse the 500 or so channels of your local cable service if you doubt this.

13. Shop, work, save, and invest locally and cooperatively, using an ethic of right-livelihood. Shift resources from absentee-owned national chains to locally owned and managed businesses. Start with low-hanging-fruit like never eating at nationally owned or franchised fast food or restaurants. Buy locally made, artisan body care products and avoid the toxic pollution found in many commercial products. To support the transition to ethical economies – at the global, regional, and local levels – start and support cooperatives of all kinds – grocery, worker, housing, service, health care, etc. Repeal laws that prohibit home businesses and small retail in residential neighborhoods. Don't allow any new concentrations of businesses that are not integrated with retail. Allow residential development within business districts

(apartments above shops and workplaces, etc.). Work for the sustainable repurposing of big box stores as cooperative marketplaces of individually owned small shops and market stands and pop-up shops. Make sure that each area of the city has a walkable area for night-life.

14. Cultural and social diversity. Encourage the social and cultural diversity of the city by not suppressing the various subcultures of the area. Make it possible for them to develop their own territories within the city so that over time, a mosaic of subcultures emerges throughout the urban area. Assist people in the self-definition of neighborhoods with technical expertise and regulatory issues. Permit the development of boundary structures around neighborhoods for identity and security. This could include, as part of an area-wide transportation redesign, closing some streets to public access and putting gates on other streets to limit non-neighborhood traffic.

15. Liberalize local economic regulation. Cities can encourage the rapid development of new centers of social and economic activity if they will liberalize local regulations relating to food trucks (and other business trucks), as well as pop-up shops, flea markets, swap meets, and other such small scale enterprise. This lowers the cost of business entry which will multiply the opportunities for small scale entrepreneurs to start businesses that meet local needs. It will help create denser development.

16. Shift to true neighborhood schools. Replace the present system of large schools with small neighborhood schools serving 30-40 students for children ages 6 to 12. These neighborhood schools concentrate on reading, writing, arithmetic, music, gardening, arts and crafts, which give children the tools they need to explore their natural curiosity. Allow the children to follow their natural curiosities. These schools should have a teacher-pupil relation of about 10 and be located in homes in the neighborhoods where the children live. Past age 12, the community can provide larger schools based on a system that supports "unschooling" concepts. Every day, the children should spend some of their time doing work, such as cleaning the school, working on the grounds, etc., with the work integrated as part of their educational experience.

17. Expect catastrophe, design for resiliency, constancy, and persistence. Constancy is the ability of a city to maintain itself without decline. Persistence is the ability to resist damage. Resilience is the ability to restore after being damaged. If something can go wrong, it will. Don't put all your eggs in one basket. Every important function (e.g., food, soil fertility, shelter, household energy, water, etc.) should have backups – more than one system should support each critical need. In all urban situations, this begins with individual households who choose to bolster their own resilience by keeping some of the household savings in the form of food and water, who decrease their dependence upon fossil fuels by insulating their dwellings and driving less, and who work together with their neighbors to increase the safety, security, and wellness of their own neighborhoods. In the context of a widespread praxis of sustainability and resilience at the household level, much can be done to increase the resiliency of urban areas and mitigate the consequences of any possible catastrophes.

In urban areas, the work doesn't stop there. We need to strengthen the infrastructures that make urban life possible. The best infrastructures will be hard to break and easy to repair. Cities and utilities should maintain protected stocks of replacement parts. Where possible, we should use natural processes and ecosystem services to protect ourselves from disaster.

18. Neighborhood Service Centers. These could be cooperatively owned by the households they serve. They offer needed services to their neighborhoods, including: large kitchens for food processing and preparing meals for larger

groups of people, community rooms for dinners and parties, washing machines, indoor line drying areas, food storage area, freezer locker space. Common area laundry rooms use an estimated 500% less energy than individual house washing machines. Similar savings are possible for water usage.

19. Decentralize energy production. Cities are vulnerable to energy problems because of their dependence on single source grids for energy distribution. By decentralizing energy production and distribution, cities become more sustainable and better able to resist damage from weather and recover afterwards. Strategies and techniques include: on-site production via co-generation (for businesses and industrial locations), solar PV, biogas to power turbines, and small wind. District or neighborhood solutions include district heating and cooling systems, perhaps powered by methane generated from biological wastes in the neighborhood, together with solar, and additional opportunities for solar PV, wind, and steam generated electricity. Neighborhood ventures could be structured as cooperatives owned by their customers.

20. Social justice and solidarity. Don't leave anyone behind for the wolves to devour. As the times get harder, the political temptation is always to abandon those who are weak and unable to defend themselves. That is a sure and certain freeway to the ash heap of history. Nurture blessings and hope in your own life and the life of your community. Expand the concept of solidarity to include nature, so that we develop a society where our rights and duties to nature are similar to our rights and duties to human beings

Don't Despair at the Size and Complexity of these Solutions!

The size and complexities of the problems of the modern era are immense and so are the solutions. It's easy to become dismayed at the thought of what needs to happen. Yet, the hardest aspect of any enterprise is the beginning. In the present situation, **the beginning is under your personal control. You** decide whether **you** will start to change your life and adapt **your** household to the imperatives of this time. **You** all by yourself can jump start the evolution of your entire metropolitan area.

None of us have to know the details, at this stage of the game, for the large systemic solutions that are demanded by these times. Fortunately, we don't need to know those details right now. We don't need to know them until we actually get started on them. In the meantime, we know what we need to do as individuals and households to begin the process. I wrote iPermie to remove any doubts on that score.

Changing an entire city begins as individuals and families change their households and neighborhoods.

Political will is built at the local level as the power of numbers comes to play on issues of sustainability, persistence, and resilience in our communities.

Cities that adapt to the realities of the future will prosper. Cities that don't adapt will not prosper.

City Problems

Zoning

The “Single Family Residence” zoning designation is a primary driver of urban unsustainability. Often this is accompanied by other details like minimum lot sizes, minimum house sizes, etc. In effect, it is a method of coercively segregating housing by economic class. This common practice is unsustainable and unjust. It creates ugly, sterile monoculture environments that make people want to drive long distances to get away from them and enjoy a more diverse and interesting urban situation “someplace else.”

Contrast this with the neighborhood where I live. It developed between about 1910 and the early 1930s. There are single family residences, duplexes, four-plexes,

and garage apartments. Lots are small compared to the suburbs and houses are close together. It is a diverse and human scale neighborhood. People on welfare live close to people with six figure incomes. That's good for social unity and cohesion in times of stress and crisis.

Property Maintenance Codes
Property maintenance codes are problems when used to restrict or even forbid edible landscaping, to minimize fences and other privacy and security structures, to limit the diversity of plants at a property, etc. They may govern the types and placement of lawn and porch furniture and may restrict or eliminate solar clothes drying. They empower a neighborhood's bullies to run roughshod over anyone with whom they have a disagreement. They allow people with access to political power to enact their personal preferences into law. Such nanny-state neighborhood codes are divisive within neighborhoods and inconsistent with ideals of freedom and justice and should be abolished. They are anti-sustainability.

Building Codes
Building codes presently mandate unsustainable construction practices while not requiring important sustainability strategies like rainwater harvesting, passive solar heating, and sufficient insulation. Building codes need revision so that they focus entirely on safety and energy efficiency. Anything else, such as industry-driven standards that increase costs without having anything to do with safety and energy efficiency.

Transportation
Local transportation policies are auto-centric and give little thought to the long term consequences of automobile dependence, nor the dependence of urban areas on long supply chains for fuel. Transit systems rarely receive sufficient funding.

Education
Education is a local responsibility, yet whole systems thinking/permaculture education is not to be found in most local school systems. Many urban school systems are nightmares, where the most important goal is social control, and education comes in a distant second on the priority list. The political elite's goal of producing obedient worker drones for the warfare/welfare state via a school system rooted in bureaucracy and coercion is not compatible with a more sustainable society.

Rent-Seeking
Special interests are well-practiced in the art of looting the public treasury for their own selfish gain. This distorts the local economic systems and robs the poor, working, and middle classes in order to benefit the lazy and corrupt rich.

Class Warfare.
Class warfare is a reality in the modern cities. Those with power use it to take resources from those who don't have power. If you doubt the reality of this, consider how often governments use eminent domain to destroy neighborhoods of the poor, take their properties, and convert them to the uses of the non-poor. Meanwhile, the lower income property owners receive cheap, non-market, politicized prices while those with access to political power can buy the properties cheaply from the government. The continued non-market destruction of the housing of the poor drives rents up above where the market would set them. Less low income housing means higher rents for low income housing. This is not a market process. It is politics at work. This kind of activity is under the control of local government and one of the goals of permaculture must be to end this ruthless war on the neighborhoods of the poor and the working class.

Subsidizing unsustainable development.
In most cities, tax revenues from older areas subsidize development in newer suburban areas. One of the solutions to this problem is to force all suburban development to pay its own costs and to stop bleeding city revenues to expand suburbs.

Resolving these problems.

Each of these problems, and many others which you will identify through observation of your own local situation, offers opportunities for permaculture work in your city. They aren't small issues. They are big problems. You can't resolve them by yourself. You will need to work with others, in what eventually could be a grand alliance of neighborhood permaculture organizations, to win elections in order to change the public policies that drive unsustainability. It's not going to be easy but it certainly is not impossible as we will learn later.

This isn't to say that our national and state politics are not important because they are. Even so, the same amount of time and effort invested at the local level will bear more permaculture fruit than if spent at the state or federal levels. If voting could fundamentally change our national policies, absent a great change of the way we live, it would certainly be illegal.

Succession works in politics just as it does in nature. If we want to change our national politics, first we change ourselves. Then we change our neighborhoods and cities. After this, we can look at regional, state, and national projects. Just as it is folly in nature to try to circumvent natural succession, we should stick with the natural program and grow our national politics from local roots. If we don't have local roots, we won't be able to grow any national politics.

Therefore . . . the place to start our interventions is at the place where success is most likely: our own individual households.

The next place to work is local government. **Before anyone will trust permaculturists with nuclear bombs and trade policy, we will have to demonstrate our competency with potholes, sewers, and garbage collection systems.**

Two invisible structure projects to start with in urban areas

Provide Information and Demonstration Projects. Many people want to live more sustainable lives and incorporate these concepts into their work. They don't know where to go for information. One of the most important and productive local efforts is to provide accurate information on sustainability best practices. Demonstration sites/pilot projects that show these concepts at work are useful.

Develop urban and peri-urban agriculture. Eighty percent of the fresh vegetables that feed Hanoi come from small-farm agriculture close to the city. Urban fish farms produce half the fish consumed in the city. Half of the pork and poultry, 90% of the eggs and milk, and 60% of the vegetables that feed Shanghai come from within the city or it's immediate foodshed.

In Caracas, Venezuela, people have created 4,000 miniature gardens of one square meter each. Each of those gardens can produce 330 heads of lettuce, 40 pounds of tomatoes, or 35 pounds of cabbage, per year. Singapore has 10,000 urban farmers who produce a quarter of the vegetables and 80% of the poultry eaten there. Havana produces half of the vegetables its residents eat.

In some urban areas of the United States, cities outlaw agricultural operations. Some municipalities persecute gardeners for growing vegetables in front yards. Many cities forbid keeping chickens, goats, and other small livestock. These nanny state structures of dependence and stagnation need to be replaced with structures of fertility and growth.

Principles useful for invisible structure work.

I know you want a checklist of organizations that need to be jump-started as soon as possible. Without prolonged and thoughtful observation of your local situation, I can't give you that. I can give

you some seeds for your contemplation that can perhaps show you something of where your design efforts can be fruitfully invested.

Focus on the journey. Goals are fine. After we develop them, we have find a way to achieve our goals. The way we do that is important. In fact, the methods of our journey will determine our eventual destinations, whatever our goals might be. So never let the end justify the means.

Patterns deliver what the patterns deliver. A bad pattern gives us a bad end. If we want a good end, we need a good pattern. Stick with the good patterns. The experiences of the journey help us develop the journey. It's a constant repetitive system of trial and error, spiraling and looping our way toward resilience and sustainability.

As much as possible we **observe nature and use the successful natural patterns** to create our urban structures and systems. Small and slow is better than fast and big. Don't reinvent any wheels or flat tires. Look for free or low-cost energy. Cooperate. Use natural materials, systems, processes. Cross-pollinate. Plan for diversity. Grow from the ground up. When challenged, adapt and evolve. Look for and support symbiosis. Improve your local ecology. Waste nothing.

Don't be afraid to make mistakes. Only be afraid of not learning from mistakes, or not being willing to admit mistakes, or being so afraid of making a mistake that you never do anything.

Spontaneous order and self-organization are good. You don't need anyone to give you authority to grow systems of resilience and sustainability. If you want a certificate authorizing you to grow systems of resilience and sustainability, , you can download one at http://www.ipermie.net. Did that help? Probably not. You are all the authority you need. Use and invest it wisely and with prudence. Add a dash of daring too so that you get that cayenne-effect.

Look for organic grassroots growth. You may have to start something brand new. Or, you can grow from existing forms/structures/systems. Anything that will be useful will grow from the ground up. It will not be imposed from the top down. You might as well just forget about the temptation to get the government to do something about these problems in the beginning. This isn't an endorsement of radical libertarianism, it is an understanding that the government won't do much that is useful until there is a groundswell of demand from people who already participate in systems and structures of sustainability and resilience. **The government is always led by the people,** even though our politicians like to pretend otherwise. There is a reason why they spend so much money on opinion polls – they have to find out what their political platform should be. Furthermore, we have to beware of the temptation to become eco-stalinists. Coercion is the pattern of the State. It isn't nature's way. Patterns produce what they produce. They don't produce what they don't produce. Coercion will produce results typical of the State. If we don't want those results, we need different patterns.

All are welcome to this process, even those who don't believe in it. Everyone in the community is in the community (!!!) and thus inevitably will impact what happens. So just be aware of this from the beginning and plan for it. When you notice that everyone that resides "here" is part of the community "here" and has an opinion about what happens (!!!), you won't be shocked or surprised. Feedback is always necessary. **It is always a triumph for grassroots organizing when we realize that feedback is in fact feedback.** Urban areas incorporate large populations of diverse races, cultures, and belief systems. This creates major boundary areas with all kinds of edge effects. Therefore, expect lots of feedback in urban areas. Adapt your designs accordingly and look for more feedback. As the shampoo label says, Wash, Rinse, Repeat. (But don't actually use

commercial shampoo, as we will see later in our journey.)

No one is in charge. Yes, I know, you have a mayor and city council and then there's the governor and state legislature and the president and congress. People are "in charge" everywhere. So what? When it comes to designing for resilience and sustainability, no one is in charge. **This is a leaderless resistance movement.** Everyone can be involved and feedback is necessary and useful. It's an orchestra and choral ensemble that work together without needing a conductor. You say, "how can this happen?" It happens every day in your friendly local forest or expanse of prairie. You may not make it to that level of resilience and sustainability in your neighborhood and metropolitan area for years. I can promise that it will be a fun and exciting journey.

Essential urban sustainability systems

I still hear you asking for specific examples, a checklist of necessary organizations, and I will not satisfy your curiosity. I can't. I am not that smart. I am only a red neck from the Red River Valley of Oklahoma, with an attitude, a permaculture education, and an internet connection. You can empower yourself and your friends though to find these answers for your own situations. But if you insist. . . I can and will give you a summary of the kinds of answers that you need --

1. You need **resilient systems that provide food and water** for your city. This must start with finding a resilient system that provides food and water for you and your household. It can grow from there. In Oklahoma City, we started the Oklahoma Food Cooperative to make it easy for people in cities to buy food directly from farmers. We said, "If we want a more sustainable, just, humane, and resilient system of agriculture, there must be a market for the products of a more sustainable, just, humane, and resilient system of agriculture." That means that people must be willing to put their money on the line to plant the seeds and cultivate the crops and harvest the food that feeds the city.

2. Your city needs **a built environment and operating systems that are frugal in their needs for energy and resource inputs**. This starts with your own individual dwelling, whether it be a house, an apartment, or a tent by the river. As you do the work to make your own dwelling more sustainable, you learn something about what needs to happen for the entire area.

3. You need systems that provide **the energy and other resource inputs necessary to operate your city.** As with points one and two, this begins with you.

4. You need **transportation and communications systems that move people, freight, and information via methods that are energy conservative and frugal of materials.**

5. You need systems that **manage the cycling of waste materials including humanure.** As it was with one through three, so it is with four. By the way you live your life, you gain understanding as to what is needed.

6. You need **invisible structures that support providing these essential functions** in ways that are more sustainable than is presently the case.

As you do the work for yourself and your household, ask – what would make it easier for me to do this? What organizations, businesses, or structures do you need to help you do the practical work that is necessary for my household to live more sustainably?

Thus, this problem-solving process begins in your own life and household as you learn to minimize your use of resources and energy and find local sources of food. As you develop your own household's systems and skills, you can grow outwards and upwards from there. There's nothing that says that a city must be a cesspool of waste and corruption. A city can be bright and exciting, a place of

justice, sustainability, and resilience. It's all in the design and the operations.

If you don't do the work for yourself, though, in your individual household, whatever that looks like, you won't know what your area needs to support others making the transition from waste to sustainability. If you don't know what your area needs, you may make mistakes in your invisible structure work and that isn't good.

Lessons from Iraq, Somalia, Argentina, and Russia

Permaculture thinker and polymath Vinay Gupta of the UK developed some interesting thoughts about what happens in urban areas when there are great challenges. He compares Iraq and Somalia with Argentina and Russia.

When the governments and economies of Argentina and Russia collapsed, localized systems were resilient enough that water continued to flow, the grids supplied energy, food came into town from the countryside and an amazing amount of food was produced in the cities.

In Iraq and Somalia, however, when their national governments disintegrated, their localized systems were so challenged they collapsed too. The populations remain in a steady-state of low-intensity revolt and warfare because things continually go from bad to worse and back again, with few long-lasting improvements making it to the neighborhoods of ordinary people. .

Argentina and Russia had much better outcomes than Iraq and Somalia **because they were better organized at the local level.**

We start at the beginning.

If you don't know where to start, look at your whole situation problem with thoughtful observation and find some aspect of the situation that you do understand. Look for something right there on your own doorstep.

Work on that.

Then, look at the situation again. Reflect on what has just happening. Praxis! In light of what you have just done, is there something else that looks understandable and doable?

So work on that. Reflect again. Praxis!

This is how we can save ourselves going forward into the major challenges of peak energy, climate instability, political criminality, and economic irrationality.

The government will not save us until we become the government. If you doubt this, watch the news and read the daily newspaper for a week.

If any saving is to be done, we will do it ourselves.

We begin with our own efforts, in our own households.

The movement towards change continues as we constantly develop ideological resistance to the system. We offer people demonstration projects and best practices. We publicize truth as an antidote to political and economic lies.

We raise the ante with a movement towards peaceful civil disobedience rooted in the way we live our lives.

We create alternative structures in the midst of the collapsing ruins of the old, such as Precinct Community Assemblies that function in our urban areas like a New England town meeting. We network and develop political support for systemic change.

At some point, we reach a critical mass. Then it is out with the old politics of greed, and in with the new politics of sustainability, and we make sure we do a better job this time around.

If we don't do it, our cities will collapse and die and that will be a great human and ecological tragedy.

Any way you look at it, absent the broadscale implementation of the ethics and design processes of permaculture, we

are up a free flowing stream of human excrement without a means of locomotion while the uncomposted feces rapidly approach the ventilation devices.

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01041Invisible Structure Toolbox

Your beliefs become your thoughts,
Your thoughts become your words,
Your words become your actions,
Your actions become your habits,
Your habits become your values,
Your values become your destiny.
– *Mahatma Gandhi*

Let's take a look at what we have to work with when it comes to invisible structures. What tools do we have that we can use to build systems of resilience, wisdom, utility, and beauty? Here's a list. It's not the list. It is my list. You may have a different list, based on your own individual circumstances and situation. You can use my list as a starting point for developing your own ideas on this subject.

Permaculture design is always context-contingent. While we may have certain principles that we consider universal (like "stacking functions"), the application of those principles is entirely contingent upon the specific context.

Memes
Memes are fundamental units of cultural, structural, social, and personal knowledge.

Meme theory is a bit controversial and some will say it is all just made up. Well, that's true of a lot of things. If they are useful, we use them for what they are useful for, irrespective of the detail that "somebody made it up" deep in the mists of time and antiquity. This is not meant to be an academic discussion of the validity of meme theories. It is a lay discussion about the application of permaculture design principles to invisible structures.

In that specific and particular context, the concept of memes is useful for the study and analysis of invisible structures. It is a map description of how ideas move around and influence behaviors. This gives us clues about ideas for changing behaviors to promote more sustainable ways of living and being. Whenever we talk about maps, we have to remember that a map is not actually the territory. It is an interpretation of the territory from the viewpoint of the map-maker. That does not mean that maps have zero value, because they have lots of utility. It just means that we have to be careful in how we use them.

POP QUIZ! How many times have I said that some form of "the map is not the territory?" What does that frequency of reference suggest about the importance of the concept for permaculture design?

The word "meme" comes from Charles Dawkins 1976 book, The Selfish Gene. He shortened the Greek word mimene which means "something imitated." Obviously he looked for a word that sounded a bit like "gene." Thus, meme was the word. He didn't invent the concept, He was its major transmitter in the 20th century.

The study of memes is not anywhere nearly as scientifically rigorous as the study of genes. Mapping the human genome is a relatively simple matter

compared to mapping the human memene (if that is a word). That is not a commentary on the simplicity of genetic mapping, because that isn't simple. It is a commentary on the extreme complexity and chaotic nature of memes and the human cultural artifacts we build with them.

Dawkins defined meme as a unit of cultural transmission.

Memes are to culture as genes are to human development.

One difference is that we can change our memes, whereas changing our genes is not practical at present. I guess maybe viruses are an exception.

NB: This is not a scientific discussion of genetics. It is a lay discussion of the application of permaculture design to invisible structures.

We can mix and match genes, such as happens with human reproduction, where the genes supplied by the mother and father determine the possible genetic universe for a baby.

Human beings replicate memes.

In doing so, we often change or modify them. Over time, some memes go extinct. People regularly create new memes. We could even say that there is a kind of natural selection that goes on with memes and we can certainly say that there is a natural succession that goes on with memes.

The human body transmits genes horizontally and vertically.

Parents give genes by inheritance to their children. Genes transmit horizontally through populations via viruses and other biological methods.

Memes transmit in the same way.

Children are born into a family with a certain set of genes inherited from their parents. They inherit memes transmitted to them by their parents through the acts of child rearing and education.

There appears to be succession in memes. Things and situations that were once unthinkable are now commonplace.

Viruses have the ability to adapt genetic codes. That's how we get multiple versions of the flu. Viruses attach to our cells via receptors. Our bodies adapt to virus by changing so that they can no longer attach to our cells. Viruses adapt to make sure they can still attach to cells.

Is this so different from what happens with memes?

If people like certain ideas, they will receive and process information in that context and that will influence their behavior.

If they aren't receptive to certain ideas, they will erect defenses against them that will influence what they accept and how they behave.

When it comes to memes, permaculture, and invisible structures . . . we want to –

– Encourage memes of sustainability, conservation, frugality, community.

– Discourage memes of gluttony, waste, violence, despair.

– Use natural succession in memes to develop the situation to support movements toward more sustainability and resilience.

The Extended Family

The family is the basic unit of all societies. It exists in many forms. We are most familiar with the nuclear family, consisting of a mother, father, and children, or one parent raising children.

Individual nuclear families and single parent families may be part of larger extended families, consisting of grandparents, aunts, uncles, and any number of cousins of various degrees. Extended families can be linked by biology or adoption to others, and become

clans or tribes sharing common bonds of support and care.

The family has a biological base, although biology is not necessary. There are many non-traditional families, tribes, and clans that form by adoption, not biology. An extended family may form among people who although not necessarily related by biology, come together based on convenience, necessity, or adoption as a united family that cares for each other and helps each other.

The ability of the conventional nuclear family of 3.1 people to live "independently' on its own is an artifact of the age of cheap energy. As cheap energy goes away, so will the ability of the isolated nuclear family to live in isolation from an extended family, whether it is their biological extended family or a group that comes together for convenience or necessity. No one in the past was able to live in such an isolated way and it won't be true in our future either. What is true for families with two parents in residence, is even more an issue for single parent households.

As we transition toward more sustainable ways of doing things, the extended family will make a major resurgence.

Bioregionalism

Bioregionalism is a system of governance and economics based on shared geography, which is referred to as a bioregion. Natural features such as watersheds and patterns of terrain, as well as human cultural factors, define bioregions. Bioregionalism takes the extended family (clan or tribe) to a larger level of social organization.

Bill Mollison's thoughts on bioregionalism (from the Permaculture Design Manual):

– An association of residents of an identifiable geographic area.

– Boundaries may be a watershed, tribal, politics, custom.

– Needs a bioregional organization to organize projects and activities.

– Seen as a parallel structure to other invisible structures of governance.

– Bioregional land access tool box.

As we move toward a critical mass of persons interested in permaculture, bioregional governance can become a reality. In the meantime, the existing bioregional organizations do important work promoting more sustainable ways of living and doing.

The North American Bioregional Congress has met every other year since 1984. It can be found online at http://wp.bioregionalcongress.net/ .

Alternative Food Distribution Systems

There are several alternative economic distribution and production systems that can work to supply urban areas with the necessary supplies. Some of the important principles for developing urban food systems are:

– Form and function follow food.

– Eat with the season.

– Be temperate in your selection of foods.

– Prepare meals from basic ingredients.

– Develop the organization and systems of your kitchen.

– Recycle resources and energy Process and preserve foods at home.

– Practice food storage. Grow some of your own food.

– Buy foods from local farmers and producers.

– Never buy meats that originate in confined animal feeding operations.

– Design for economy.

--Design for resilience.

– Design for catastrophe.

The *Small Plot Intensive farming model* (www.spinfarming.com) practices urban market gardening on small backyard

plots. This links people with land, who don't want to garden, with people who want to garden but have no land.

Community Supported Agriculture. These structures partner urban customers with rural producers. The customer pay part of the price up front, during the winter, thus providing seed money for the production and assuming some of the risk. Typically, everyone gets a weekly box with that week's harvest divided among the number of subscribers.

Urban gleaning. People may have fruit and nut trees on their properties and never harvest the fruit. Programs can promote gleaning such perennial food production assets on residential and business properties.

Farm-link systems. Various kinds of structures that make it easy for people in cities to buy food from farmers. Besides Community Supported Agriculture programs, these type of structure includes food cooperatives, farmers' markets, roadside stands, etc.

Commonworks. An organization of individuals and families buys or leases land, and subleases it to its members for food production. A percent of the total revenues generated goes into a common fund for improvements.

Farm and garden clubs. Another variation on Community Supported Agriculture, various kinds of sharing agreements between urban residents and rural food producers.

Barter systems and labor exchanges. These go around the money system by promoting trade between individuals and households without the use of money.

The important alternative economic principle of these structures is CYCLING – keep money and resources cycling in a village to bioregion context. The goal is to minimize outflows of resources.

Ecovillage Development

An ecovillage is a group of people, consciously united in a network of mutual support. In the Design Manual, Mollison points out these advantages of being part of an ecovillage development:

– Harnesses the neighborhood principle of mutual aid.

– Reduce the need to earn.

– Earn within the village.

– Produce a surplus for export.

– Provide many of the nonmaterial needs of the people.

– Cooperate in enterprises and small associations.

– Provides privacy, access to tools, conservation, recreation, basic life essentials (shelter, food, water).

Mollison thinks that 100 to 500 income producers is a good size for such an effort. This would perhaps be 200 to 2,000 people. At the 3,000 level, he says there is a serious deterioration in the personalism of the activity. The Hutterites, a communal Christian organization, keep their villages below 300 total people. An ecovillage of 3,000 people could be composed of ten smaller groups of about 300 people.

There are a wide variety of legal and governance strategies that can be used to organize the eco-village, including housing cooperatives, consumer cooperatives, worker cooperatives, and land trusts, The balance required is to not manage too much, while managing enough for the common good of the group.

The ecovillage could start with restrictive covenants forbidding certain activities (like use of chemical fertilizers, pesticides, herbicides), and mandating other activities (like composting and recycling).

Depending on how the group starts, Mollison suggests that 30% of the sites be deeded to the village government, to be sold or developed or otherwise used for

the benefit of the common works of the village.

Never build an ecovillage on virgin land in a pasture or forest. It makes no permaculture sense to destroy a natural ecology in order to build a human ecology. While people often think of moving to an eco-village in a rural area, the real ecological frontier is to develop ecovillages in the midst of existing towns and cities.

When we think about this kind of development in the urban context, it's important to speak the language of urban planners. Rather than refer to something like this as an urban ecovillage, which is a concept that could possibly cause the heads of an urban planner to explode, we would speak of this as a Planned Unit Development, or "PUD."

– A PUD is both a development method and a regulatory process.

– The design features a negotiation between local government authorities and the land owner(s) seeking to develop the PUD.

– Works with new construction and existing neighborhoods.

– Offers a model for an eco-village in the context of an urban area.

– It is familiar to planners and local government authorities. Familiar is good.

Location criteria for ecovillages. The traditional suggestion is to look for edge/transition eco-region areas. If people can access more than one eco-region, they will have an easier time developing their system.

OK, those criteria developed among people looking for locations for eco-villages in rural areas. What do they look like when applied to urban areas?

We first note that cities are themselves ecologies and contain their own versions of edge/transition areas. Look for areas of transition in urban areas, where there are both residences and small-scale commercial or even some kinds of smaller industrial development.

Declining industrial areas could become seriously fertile urban ecovillages. It would be easier to establish an Planned Unplugged Development in a commercial area. Think about the possibilities of converting a warehouse or a former industrial site to an Unplugged development.

New Urbanism is the concept that city planners would be familiar with. It prepares them to consider new options for urban planning such as we are talking here.

Ecovillage Infrastructure

The infrastructure can take different forms. The essential patterns are:

Dwellings. Mixed sizes are best. Multiple housing units have an energy conservation advantage (shared walls). Think duplex and triplex and four plex. See also mother-in-law and garage, basement and attic apartments. A village needs some small living spaces and some larger sizes. An ecovillage could be entirely located in an apartment complex. An ecovillage group could convert a warehouse to an ecovillage.

Structures for economic purposes

– Shops

– Work spaces

– Storage

Structures for communal purposes

– Schools

– Places of worship

– Places of celebration

– Libraries

Community tools

– Streets and sidewalks

– Transportation systems

– Tool supplies

– Water storage

– Recycling facilities

– Fuel production facilities

– Utilities (distributed/localized energy generation, rainwater harvesting and distribution)

– Communications

– Theaters and places of entertainment

– Sports venues

Systems/tools for resilience

– Walls and fences

– Warning systems

– Connections with neighbors

– Fire and police protection

– Protective structures for hazards specific to the site (tornadoes, hurricanes, tsunamis, earthquakes, wild fires, etc.)

– Disaster response

– Food storage

– Covenants on real estate deeds

Food production

– Gardens (in the ground, containers, indoor)

– Edible landscaping (7 layers of a forest garden in the city)

– Agreements with rural farmers.

– Food processing and storage facilities.

Essential Occupations

The goal of a village economy is to keep capital and income within the village as much as possible, thus minimizing outflows.

-- Food production, 5 workers per 100 people.

-- Energy, About 10 workers per 100 residents.

-- Vehicle maintenance/repair, 2 to 4 workers per 100 residents.

-- Financial, 2 workers per 100 residents.

-- Medical, 1-2 per 100.

-- Maintenance (repairs, plumbing etc.), 1-2 per 100.

This would account for 25 jobs for 100 people. Depending on the number of people working full time as parents, another 50 or so jobs are needed that could provide goods and services for export or work outside of the eco-village.

If people only wanted to work half-time, the plan could be –

-- Food production. 10 half-time workers per 100 people.

-- Energy. About 20 half-time workers per 100 residents.

-- Vehicle maintenance/repair. 4 to 8 half-time workers per 100 residents.

-- Financial. 4 half-time workers per 100 residents.

-- Medical. 2-4 half-time workers per 100.

-- Maintenance (repairs, plumbing etc.). 2-4 half-time workers per 100.

This would be about 50 half-time workers per 100 people.

Getting Started

How do you grow an eco-village? You start with your own household. That's the seed that grows into an eco-village. Seeds are small compared to the plant that results. Don't be afraid to start small, because we start small or we don't start at all.

Then as you evolve your own life, you share what you do with others. You encourage them to do likewise. Over time you come into relationships with more and more people. Circumstances conspire to drive people your way. At some point,

there is a transition from informality to a more formal structure, perhaps a cooperative of some sort, that carries on the process of looking for an actual location.

Finance and Alternative Currencies
This topic will be covered in greater detail in the Economics section. Here is a preview of that coming attraction.

– We need ethical investments that do no harm.

– Every dollar spent is a dollar voted, for or against the future.

– We need financial structures rooted in the permaculture ethics.

– There is a significant need for permaculture oriented retirement funds.

Alternative Disaster relief.
The most essential component of alternative disaster relief is trusting relationships. The time to build such relationships is before the disaster hits. A certain amount of infrastructure is useful – picture ID cards, printable flyers, communications equipment, etc.

Maker groups.
These are associations that promote DIY making and repair of useful items.

Trusts
Trust as a form of ownership that can transcend the lifetime of a single person. This can be important for permaculture, since one of the needs is for investments that carry on through time, beyond the life span of any individual human. Trusts can take a myriad of forms, based on their design. If you are going to do one, design it from the beginning to accomplish the goals you need from the structure and get competent legal assistance in drafting the papers. Three common types of trusts are:

– Discretionary trust – distributes all profits to its beneficiaries. Has an organizing document, board, annual meeting,

– Non-profit trust – operates for a public good purpose. Does not distribute profits, is not taxed.

– Investment trust – invested in ethical efforts. Features are matter of design.

– Property trust – owns property for the purposes described in its organizing documents.

Unschooling Education
Permaculture concepts of education start with the Unschooling movement and go on from there. We have little interest in creating obedient worker drones to serve the Welfare/Warfare State. The future needs ways to pass on knowledge, wisdom, and skills.

Systems of Sharing Tools and Resources
We need structures and systems that enable sharing/Leasing/rental of tools and resources that would be expensive for an individual to purchase.

Cooperatives
Cooperatives are a primary business structure of great utility in permaculture design. A cooperative is a business organized to provide a specific benefit (or benefits) to its members. Government is via one person, one share, one vote basis. Cooperatives differ from each other based on these criteria:

--What they do.

--The ownership structure.

--How they distribute profits.

The primary kinds of cooperatives active these days are:

-- Worker – a business owned by its workers. The benefits it provides its members are jobs. Coops distribute profits to workers in proportion to their work.

-- Producer – a business owned by producers of products. Producers coops provide benefits like marketing and supplies. They distribute profits to the producers in proportion to the amount they have bought and sold through the cooperative.

-- Consumer – a business owned by the customers. The benefit it provides to its members is a place to shop. They distribute profits to the members in proportion to how much they have bought from the cooperative.

-- Hybrid – a combination of more than one kind of cooperative. The Oklahoma Food Cooperative, for example, is a hybrid producer-consumer cooperative.

-- Financial – a cooperative providing financial services. The benefits it provides to its members are financial services, typically at lower cost than privately owned financial companies.

Community Based Social Marketing

Uses a five-step process to promote social change toward sustainability:

1. Select behaviors that need to be modified and can be promoted. CBSM direct its attention at behavior, not ideology.

2. Identify the barriers to modifying the selected behaviors and the benefits associated with the modified behaviors. If we want people to change, we have to figure out what will prevent them from changing. Benefits provide motivation for change.

3. Once the barriers and benefits have been identified, a strategy can be developed to help people surmount the barriers and to promote the benefits. Successful strategies involve personal contact and an invitation to make a personal commitment to change the behavior that is the target of the campaign.

4. A pilot project precedes full-scale campaigns to test the strategy and see what works and what doesn't so that cost-effective methods can be deployed in the larger community.

5. Broadscale implementation follows after a pilot test and evaluation of its results.

The online text of a book on the subject of Community Based Social Marketing is available at http://www.cbsm.com/pages/guide/preface/ .

Music and Art

Music and art are essential to the movement towards more sustainable ways of living. Every successful social movement in history has moved forward while singing songs that gave voice to the deepest feelings of their hearts. What we do in permaculture is no different from what our ancestors did to build a better world. One successful tactic is to write new permaculture words for existing melodies that are widely known. That helps their singability and contagion of the ideas they embody in their lyrics. One picture is worth a thousand words.

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01051 Invisible Structure Zones

If we desire respect for the law, we must first make the law respectable. -- *Louis D. Brandeis*

One of the useful tools of permaculture is the concept of zones.

When applied to permaculture design, we "start at our doorstep", as Mollison advised, with Zones 1, which are your dwelling and the areas of most intensive use surrounding and including the dwelling. The zones move outwards from there, to Zone 7, which is considered wilderness.

In permaculture design, the areas closest to the doorstep – Zones 1 – are the most intensely designed aspects of the site. There are many things going on in Zone 1 and their interactions, needs, and yields must be carefully accounted for.

Zone 1 contains the areas that are under the most control of the householders. Once one gets to zone 5, a person has no control over the situation.

Applying permaculture zone concepts to invisible structures depends on the angle formed by the position and purpose of the observer.

Starting with the "doorstep" – the area closest to "home" – and going outwards from there, I find a total of 8 possible "zones" of invisible structure activity:

Zone 1: Memes

Zone 2: Habits/behaviors

Zone 3: Structures

Zone 4: Systems

Zone 5: Communities

Zone 6: Cultures

Zone 7: Peoples

Zone 8: Species

This could be read as follows:

Memes of individual human beings –

– support habits and behaviors
– that build structures
– which combine into systems
– that constitute communities
– which create cultures
– that become the peoples
– who constitute our species.

We could look at it a different way, beginning at the "other end" --

Our species

– gives rise to peoples
– who create cultures
– that constitute communities
– which are combinations of systems
– that are composed of structures
– which are built by habits and behaviors
– supported by memes of individual human beings.

Memes are the ideas and thoughts we carry around with us, consciously and in our subconscious. We interact with others, and others deal with us, on the basis of the memes (beliefs, ideas, thoughts) we have internalized in our thinking.

Based on the ways we think, we have habits and behaviors. We do things in certain ways. Maybe we drive large cars fast, and use a lot of gasoline. Perhaps we deliberately trash the environment and pollute. On the other hand, we could have habits of conservation and frugality, where we consciously work to heal the biosphere.

As we go about our lives, we create structures to help us do what we want and

need to do. The family is such a structure, based on both biology and adoption. Other structures help us do good. They are structures of beauty, wisdom, joy, conservation, frugality, peace, and serenity. On the darker side. . . There are structures of gluttony, violence, destruction, domination, crime, covetousness, and anger that enable us to do evil and which drive unsustainability.

As a matter of both spontaneity and intentional work, structures combine into systems, such as –

– Economics

– Politics

– Education

– Science

– Technology

Again as a matter of spontaneity and intentional work, systems become the integral components of communities, in which people, systems, and resources interact in complex and often chaotic ways.

Communities are the foundations of cultures, which unite people in large and complex structures much bigger than the individual, the family, and the community.

From there we go to peoples, which could also be known as nations, and over all is our existence as a species, Homo sapiens, "thinking person."

How to use a zone system for invisible structures.

Permaculture design helps people make changes in their lives towards sustainability. It's not simply a focus on the personal. Permaculture is just as applicable to larger systems as it is to a personal household. It's one thing to say that, however, and another thing entirely to have some influence on people organized in a large system – such as the United States of America.

I can't even imagine what that would look like and fortunately, I don't need to know that because even if I did know it right now, there is nothing I could do about that reality. When something happens to change the United States government in a more sustainable direction, it can only occur as a result of a succession of events and happenings that creates the situation as it unfolds and progresses.

This is a journey that creates the destination.

What I need to know is: What do I do right now? What's the next thing on my To-Do list?

Generally, major political attention focuses on our national politics. Meanwhile, municipal elections have the lowest turn-outs of voters. This is ironic, because people have more control over things and situations at their municipal government doorstep than they ever will at the national level.

Besides pointing us towards our own doorsteps, permaculture teaches us to prefer small and slow solutions and to use natural succession to achieve goals.

When you begin at your doorstep – working with the memes that animate your actions, and thus changing your habits and behaviors – you learn what works and doesn't work.

With this knowledge, you are better positioned to make recommendations that will be useful and productive for yourself and others.

First we learn and become competent, then we can teach. This gives authenticity.

And in today's marketplace of ideas, authenticity is worth its weight in gold.

This leads to the creation (or re-creation) of structures, systems, and communities, which can have great influence on cultures and peoples. If we don't start at our doorstep, with our own memes and habits and behaviors, we'll never get to a

place of influence at the level of culture and people.

This focus on the individual doorstep is true even if we contemplate the resilience and sustainability needs of a metropolitan area of millions of people. The path towards sustainability and resilience for such large conglomerations is through the individual commitments of the great majority of its inhabitants to reduce the resource footprint of their individual households and enterprises.

This can’t be imposed from the top down. It must be lived from the grass-roots up. While it will be driven or constrained by circumstances, even so the initiative rests with each individual person and the household or family where he or she lives.

The path towards sustainability is paved with broadscale grassroots work, that creates hope in the midst of alienation, abundance instead of scarcity, and cooperation in place of competition. This is the way we will avoid the ash heap of history.

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01061 Observations Regarding Invisible Structures

How can a society that exists on instant mashed potatoes, packaged cake mixes, frozen dinners, and instant cameras teach patience to its young? -- *Paul Sweeney*

Individual and collective human action is the foundation of all invisible structures.

Everything in an invisible structure **originates in a concrete action of a human being**. The invisible structure of the "United States of America" has no existence apart from the people who think of themselves as "The Americans." If a great catastrophe happened and all "The Americans" died, there would not be some metaphysical entity left over, as a ghostly echo, endlessly moaning, "I am the American nation." If all the Americans die, the American nation dies.

Invisible structures do not magically spring into being. They come about as the result of deliberate human design and action, or by spontaneous order, or by some combination thereof.

Invisible structures have consequences.

You can't do just one thing. Everything will ripple effect everything else. It therefore is always necessary to beware of **unintended consequences.**

Consider the meme – the earth is flat. Most people would say that it is good that the scientific truth that the "earth is round" replaced the previous flat earth thinking. Alas, one of the consequences of the demise of the "earth is flat" meme was the conquest and subjugation of the indigenous populations of the western hemisphere. In other words, for a certain period of time, the "earth is flat" meme kept Europeans bottled up on their end of the Eurasian land mass. Once the "earth is flat" meme was out of the way, well, look what happened.

So we have to embrace a certain humility when we undertake change work regarding invisible structures and have a care for the future by considering the law of unintended consequences. Just when we think we have things all figured out, Murphy comes knocking at the door.

Initiate change work at the lowest level where you can do what needs to be done.

The larger the system, the more resilient it is in the face of challenge and the more inertia it has available to resist to any proposal for change.

Thus, it is almost always easier to start something new than to change something that already exists. There are exceptions. For example, if an existing credit union can be influenced to do sustainable loan work, that is great. If this doesn't happen, start your own credit union.

In any design for change, use long and thoughtful observation to determine the lowest possible level where the change can be affected in a way that actually produces something positive.

Systems and structures will always have defense mechanisms against change. And they can be quite ferocious in their defense of the status quo. The bigger the system, the more powerful the defense.

The smaller the system or structure, the more manageable their defense will be.

Accumulate small changes to impact larger structures and systems. Always be on the lookout for the big score.

We start small or we don't start at all.

Think of this as the persistent effect of rain on a granite boulder. Eventually, the rain erodes the granite boulder to a pile of sand. In the event of a "big score" – the granite boulder could be pummeled to pieces quickly by an even larger granite boulder, an earthquake, a meteor strike, or the use of dynamite.

Note the great violence implied in these sudden transitions. The granite boulder, as a granite boulder, has a tremendous amount of inertia to just stay the way that it is. The rain finesses that by picking away at it, tiny bits at a time, over long periods of time. If we brought enough energy to bear on the subject, we get the job done much quicker.

In social terms, we refer to a period of rapid fundamental change as **punctuated equilibrium** (a term borrowed from biology)**.** It is a time of often chaotic development in invisible structures. Sometimes we call these events revolutions. If they are unsuccessful, we know them as rebellions or uprisings.

Invisible structures are like icebergs. You only see 1/7th of what happens. So always be wary of your first impressions. Long and thoughtful observation is essential to all of permaculture design.

Memes that relate to reasons and beliefs are often much more resilient than memes that relate to actions and behaviors.

It is easier to convince a climate skeptic to build a compost pile than it is to convince a climate skeptic that global climate change is a reality. One way to approach social change via permaculture design is to decide which behaviors we want to encourage and then work on encouraging those behaviors, leaving the "theology" (so to speak) aside. A compost pile mitigates climate instability, even if built by a climate skeptic, as do organic gardening, insulation, and public transit.

The edge effect is real. Use it!

Edge and transition areas are known to be extra productive. We ignore this to our communal peril. Geographies where different kinds of structures, systems, and communities meet and interact become particularly generative of new invisible structures and systems. To get things done, design to bring people with diverse ideas, backgrounds, beliefs, and customs together.

Work with patterns.

Look for patterns in invisible structures and work with them to achieve your goals. Look for the trees and other structures within the forest and how they interact with their surroundings to create the forest.

– Everything connects to everything else.

– Many elements support every function.

– Every element serves many functions.

– Maximize beneficial connections in invisible structures.

How could this work?

A family of four could have one person who works in a coop that provides goods or services to the local community.

The household participates in a recycling program. It buys from small business and other coops in the neighborhood. It connects to an extended family by bonds of trust and mutual aid.

It connects to the larger village system by a variety of structures. Its extended family connects with other extended families in the village.

The worker coop buys from others in the village.

Everybody banks at a village owned credit union, which loans money for village enterprises and capital purchases.

What else?

What are your observations of invisible structures? How do things look from your angle of observation?

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01071 Succession and Invisible Structures

The human race's prospects of survival were considerably better when we were defenseless against tigers
than they are today when we have become defenseless against ourselves.
-- *Arnold J. Toynbee*

These notes are from an Oklahoma City permaculture design course taught by Scott Pittman of the Permaculture Institute in New Mexico, Fall 2011, during a presentation I gave on invisible structures.

In permaculture design, we apply natural patterns to human cultural issues.

Let's ask ourselves what happens in nature when something seriously damages an ecological system.

The principle of succession goes to work. The first plants to sprout are not what will grow into the mature trees later in the cycle. They are the pioneer species that move in to the damaged area, reproduce rapidly and grow quickly to cover the soil and begin the process of healing. After the pioneering plants lay the foundation by accumulating nutrients and fixing nitrogen, the second generation plants come in, followed by the third generation and so on as the ecology evolves from one form to another. It may linger for a while in certain forms and persist for very long periods of time in one or more forms.

The lists below developed in a brainstorming session after my presentation on invisible structures (which largely consisted of the previous material in this Invisible Structure section). The particular geography of those contributing to this list was Oklahoma. To repeat this analysis for your area, first you need --

-- *long and thoughtful observation* so that you (1) understand the tribe(s) of your area, (2) invest time, (3) build relationships.

Observations of memetic evidence of an extremely damaged cultural ecology.

These are the memes (ideas) that support the present system.

Use lots of stuff.

Bigger is better.

Borrow lots of money.

Specialize as much as possible.

Experts know more than you or me.

The boss is the most important.

Violence solves problems.

Convenience is a virtue.

Because I say so.

We own the planet.

Faster is better.

Fast and cheap is better.

It's impudent to think that humans can change the planet.

Climate change is an easy way to implement socialism.

Consume more to promote growth.

You must spend time doing things you don't like so you can have some time to do things you want to do.

Nature doesn't matter.

Humans don't need a relationship with nature.

Humans are the most important organism.

Success = money (lots of it).

Some people don't count.

Corporations are people.

There is one right way to be in the world.

Productivity, efficiency, profitability rule.

Sustainability is for hippies.

Trickle down solves poverty.

A rising tide lifts all boats.

Don't worry your pretty little head, the men will take care of things.

You can't speak against the tribe.

If you are not rich you are lazy.

There are only two ways – if you are not for us, you are against us.

There are 100 years of natural gas.

Pioneering Species

The first generation of change memes to heal the damaged cultural ecology.

There are the memes that can lay the groundwork for change in a beneficial direction.

They develop an *ideological resistance* to the status quo.

Stewardship

Frugality

Sharing

Cooperation

Conserving

Conservation

Simplify

Kindness

Function is beauty.

Listening is important.

Go local.

Community

Economic renewal

Transparency

Honesty

Authenticity

Historical memory

Understand and value traditional and indigenous cultures.

Personal responsibility and accountability.

In nature, pioneering species would grow prolifically and produce lots of seeds so that a large territory could be colonized quickly. There will be a significant increase in diversity in the plant life of the area. Many of the plants will be nitrogen fixers and nutrient accumulators. They create conditions where further layers of succession can occur.

Second Order Change Agents

These memes move the process along, at an accelerated pace and depth of impact. They support *civil disobedience* to the status quo by *promoting the withdrawal of consent via changes in lifestyle and creation of new communities.*

People start doing things that are reflected in these ideas.

Doing is good.

Being the change.

New tribes organically develop.

Multiple tribes (diversity continues to increase).

Less conformity.

What's easiest is not always best.

Turn from mass media to live forum/personal interrelationships.

Restoration of the commons.

Ethics become important.

Voluntary sacrifice for the greater good.

Peace

Understanding of what has really happened (historical reality).

Crap media grew because we lost ways to express ourselves in artistic ways. Now we develop a new appreciation for, and blooming of, active participation in the arts and cultural activities (more than passive viewing).

Third Order Change Agents

This is the revolution that overturns the old order. With the work done by the first two orders of change agents, the cultural ecology continues to evolve into healthier forms, perhaps at some point leading to a punctuated equilibrium in the forms of --

– Educational Revolution

– Economic Revolution

– Political Revolution

-- where a significant amount of change for the better occurs in a short period of time.

If we have done a good job developing our ideological resistance and civil disobedience, the transition will be managed and peaceful instead of becoming chaotic and violent.

Permaculture itself is a new tribe. The purpose of permaculture teachers is to help us find each other.

Additional Reading:

Ecotopia and Ecotopia Emerging, by Ernest Callenbach

Carol Flinders, "Keeper of the Keys" essay, from Laurel's Kitchen (by Laurel Robertson)

Paul H. Ray and Sherry Ruth Anderson, "The Cultural Creatives." New York: Harmony Books, 2000. ISBN 0-609-60467-8.

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01081 Extended Families, Groups, and Organizations

Family means no one gets left behind or forgotten. *David Ogden Stiers*

While growing up in a rural community in southwest Oklahoma, I was part of a large extended family. Grandparents, aunts, uncles, cousins of all degrees, nearly everyone in our family still lived in our home community where all eight of my great-grandparents settled before statehood, all of whom, together with my grandparents, are buried in the town cemetery.

That's changed. The era of Cheap Fossil Fuels has not been supportive of the extended family. As the older generations died, younger generations moved away. It no longer mattered if you had your kinfolk around, because if you worked reasonably hard and regular you could make it without help from others. Family size declined, so there aren't as many new cousins being born. There's no one with my paternal surname living in that county anymore.

I now live in a large city with none of my relatives within shouting distance. The individual nuclear family, consisting of a mother and father and 1.3 kids, or a single parent and 1.3 kids, is the new normal.

We've eased our way into this, one little step at a time.

Extended families used to get together for work. As a large group of people working together, they would –

– Put up firewood for the winter,

– Can, pickle, dehydrated, and ferment foods,

– Plant and harvest gardens,

– Do repairs and build buildings.

Now what do we do?

We turn up the thermostat and burn fossil fuels to get warm, thus we don't need friends or family to help put up wood for the winter.

We buy canned and frozen and bottled foods at the supermarket, thus we don't need friends or family to help put up food for the winter.

We buy meats and veggies at the supermarket, so we don't need friends or family to help with our garden.

We hire contractors, so we don't need friends or family to help us do repairs and or build buildings.

Note how important fossil fuels are to these typical household equations:

The natural gas and electrical grids, which bring us energy for cooking, refrigeration, heating, and cooling, are possible and affordable thanks to cheap fossil fuels.

Canned and frozen and bottled foods at the supermarket come to us from the four corners of the earth, thanks to the expenditure of large quantities of fossil fuels.

Contractors can build cheaply because of cheap fossil fuels.

But the era of Cheap Fossil Fuels nears its end. Here we are, in our little households of one to three people, together with our "energy slaves" that have made life easy and comfortable. Alas for all of us, those energy slaves become more expensive and harder to find all the time.

One of the consequences of the demise of cheap fossil fuels will be a rise in the

importance of the family including the extended family. Living in small households of one to three will become increasingly problematic and expensive.

By Blood or Adoption?

Extended families may come back together based on blood kin relationships or they may come together based on friendship and mutual adoption. As blood-related families have declined, the importance of close personal friendships has increased. It's not much of a step from a group of people being "close personal friends" and those same people, under the increasing pressure of external circumstances going from bad to worse, deciding to form an extended family by mutual adoption.

This could be looked at as the formation of a clan or tribe, or in a more secular terminology, a mutual assistance group.

Four Tiers of Cooperation

I am a fan of the work of permaculture thinker Vinay Gupta. He describes four basic tiers of cooperation among human beings:

– Individuals

– Groups

– Organizations

– States

Individuals and Groups
Individuals are the base of the pyramid and we constantly form ourselves into groups. We acquire membership in some groups by birth – our families and extended families, clans, and tribes. Others invisible structures have secular or religious purposes. We may be affiliated by default, or by our own voluntary choice. Whatever that case may be, a group has a definite idea of its own identity. Group members know who is in the group and who is not in the group.

Four Functional Necessities of Groups
There are four kinds of infrastructure necessary for the group to work effectively:

Space – the group needs a place to come together and meet.

Communications – the group must be able to communicate amongst its membership and with its leaders.

Transportation – groups need mobility.

Resource allocation – groups have scarce resources, so a method of allocating them for group purposes must be developed and implemented.

Three Necessary Characteristics for Organization Formation
An organization requires all of the conditions and infrastructure of group. In addition, there are three levels of social infrastructure that make it somewhat different from an ordinary group.

Shared Map. People and families come together based on a shared model of reality. They may not agree on everything, but they will have more in common than not. They will need to agree on the purpose of the group for it to be effective. This includes a definition of boundary conditions – who is in the organization and who is not in the organization.

Shared Plan. As the organization develops, a shared plan emerges based on their shared map.

Leadership succession. To be successful, an organization must have an common agreement on what happens if leadership does not perform and/or otherwise needs to be changed.

The Nation State
Sitting on top of everything these days is the nation state. There are five characteristics that support a state and make it possible.

Jurisdiction. This is manifested by systems of law and enforcement.

Citizens. States have citizens and there is a definition of who is a citizen and who is

not a citizen, as well as a path to become a citizen.

Territory. Each geography comes with a governmental jurisdiction. Conflicts result when more than one nation attempts to exercise jurisdiction over a given geographical area.

Effective organization. A state must get things done and it does things through ancillary organizations.

International recognition. Full sovereignty requires the support of other nations.

The nation state is the arena where the individual citizen has the least control or influence. When considered in its totality (government at all of its levels – local, regional, and national) a state has enormous life and death control over its citizens, for good and for ill.

The Impact of Invisible Structures

For better and for worse, all of the invisible structures of our lives have enormous influence over us and the planet. At present, our invisible structure systems actively work against all movements towards sustainability. It is hard to do the right thing for the planet, for the human race, and for the future.

So it comes to pass that work on invisible structures is every bit as important as building compost piles, riding a bicycle instead of driving a car, and increasing the density of our housing.

This is particularly true for those of us who live in urban areas.

Since we will not be able to raise all of our own food, we will need to be part of structures and systems that supply us with food.

We will not be able to grow all of our own energy, we will need to be part of structures and systems that supply us with energy.

For most of this, this process of affiliation with new invisible structures that support more sustainable ways of living begins with our own families – whether those be by blood and birth or by adoption and friendship.

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01091 Open Source Resistance and Protest

Change does not roll in on the wheels of inevitability, but comes through continuous struggle.
And so we must straighten our backs and work for our freedom.
A man can't ride you unless your back is bent. -- *Martin Luther King, Jr.*

Open Source did not originate in the modern software movement. It is an ancient concept – recipes have always been open source, for example.

Actions by groups within the developing software industry gave clearer definition and an ideological impetus to the concept. In the modern world, open source movements are the new normal.

Open Source is a hallmark of those working for an economy of abundance in opposition to those who profit from artificially created and coercively maintained economies of scarcity.

So it was only a matter of time before open source protest became a reality, and that's what we saw in 2011 with the birth and development of the Occupy! movement throughout the world. The Occupy! Movement changed the content of political discourse in the United States. In the Arab world, authoritarian governments have been overthrown.

What are the characteristics of these open source resistance movements?

Big Tent. They exist outside of the traditional political categories, transcending left, right, libertarian, leftist, Marxist, and anarchist ideologies. They are all big tents. This is one of the reasons they are potentially dangerous to the established systems. Rulers specialize in divide and conquer. When their subjects unite around the common theme of resistance to the rulers, the primary defense of the ruling elite crumbles.

Leaderless structure. The general assembly structure works and seems to eliminate some of the needs that we usually look for conventional leaders to satisfy. The movement has shown social wisdom by rejecting "leaders" attempting to hijack the movement for their own selfish ends. This lack of conventional leadership makes it hard for mainstream media, businesses, and politics to cope with or resist the movement.

Rooted in place and geographies. They attempted – and succeeded – in occupying physical territories in the corridors of power. People come together in such places and spend time with each other. They actually talk with each other, unmediated by media including microphones, radios, computers, and internet networks.

No specific ideological demands. This drove both media and politicians crazy. The Official Rules for Protest Movements are that groups are to organize, protest, present specific demands that allow the groups to be properly categorized on the left-right spectrum, and then they can be appropriately marginalized. The refusal to submit detailed demands subverts this dominant rule book. Since the rule book advantages those with power, this particular subversion is an effective tactic.

They developed their own infrastructures. They copied, publicized, and reproduced everything that worked. They developed support systems for their "temporary autonomous zones." They maintained these infrastructures even as the first generation of occupation sites dispersed. **Affinity groups** came together

and provided support for primary occupation activities.

John Robb is a permaculture thinker who writes on the development of modern movements of resistance to state oppression. He notes that a strategy to successfully defeat your opponent **requires isolating your opponent across three vectors – physical, mental, and moral – while at the same time improving your own connectivity across those same vectors.**

The game plan is therefore to isolate your opponents from allies and support networks. You **mentally disrupt** your opponents with a rapid pace of operations, novel and unusual situations that aren't planned for in advance and that prevent your opponent from acquiring adequate accurate knowledge about events. You **morally** isolate your opponents when you provoke them to violate their own moral rules and laws.

The Occupy movements of 2011 grew out of permaculture design concepts, even though most of its participants weren't aware of permaculture. Robb's analyses helps us see how permaculture, as a design movement, cultivates resistance to the dominant paradigm.

By providing design tools and strategies that encourage local interdependence and the formation of resilient communities, we over time **withdraw our consent and end our physical, moral, mental, and economic support of the structures of dominance and violence and greed that are in** control of this world. This isolates the "One Percenters," and deprives them of income and wealth and power.

By utilizing novel strategies such as the leaderless Occupy movement, **we confuse the ruling authorities,** sowing doubt and disorganization amongst their own ranks.

This action **inevitably produces immoral responses** from the government. From forcing people to chop down fruit trees in urban areas, to pepper spraying peaceful, nonviolent protestors, the immoral actions of ruling authorities cause people to lose faith in them and to doubt their legitimacy. Once the authorities destroy their own legitimacy, it is all down hill.

Ask the Romanoff's about that. Or Gorbachev.

iPermie is an instruction manual for **how to occupy your own life and begin your own leaderless resistance** to the system that destroys people and the planet with careless abandon. Since we always start with our own doorstep, occupy your own lifestyle first and then help others to do likewise. Form small groups around mutually agreed purposes – affinity groups – and make alliances. Erect a big tent.

Revolution begins with ideological resistance. That's one of the functions stacked on iPermie. Here we take advantage of the contagion of ideas to spread the word that a new and better world is not only possible, it is on its way. This supports a growing tide of resistance rooted in an unsentimental holistic understanding of the domination/subjugation system. As people learn what is happening to them, they become more interested in putting an end to such manipulations.

The second stage of revolution is disobedience. Another function stacked on iPermie is "Manual of Civil Disobedience." Most people think of civil disobedience as mass rallies, and that has always been part of civil disobedience. Yet . . . Gandhi was as concerned about what the Indian people did and didn't do as he was about the British. He targeted the way that the Indian people lived their lives and cooperated with the British administration. By encouraging Indians to break the law and make their own salt, for example, he undermined British revenues and authority. By peacefully provoking the authorities to violent responses, they undermined the moral legitimacy of British rule.

These same principles hold true in our era.

The road to effective civil disobedience is how you live your life. As you withdraw your consent – and your financial and emotional and political support – from the established system of greed, domination, and violence, you lay the foundation for a better, more beautiful and peaceful and productive future.

iPermie offers you the resources you need to design your life to resist and rebuild, regenerate and renew, give hope to the hopeless, and to comfort the afflicted, and afflict the comfortable.

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01101 Permaculture Projects for your Community or Campus

The pessimist complains about the wind;
the optimist hopes it will change;
the realist adjusts the sails.
Designers build ships and make better sails. *Unknown*

How can we apply these concepts of invisible structures to particular situations? If you live in an urban area, that would be your neighborhood. If you are a student, you're looking at your campus.

Let's first look at the situation on campus.

A permaculture structure for your campus.

First things first, as we often say, and second things second. You need an on-campus structure that can interact with other on-campus organizations and your school's administration.

This involves reviewing the basics of all structures: shared map, shared values, leadership plan.

Research. Every school will have a procedure for approving new organizations on campus. Find that procedure, study it, and develop a written plan to start your organization that meets your school requirements.

Meet and Greet. Look for other students on campus who share your interest. Hold a meeting to discuss forming a permaculture group on your campus.

Find a faculty advisor. Most schools require a faculty advisor for student organizations. It's always best to approach a professor already known to one or more of the members of your group. If none of you have such contacts, look for someone who perhaps teaches some kind of sustainability course at your school.

Decide on a first project. Start with something easy. Your group should spend some time observing the way campus life works at your school. Those observations, and suggestions from here and elsewhere, will help you find something that is easy and doable. You want something easy because you want your first activity to be successful. You don't want to start with a spectacular failure.

Give yourself a name. One common organizational practice within the permaculture movement is to refer to permaculture organizations as "guilds." So you could be the (name of your school) Permaculture Guild – or Permaculture Guild of (name of your school).

Education. Education is always in order. Hold weekend workshops, present short seminars, give presentations to groups. Sponsor speakers. Do demonstrations. Start a website and an online discussion group or bulletin board system, to facilitate communication. Form iPermie study groups.

Campus Recycling. If your campus doesn't recycle, that's a place to start. It's possible that your school could even make money on the deal or at least cover its costs.

Campus Composting. This project directs campus organic waste (from cafeterias) to a compost system. Ideally, the compost would be used to grow more food to supply the cafeterias. Look for professors doing research and see if their research projects could be linked in some way to composting.

Campus Vermiculture. Extra points all around if food waste from the cafeteria feeds worms in greenhouses, where greens grow using worm tea and compost, producing food for the cafeteria. Note the beneficial connections of this particular project. This idea derives from a successful Saginaw Valley State University project. Professors use the greenhouse project and its associated vermiculture project for academic research.

Dormitory Energy Conservation. Sponsor a campus contest among the dormitories to see which dormitory could reduce its ecological footprint for energy and water the most. This is likely to be a popular idea with your university's administration, since a successful project could significantly reduce the operating cost of the dormitories.

Campus Vision. What is the permaculture vision for your campus? Remember the example of a forest, which has no human caretaker, yet it is abundant and productive. What would your campus look like if it were like a forest, where all of its needs were met within itself with the addition of solar energy and rainfall. This could be a fun, ongoing game where you could learn design concepts while rethinking your campus.

Permaculture Career Advising. As your permaculture skills increase, you can provide career guidance to students who want to work in permaculture design or use permaculture design in their careers. You can promote worker owned cooperatives as an alternative for graduating seniors in a difficult job market. You can help students decide if they really should be in university, or if there are other options for them.

Edible Landscaping. Encourage your campus to green its landscape by planting edibles and demonstration gardens, with the food going to the campus cafeterias or local food security organizations.

Organic Campus. Every campus should be certified organic! Pesticides and herbicides are harmful for students and other living organisms. A certified organic campus is a selling point for recruiting students.

Community Permaculture Organization Projects

For non-students living in urban neighborhoods. . . everyone needs a community permaculture organization. It can help spread the word about permaculture and be a voice for the neighborhood when interacting with the government.

Start with education. One way to find kindred souls in your neighborhood is to have a series of workshops or presentations on sustainable living topics. For example, if your neighborhood is mostly rental apartments, do a program on "How to cut the energy bill for your apartment." Or, "Growing food in urban areas."

Starting the organization. Once you have made some contacts and found some kindred souls, the group can organize itself more formally. You can incorporate as a nonprofit, or you can simply be an unincorporated association. Incorporation carries its own issues, so unless it's needed for a specific reason (like to apply for a grant), unincorporated association status works well. Get yourself a name and work out what your organization will do and how it will do it.

Growing food in small spaces. Given the limited areas available in urban neighborhoods, teaching folks how to

maximize the use of small spaces for food growing should be popular and is an effective topic on which you can start. In Venezuela, they pioneered a program to plan 8,000 one-square-meter gardens. Their results indicate that even in such a small area, they could grow 330 lettuce plants, or about 40 pounds of potatoes or 35 pounds of squash, if planted continuously throughout the year.

Solving the specific problems of your area. Your neighborhood has specific problems, you can hold a series of meetings to talk about those problems and brainstorm solutions. As that process continues, you may want to go deeper into community organization and use the strategies and tactics described in the Community section to develop an effective neighborhood organization to support the people in your area in their efforts to solve the problems of the neighborhood.

Edible landscaping. Encourage your municipal government to plant edible landscaping in areas like parks, street medians, and other government properties.

Promote passive solar. Educate people about the advantages of passive solar heating. Hold workshops on building small window-box solar air heaters.

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01111 Political Corruption

Some will rob you with a six-gun and some with a fountain pen - *Woody Guthrie*

Invisible structures are a primary method to impose injustice upon the population and to steal surplus and transfer it to those with privileged access to political power.

One popular method of political corruption, where those with power reward their friends and punish their enemies is known as rent, which today has two meanings. One is commonly understood as the price you pay to live at or commercially use a house or other property. However, it has a political meaning . . . often formulated as "rent seeking". . . about which Wikipedia sayeth . . .

> . . . rent-seeking is an attempt to derive economic rent by manipulating the social or political environment in which economic activities occur . . .

In more plain language, rent-seeking **rigs the economic and political situation to unfairly benefit those with access to political power**, at the expense of those without access to political power. It is invisible structures at work **making the world a worse place to live.**

When dentists manipulate the law to prevent denturists (the skilled technicians who actually make dentures) from selling dentures directly to the public, they make more money at the expense of both the public, who pay higher prices, and denturists, who have lower incomes, as a result of this legal manipulation of the dental services market that has nothing to do with the quality of the dentures. The law indentures the denturist to the dentists and increases the prices paid by the customers.

When Devon Energy blackmailed Oklahoma City government into borrowing tens of millions of dollars, at a high interest rate *from the corporation* in order to do downtown improvements so that Devon would build a large building, Devon Energy and its stockholders profit from the economic rents in the form of high interest payments paid by the city's general taxpayers.

When private prison companies lobby legislatures for "tough-on-crime-three-strikes-you-get-life" laws, they profit from the increase in prisoners, at the expense of the state government which rents space in their facilities for prisoners.

When makers of bombs and guns promote war, as they did against the people of Iraq and Afghanistan, they profit by the destruction of war and the subsequent demand for more bombs and more guns.

Those who manipulate the system so that they have an advantage, and others have a disadvantage, gravely harm the common good for the sake of their own selfish special interest.

If you want to know why the rich are richer, and everyone else is poorer, why the top 1% own so much and everyone else has so little, look no further than the problems caused by our rent-seeking elites who distort economic markets to coercively extract financial advantage from those without the political power to defend themselves against these assaults.

Rent-seeking is at the heart of our problem of political criminality. The common good will continue to suffer until rent-seeking becomes impossible. That will require structural changes in the ways our governments operate.

We insulate ourselves from the thefts of the rent-seeking aristocrats by establishing systems and structures, internal to the growing sustainability community, that minimally participate in the economic system dominated by the corporations. As more economic activity shifts out of the mainstream economy, we deny rent-seeking aristocrats income.

Less income for the wealthy means less power for the rich and more power to the people.

That's the reason for seemingly small but important details like avoiding the use of plastic cards and always spending cash or using checks. The transnational financial system gets a small cut of every transaction on a plastic card. Over time, this siphons wealth away from local economies in order to feed parasitic financial elites who produce nothing useful, only manipulations of money. Each time we avoid the use of plastic payment cards, we deny the powerful their cut and vote to keep it in the local economy.

Plus, you spend more money if you use plastic instead of cash, even if it is a debit card.

Just as the financial and corporate leadership got their power one small transaction at a time, we can take it away from them one small transaction at a time.

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01121 Memes and Structures of Control and Liberation

Usually, terrible things that are done with the excuse that progress requires them are not really progress at all, but just terrible things. -- *Russell Baker*

The Excess Consumption System benefits its controllers at our expense because we give our consent to it and make it possible. That's easy to do. It is not at all difficult. The system makes it so. There are numerous memes circulating through our society that ensure social control and conformity to the desires of those who benefit from the Excess Consumption System. These memes support structures and systems that make it easy to make bad choices. They endeavor to make it hard to make good, better, or best choices:

The system benefits me.

The government does the right things for the nation.

I am a powerless pawn in the hands of great forces beyond my control.

Nothing I can do will change things, for me personally, or for society.

Enemies threaten us. We must unite and do what the government tells us to do!

More stuff is more better.

Bigger, faster is better.

Borrowing money benefits me.

The lesser of two evils is a fine choice.

Violence solves problems.

Humans don't need a relationship with nature.

A rising tide lifts all boats.

This system is not an accident. We sometimes forget that the Greatest Generation came out of World War II as expert practitioners of thrift and frugality. They were coming off of a dozen years of depression followed by four long years of war. They knew how to plant gardens and preserve the harvest for winter eating. They knew the truth of "make it over, make do, do without." But it wasn't long before they were turning their backs on those days and enjoying the "fruits" of their wartime victory.

Victor Legough, a PR and advertising expert from the 50s, wrote:

> Our Enormously productive economy…demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption…we need things burned up, replaced and discarded at an ever-accelerating rate.

Thus began the development of shopping as a virtual cult religion, the perfect antidote to traditional American thrift and frugality.

Distraction, Fear, Compensation: Bread and Circuses

The system uses the media to distract the population with trivialities and on edge with fear. Watch your evening news and count and time the number of crime

reports. Measure the column inches of violence in your newspaper.

There are plenty of compensatory activities to keep people mindlessly entertained. Five hundred channels of cable television will fill your mind with drivel and stoke your bloodlust for violence and sex. Drugs and alcohol are readily available to numb your senses, dull your brain, and make it seem as though none of this really matters.

Memes of Liberation

If all was lost, you would not be reading this.

There are memes of liberation that help us to break free of the Excess Consumption System and liberate our lives from the controls of slavery. These memes are the seeds of structures of beauty, wisdom, frugality, and sustainability that help us make good, better, or best choices:

The system benefits the powerful at the expense of the common good.

Cooperation is more beneficial than competition.

Less stuff brings more quality of life. This is often said simply as "less is more."

You are not a powerless pawn.

The lesser of two evils is still evil.

The borrower is the slave of the lender.

What you do matters – to you, to all you love, to your community, and to the planet. Never let anyone tell you otherwise.

Your life is under your control.

If you don't like what's happening to you, you can design a better system by which to operate your life.

Kindness, beauty, solidarity, authenticity, and participation work better than greed, gluttony, violence, selfishness, and waste.

The government defends the special interests and takes from the majority to give to the powerful.

We can take back control of the government from the rent-seeking aristocrats.

We can overcome evil with good.

Some structures of liberation are a matter of opening your eyes and your mind and understanding how things actually work. Others empower people to take action that withdraws their consent and support from the Excess Consumption System.

These actions constitute growing communities of support that help us along our journeys of beauty, wisdom, and sustainability.

No one can eliminate their bondage to the Excess Consumption System overnight. It's a process, a journey.

Our liberation begins first in our own minds.

At the beginning, your work on your own attitudes and thoughts is more important than any other single thing you can do. Freeing your mind – emptying out the trash – is the basis of a better, more sustainable life.

Don't think that is easy, because it isn't. There's a reason people say, "We can be our own worst enemy." The imprinting and socializing begin early.

But it isn't impossible. You are the owner of your own brain. You can unlearn bad habits of thought and awake your life to new patterns of freedom and liberation.

Self-Fulfilling Prophecies

I love self-fulfilling prophecies. They are the best kind of prophecies because they always come true. This is because we self-fulfill them.

The trick is to be careful about the prophecies that you self-fulfill. Stick with

prophecies of joy, abundance, cooperation, wisdom, and beauty.

Leave the prophecies of violence, scarcity, destruction, and terror alone.

The world has seen enough violence. We need no more of it. Instead, we need more joy, abundance, cooperation, wisdom, and beauty.

Permaculture design can make this so.

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01131 War, Peace, Justice

In reviewing the history of the English Government, its wars and its taxes, a bystander, not blinded by prejudice, nor warped by interest, would declare, that taxes were not raised to carry on wars, but that wars were raised to carry on taxes. *Thomas Paine, Rights of Man*

In time of actual war, great discretionary powers are constantly given to the Executive Magistrate. Constant apprehension of War, has the same tendency to render the head too large for the body. A standing military force, with an overgrown Executive will not long be safe companions to liberty. The means of defense against foreign danger, have been always the instruments of tyranny at home. Among the Romans it was a standing maxim to excite a war, whenever a revolt was apprehended. Throughout all Europe, the armies kept up under the pretext of defending, have enslaved the people. *James Madison, fourth president of the U.S.A.*

Every gun that is made, every warship launched, every rocket fired, signifies in the final sense a theft from those who hunger and are not fed, those who are cold and are not clothed.
-- Dwight D. Eisenhower, 34th president of the U.S.A.

War is not a sustainable activity and it has no place in a more permacultural future.

Permaculture addresses war by resolving the issues that create tension between nations and lead to war, such as the gluttony that drives our endless quest for cheap natural resources to fuel our industrial machines. While ideology and religion have been blamed for the recent wars in Afghanistan and Iraq, in reality these wars were about control of the oil fields of the Middle East.

We propose better design of our political processes, to eliminate the power of special interests to distort policies to benefit them at the expense of the common good. War is a money-making activity in the United States and elsewhere, so there is never a lack of rich people planning to become richer by encouraging our governments to resort to violence and conquest. It's a problem that goes back to antiquity.

Given the propensity of the developed nations, led by the United States, to make war to protect access to oil, we can help eliminate one cause of war by addressing our addictive dependence upon fossil fuels. In another stacked function, we find that the first step to peace is fossil fuel demand destruction. We need to drive less and to travel less. The more developed nations need to get over their sense of national entitlement to cheap energy that has driven their war adventures in the less developed countries which possess oil and mineral riches. It is always immoral to go to war to seize the resources of another country.

A word of wisdom – “peace is the fruit of justice” – and human history certainly testifies to the truth of that.

When was the last time the oaks went to war with the shrubs in a forest? It’s not a concept that works, is it? Oaks and shrubby understory plants coexist quite well in a forest. The shrubby understory plants evolved there so they are quite happy with the dappled sun/shady interior

of the forest. The wastes of each (dead leaves and wood decomposing) create fertility that feeds both and all the other elements and niche occupants of the forest.

While human societies of that level of sustainability are far in the future, the lessons the forests (or the prairies, or the plains, or the deserts) teach us are clear. Members should share in the surplus created by systems create surpluses. The variety of mechanisms for such sharing is enormous. In human terms, we could speak of investment, giving, earning, paying, buying, selling, taxing, sharing, etc.

Contrast this with the tendency of human societies to go to war over greed for loot and resources. The Roman Empire made a profit for centuries by conquering and looting its neighboring civilizations. They rejected mutual trade and benefit in favor of conquest and looting. The day of course eventually came when they too were conquered and looted. Rome, the Eternal and Imperial City was left depopulated and devastated.

In the modern era, the US seems determined to follow the trajectory of ancient Rome. All too often we choose violence as our method of resolving problems and disputes. Sometimes the violence is open and large scale, as with the wars on the people of Afghanistan and Iraq. Other times we use more covert strategies, such as we presently employ in Somalia, Eritrea, South Sudan, and elsewhere. Many nations and para-nations are working their own devious programs – China throughout Africa, Al Qaida throughout Africa, the Middle East, India, and Oceania, and then there is the Pakistan versus India perennial quarrel.

Lust for resources drive these wars. Structural violence profits from, and creates, more, injustice.

The work we do to praxis permaculture design in our own lives has some additional functions stacked on it. One of the more important of those stacked functions is to "create a world of justice and peace." As long as we in the developed countries live lives of gluttony and greed, our nations will resort to violence to ensure that there are enough resources on hand to satisfy our appetites.

The ugly truth that we hate to confront is that our governments are reflections of who we are as a people. The government is the unfortunately dysergistic sum of our collective experiences, desires, and demands, distorted and amplified by special interests who control the media and our political systems. It has turned dysfunctional because we as a people are on an increasingly dysfunctional downward spiral. We sell ourselves into the slavery of debt bondage to banks so that we can consume, excrete, and consume even more. We are never satisfied with our level of material achievement. We must always have more, more, more. Some do not hesitate to resort to crime to satisfy our gluttonous appetites. From the banker committing fraud on the billion-dollar scale to the neighborhood thief who robs you of your wallet, both manifest of the power of greed in our society to distort our humanity and debase our culture.

In such a situation, it is not a surprise to find that our politicians regularly corrupt the system and loot the public treasury in order to reward their friends and punish their enemies. That's why the powerful invest such huge amounts of money in our politics. It's not because people want to support the common good. It's because they think they will make a profit on their campaign contributions.

The process of political money often distracts people. They fetish on the idea that if we could somehow control that process better, we would make the system more fair. Permaculture derives from long, thoughtful, and accurate observations of reality. And there is nothing in our observation of reality that suggests that any amount of process can do anything to make a system like that of the United States, governing a people as selfish, greedy, and violent as we Americans, more just and fair so that the

rich and the powerful do not have inordinate influence over the outcomes of our politics.

We need better people, better design, and systemic change.

The influence of power and money on our government will only disappear as the influence of power and money on We the People, as individual human persons in our families and households, wanes and declines. We willingly allow ourselves to be distracted by those hiding behind the curtain pulling the levers and orchestrating the pretty shows. We willingly close our eyes to truth and embrace falsehood. We the People prefer gluttony, greed, and violence to truth, beauty, frugality, and justice.

As long as these realities remain true, our governments will do evil. If the situation changes, and we become a people of truth, beauty, frugality, and justice, our governments will change and learn to do good. Or at least "less bad."

So never let it be said that what you do, as an individual human person, in your families and households, doesn't count, because it does.

It matters to you, to your family or household and all who love and care for you. It matters to your community and to your nation. It matters to the planet and the ecologies and critters great and small who share this space with us.

Everything that you do creates the future. Whether that future is good or bad at least in part is up to you. It's a significant part too, because it's Zone 0, your own self. It's really true that the road to world peace begins in each individual human heart.

Let's repeat that: This is the road to peace. The United States military will withdraw its troops and fleets to the United States and turn away from our present imperial occupation of most of the world, when We the People have made this possible and desirable by the way we live our lives.

There are several levels of importance here:

– The things we do in our own individual lives and households.,

– Our work to spread the news about permaculture and encourage others to live more sustainably.

– Activities involved with creating structures and systems that make it easier to live in wisdom, justice, frugality, and beauty, and harder to live in gluttony, greed, despair, and violence.

Truth and justice are important. As we live them, they will increase. But if instead we live in falsehood and injustice that will be our future and it won't be beautiful, wise, or happy.

So what we do is important not only for the cause of sustainability. It is critical for the cause of justice and peace. Indeed, justice and peace are an integral aspect of the holistic sustainability we find in nature and aspire to in human systems.

Without justice and sustainability, there will be war.

Without peace and sustainability, there will be no justice.

When and where there are war and injustice, there will be no sustainability.

> Of all the enemies to public liberty war is, perhaps, the most to be dreaded, because it comprises and develops the germ of every other. War is the parent of armies; from these proceed debts and taxes; and armies, and debts, and taxes are the known instruments for bringing the many under the domination of the few. In war, too, the discretionary power of the Executive is extended; its influence in dealing out offices, honors, and emoluments is multiplied: and all the means of seducing the minds, are added to

those of subduing the force, of the people. The same malignant aspect in republicanism may be traced in the inequality of fortunes, and the opportunities of fraud, growing out of a state of war, and in the degeneracy of manners and of morals, engendered by both. No nation could preserve its freedom in the midst of continual warfare.
James Madison

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01141 The Melbourne Principles

In 2008 for the first time in human history, the world's population became more urban than rural.
At present 3.6 billion people (of a total of seven billion) live in urban centres.
By 2030 this figure is predicted to increase to almost five billion,
with urban growth concentrated in Africa and Asia. *Movement for Food Sovereignty, Mali.*

The Melbourne Principles provide a basic framework for developing invisible structures to help evolve our urban areas to be more sustainable, friendly, and humane places to live.

According to Wikipedia. . .

> The Melbourne Principles were adopted at the Local Government Session of the Earth Summit 2002 in Johannesburg, as part of the final communique, known as Local Action 21 or the Johannesburg Call. They consist of ten short statements on how cities can become more sustainable. Each principle has a few paragraphs of elaboration that provides additional information on its meaning and application. The Principles are designed to be read by decision-makers, and provide a starting point on the journey towards sustainability. Additional tools will be needed to operationalize the Melbourne Principles.

The 10 Melbourne Principles

1. Provide a long-term vision for cities based on: sustainability; intergenerational, social, economic and political equity; and their individuality.

A long-term vision is the starting point for catalysing positive change, leading to sustainability. The vision needs to reflect the distinctive nature and characteristics of each city. The vision should also express the shared aspirations of the people for their cities to become more sustainable. It needs to address equity, which means equal access to both natural and human resources, as well as shared responsibility for preserving the value of these resources for future generations. A vision based on sustainability will help align and motivate communities, governments, businesses and others around a common purpose, and will provide a basis for developing a strategy, an action programme and processes to achieve that vision.

2. Achieve long-term economic and social security.

Long-term economic and social security are prerequisites for beneficial change and are dependent upon environmentally sound, sustainable development. To achieve triple bottom line sustainability, economic strategies need to increase the value and vitality of human and natural systems, and conserve and renew human, financial and natural resources. Through fair allocation of resources, economic strategies should seek to meet basic human needs in a just and equitable manner. In particular, economic strategies should guarantee the right to potable water, clean air, food security, shelter and safe sanitation. Cities are the locus of human diversity; their policies, structures and institutions can significantly contribute to fostering cohesive, stimulating, safe and fulfilled communities.

3. Recognise the intrinsic value of biodiversity and natural ecosystems, and protect and restore them.

Nature is more than a commodity for the benefit of humans. We share the Earth with other life-forms that have their own intrinsic value. They warrant our respect, whether or not they are of immediate benefit to us. It is through people's direct experience with nature that they understand its value and gain a better appreciation of the importance of healthy habitats and ecosystems. This connection provides them with an appreciation of the need to manage our interactions with nature empathetically. Just as humans have the ability to alter the habitat and even to extinguish other species, we can also protect and restore biodiversity. Therefore, we have a responsibility to act as custodians for nature.

4. Enable communities to minimise their ecological footprint.

Cities consume significant quantities of resources and have a major impact on the environment, well beyond what they can handle within their borders. These unsustainable trends need to be substantially curbed and eventually reversed. One way of describing the impact of a city is to measure its ecological footprint. The ecological footprint of a city is a measure of the 'load' on nature imposed by meeting the needs of its population. It represents the land area necessary to sustain current levels of resource consumption and waste discharged by that population. Reducing the ecological footprint of a city is a positive contribution towards sustainability. Like any living system, a community consumes material, water and energy inputs, processes them into usable forms and generates wastes. This is the 'metabolism' of the city and making this metabolism more efficient is essential to reducing the city's ecological footprint. In reducing the footprint, problems should be solved locally where possible, rather than shifting them to other geographic locations or future generations.

5. Build on the characteristics of ecosystems in the development and nurturing of healthy and sustainable cities.

Cities can become more sustainable by modeling urban processes on ecological principles of form and function, by which natural ecosystems operate. The characteristics of ecosystems include diversity, adaptiveness, interconnectedness, resilience, regenerative capacity and symbiosis. These characteristics can be incorporated by cities in the development of strategies to make them more productive and regenerative, resulting in ecological, social and economic benefits.

6. Recognise and build on the distinctive characteristics of cities, including their human and cultural values, history and natural systems.

Each city has a distinctive profile of human, cultural, historic and natural characteristics. This profile provides insights on pathways to sustainability that are both acceptable to their people and compatible with their values, traditions, institutions and ecological realities. Building on existing characteristics helps motivate and mobilize the human and physical resources of cities to achieve sustainable development and regeneration.

7. Empower people and foster participation.

The journey towards sustainability requires broadly based support. Empowering people mobilizes local knowledge and resources and enlists the support and active participation of all who need to be involved in all stages, from long-term planning to implementation of sustainable solutions. People have a right to be involved in the decisions that affect them. Attention needs to be given to empowering those whose voices are not always heard, such as the poor.

8. Expand and enable cooperative networks to work towards a common, sustainable future.

Strengthening existing networks and establishing new cooperative networks within cities facilitate the transfer of knowledge and support continual environmental improvement. The people of cities are the key drivers for transforming cities towards sustainability. This can be achieved effectively if the people living in cities are well informed, can easily access knowledge and share learning. Furthermore, the energy and talent of people can be enhanced by people working with one another through such networks. There is also value in cities sharing their learning with other cities, pooling resources to develop sustainability tools, and supporting and mentoring one another through inter-city and regional networks. These networks can serve as vehicles for information exchange and encouraging collective effort.

9. Promote sustainable production and consumption, through appropriate use of environmentally sound technologies and effective demand management.

A range of approaches and tools can be used to promote sustainable practices. Demand management, which includes accurate valuations of natural resources and increasing public awareness, is a valuable strategy to support sustainable consumption. This approach can also provide significant savings in infrastructure investment. Sustainable production can be supported by the adoption and use of environmentally sound technologies which can improve environmental performance significantly. These technologies protect the environment, are less polluting, use resources in a sustainable manner, recycle more of their wastes and products and handle all residual wastes in a more environmentally acceptable way than the technologies for which they are substitutes. Environmentally sound technologies can also be used to drive reduced impacts and enhance value along a supply chain and support businesses embracing product stewardship.

10. Enable continual improvement, based on accountability, transparency and good governance.

Good urban governance requires robust processes directed towards achieving the transformation of cities to sustainability through continual improvement. While in some areas gains will be incremental, there are also opportunities to make substantial improvements through innovative strategies, programmes and technologies.

To manage the continual improvement cycle, it is necessary to use relevant indicators, set targets based on benchmarks and monitor progress against milestones to achieving these targets. This facilitates progress and accountability and ensures effective implementation. Transparency and openness to scrutiny are part of good governance.

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01151 The Methods Of Nonviolent Action

This list, with definitions and historical examples, comes from The Politics of Nonviolent Action, Part Two, The Methods of Nonviolent Action, by Dr. Gene Sharp, as quoted in his book, *From Dictatorship to Democracy: a Conceptual Framework for Liberation*, published by the Albert Einstein Institution. Its author placed it in the public domain. It provides ideas for activities directed at replacing dysfunctional invisible structures that promote war, injustice, and ecological devastation with beneficial invisible structures that care for people, care for the planet, and have a care for the future. It is used here with the permission of the Albert Einstein Institution.

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THE METHODS OF NONVIOLENT PROTEST AND PERSUASION

Formal statements

1. Public speeches

2. Letters of opposition or support

3. Declarations by organizations and institutions

4. Signed public statements

5. Declarations of indictment and intention

6. Group or mass petitions

Communications with a wider audience

7. Slogans, caricatures, and symbols

8. Banners, posters, and displayed communications

9. Leaflets, pamphlets, and books

10. Newspapers and journals

11. Records, radio, and television

12. Skywriting and earthwriting

Group representations

13. Deputations

14. Mock awards

15. Group lobbying

16. Picketing

17. Mock elections

Symbolic public acts

18. Display of flags and symbolic colors

19. Wearing of symbols

20. Prayer and worship

21. Delivering symbolic objects

22. Protest disrobings

23. Destruction of own property

24. Symbolic lights

25. Displays of portraits

26. Paint as protest

27. New signs and names

28. Symbolic sounds

29. Symbolic reclamations

30. Rude gestures

Pressures on individuals

31. "Haunting" officials

32. Taunting officials

33. Fraternization

34. Vigils

Drama and music

35. Humorous skits and pranks

36. Performance of plays and music

37. Singing

Processions

38. Marches

39. Parades

40. Religious processions

41. Pilgrimages

42. Motorcades

Honoring the dead

43. Political mourning

44. Mock funerals

45. Demonstrative funerals

46. Homage at burial places

Public assemblies

47. Assemblies of protest or support

48. Protest meetings

49. Camouflaged meetings of protest

50. Teach-ins

Withdrawal and renunciation

51. Walk-outs

52. Silence

53. Renouncing honors

54. Turning one's back

THE METHODS OF SOCIAL NONCOOPERATION

Ostracism of persons

55. Social boycott

56. Selective social boycott

57. Lysistratic nonaction

58. Excommunication

59. Interdict

Noncooperation with social events, customs, and institutions

60. Suspension of social and sports activities

61. Boycott of social affairs

62. Student strike

63. Social disobedience

64. Withdrawal from social institutions

Withdrawal from the social system

65. Stay-at-home

66. Total personal noncooperation

67. Flight of workers

68. Sanctuary

69. Collective disappearance

70. Protest emigration (hijrat)

THE METHODS OF ECONOMIC NONCOOPERATION :

(1) ECONOMIC BOYCOTTS

Action by consumers

71. Consumers' boycott

72. Nonconsumption of boycotted goods

73. Policy of austerity

74. Rent withholding

75. Refusal to rent

76. National consumers' boycott

77. International consumers' boycott

Action by workers and producers

78. Workmen's boycott

79. Producers' boycott

Action by middlemen

80. Suppliers' and handlers' boycott

Action by owners and management

81. Traders' boycott

82. Refusal to let or sell property

83. Lockout

84. Refusal of industrial assistance

85. Merchants' "general strike"

Action by holders of financial resources

86. Withdrawal of bank deposits

87. Refusal to pay fees, dues, and assessments

88. Refusal to pay debts or interest

89. Severance of funds and credit

90. Revenue refusal

91. Refusal of a government's money

Action by governments

92. Domestic embargo

93. Blacklisting of traders

94. International sellers' embargo

95. International buyers' embargo

96. International trade embargo

THE METHODS OF ECONOMIC NONCOOPERATION :

(2) THE STRIKE

Symbolic strikes

97. Protest strike

98. Quickie walkout (lightning strike)

Agricultural strikes

99. Peasant strike

100. Farm workers' strike

Strikes by special groups

101. Refusal of impressed labor

102. Prisoners' strike

103. Craft strike

104. Professional strike

Ordinary industrial strikes

105. Establishment strike

106. Industry strike

107. Sympathetic strike

Restricted strikes

108. Detailed strike

109. Bumper strike

110. Slowdown strike

111. Working-to-rule strike

112. Reporting "sick" (sick-in)

113. Strike by resignation

114. Limited strike

115. Selective strike

Multi-industry strikes

116. Generalized strike

117. General strike

Combinations of strikes and economic closures

118. Hartal

119. Economic shutdown

THE METHODS OF POLITICAL NONCOOPERATION

Rejection of authority

120. Withholding or withdrawal of allegiance

121. Refusal of public support

122. Literature and speeches advocating resistance

Citizens' noncooperation with government

123. Boycott of legislative bodies

124. Boycott of elections

125. Boycott of government employment and positions

126. Boycott of government departments, agencies and other bodies

127. Withdrawal from government educational institutions

128. Boycott of government-supported organizations

129. Refusal of assistance to enforcement agents

130. Removal of own signs and placemarks

131. Refusal to accept appointed officials

132. Refusal to dissolve existing institutions

Citizens' alternatives to obedience

133. Reluctant and slow compliance

134. Nonobedience in absence of direct supervision

135. Popular nonobedience

136. Disguised disobedience

137. Refusal of an assemblage or meeting to disperse

138. Sitdown

139. Noncooperation with conscription and deportation

140. Hiding, escape and false identities

141. Civil disobedience of "illegitimate" laws

Action by government personnel

142. Selective refusal of assistance by government aides

143. Blocking of lines of command and information

144. Stalling and obstruction

145. General administrative noncooperation

146. Judicial noncooperation

147. Deliberate inefficiency and selective noncooperation by enforcement agents

148. Mutiny

Domestic governmental action

149. Quasi-legal evasions and delays

150. Noncooperation by constituent governmental units

International governmental action

151. Changes in diplomatic and other representation

152. Delay and cancellation of diplomatic events

153. Withholding of diplomatic recognition

154. Severance of diplomatic relations

155. Withdrawal from international organizations

156. Refusal of membership in international bodies

157. Expulsion from international organizations

THE METHODS OF NONVIOLENT INTERVENTION

Psychological intervention

158. Self-exposure to the elements

159. The fast – (a) Fast of moral pressure, (b) Hunger strike, (c) Satyagrahic fast

160. Reverse trial

161. Nonviolent harassment

Physical intervention

162. Sit-in

163. Stand-in

164. Ride-in

165. Wade-in

166. Mill-in

167. Pray-in

168. Nonviolent raids

169. Nonviolent air raids

170. Nonviolent invasion

171. Nonviolent interjection

172. Nonviolent obstruction

173. Nonviolent occupation

Social intervention

174. Establishing new social patterns

175. Overloading of facilities

176. Stall-in

177. Speak-in

178. Guerrilla theater

179. Alternative social institutions

180. Alternative communication system

Economic intervention

181. Reverse strike

182. Stay-in strike

183. Nonviolent land seizure

184. Defiance of blockades

185. Politically motivated counterfeiting

186. Preclusive purchasing

187. Seizure of assets

188. Dumping

189. Selective patronage

190. Alternative markets

191. Alternative transportation systems

192. Alternative economic institutions

Political intervention

193. Overloading of administrative systems

194. Disclosing identities of secret agents

195. Seeking imprisonment

196. Civil disobedience of "neutral" laws

197. Work-on without collaboration

198. Dual sovereignty and parallel government

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01161 Social Justice and the Oppression of the Poor

No society can surely be flourishing and happy, of which the far greater part of the members are poor and miserable. -- *Adam Smith*

The oppression of the poor is a human reality. Our societies have always drawn circles around certain groups of people and said, “These people are not people, do what you will with them.” The strong loot the weak. If a situation devolves to the level of pushing and shoving to get to a scarce resource, those who are weak and without power will be shoved out of the way every time.

The developed countries are not an exceptions to this historical truth. We tell ourselves that we are somehow different. We think we don’t oppress the poor. The truth is different.

There are two important concepts for permaculture work that relate to issues of poverty and justice:

Solidarity is a matter of seeing the poor as if they were actually blood kin to us and act towards them accordingly. The poor are not an “Other,” to be feared and repressed. The poor are me and all I love.

Participation is the concept that people have a right and a duty to participate in their own lives, in their own rescue if need be. Government commits grave evil when it prevents people from participating in their own life.

So let us count the ways that the governments of these United States -- federal, state, and local -- oppress the poor by making it illegal for them to participate in their own lives. Your mileage varies on these issues based on your geography and the invisible structures that prevail in your area.

In most areas it's **illegal to sell along public right of ways** (sidewalks, roads, rest stops on the highways and toll roads, etc.) Where legal, such high prices are charged for licenses and they usually incorporate such bizarre requirements that they make street vending illegal.

It's **illegal to practice small scale itinerant trades without "proper licenses"** which often have expensive prerequisites so that they function as barriers to market entry rather than protections for the public. These are trades like hair braiding, hair cutting, carpentry, plumbing, etc. The proliferation of coercive credentialing in general raises political barriers to finding and doing work and lowers compensation.

It's often illegal for people to **practice trades out of their houses.**

Laws limit and restrict the ways that people **can use their houses to earn a living.**

Laws forbid people **from making non-hazardous foods** (like jams, pickles, and baked goods) at home **and selling them to the public.**

It's generally **illegal to drive people around and charge for the service** unless you have a taxi license. It would be illegal to **use a van to establish a jitney service** (a type of transit, common elsewhere, where a van or small bus drives a route that deviates around the route to pick up fares dispatched from a central location). Transportation has serious political barriers to market entry.

In most areas it is **illegal to teach people how to apply makeup without government licenses** which require expensive training.

In many areas it is illegal to grow vegetables in your back yard and sell them in your front yard.

The government's "war on people who use drugs" **breeds crime in low income areas and makes crime pay much better** than honest work and entrepreneurial activity.

The common political practice of rewarding friends and punishes enemies (known as "rent-seeking") **reduces economic opportunities for all**, keeps people out of the market, and is a non-market process driving the centralization of wealth.

How government makes people more miserable and reduces opportunities for all.

Now let's consider how government makes the lives of poor people more hard and miserable and prevents people from helping them. Many of these invisible structures also make our lives more unsustainable.

In many areas it is practically **illegal to be homeless.** Cities manage this with laws forbidding loitering, sleeping in public, criminalizing begging, etc.

Zoning laws **prevent people from adding small apartments** (garage, attic, basement, back-yard) that would increase the amount of rental housing and thus moderate rental prices, especially at the low end.

In most areas it would **be illegal to put a trailer house in your back yard** and then rent it out.

Economic redevelopment programs**, using eminent domain, have attacked poor neighborhoods across the country,** destroying millions of units of low income housing. This non-market, politicized process drives up the price of housing, especially at the low end. It takes property from the poor, cheats them by paying cheap, non-market, court-dictated and politicized prices for the property, and then gives that property at low prices to persons with privileged access to politicians.

Code requirements **increase the cost of housing** and are more related to political pressure from construction contractors than to actual safety issues.

It's **illegal for poor people to live** in many neighborhoods. Cities manage this by mandating minimum lot sizes, distances between houses, square feet minimums, and by forbidding any manufactured housing or trailer houses.

It's illegal to **provide some kinds of useful housing** to poor people. Try building hexayurt for homeless people.

It's **illegal to not have electricity in your house**. It's illegal to not buy water from your city utility. Many states have the authority to **take your children into state custody if you don't have electricity.**

It's illegal in many areas for **more than four or five unrelated people** to live together.

You can't raise chickens or other small animals in most cities unless you have a large (one acre or larger) lot. This inhibits economic activity and prevents people from supporting themselves by their own labor.

Police commonly allow crime that would not be tolerated in upper income neighborhoods to **proliferate in low income areas.**

Taxes and fees extracted from low income, working class, and middle class areas **subsidize upscale development in newer areas** of cities. This constantly drains older neighborhoods of revenue important for maintaining infrastructure and providing services.

The negative cumulative impacts of these prohibitions and persecutions is to --

-- Make people dependent upon government social services,

-- Make the lives of poor people more miserable, risky, and unhealthy,

-- Suppress the price of lower-income labor,

-- Keep unemployment high,

-- Reduce entrepreneurial activity and thus ensure a continued supply of cheap workers,

-- Increase the number of abortions due to economic distress and psychological despair.

Violations of social justice and economic persecution drive a host of negative consequences for our society, including alcoholism and drug abuse, violence against women and children, family dissolution, abortion, despair, crime, and suicide.

These issues – and consequences – are not only a problem for poor people. They are big issues for the working and middle classes.

I am not a big fan of government social programs, but since economic persecution is a reality in these United States, we have to have programs like food stamps, Social Security, Medicare, Medicaid, and housing assistance. If we didn't have them, probably 10% of the population would be dead of starvation and exposure within the first year.

Sure, some would endeavor to help, as they do now. However, there's never enough private charity to go around.

CHARITY CANNOT DO THE WORK OF JUSTICE.

As long as our system of economic injustice prevails, people will be driven into poverty much faster and kept there longer than private and religious charities are able to cope with.

There are not enough private and religious charitable resources to go around as things stand right now. Help doesn't get to everyone. We live in a culture of death, and without the government's social safety net, as problematic as it is, mass death would be the result.

If we want to help the poor, then among other things that need to be done, the government should stop actively persecuting the poor as described herein. It is likely that there will be less need for government programs as people become more able to participate in their own lives by helping themselves by their own efforts.

The huge amount of drug business in low income areas indicates that there is an entrepreneurial streak a hundred miles wide among poor people. Ironically, it is easier and more profitable for poor people to go into the recreational drug business, than it would be for (e.g.) three young people to set up a hot dog stand at a rest stop on a freeway. That would certainly result in a major police and food regulatory bureaucracy response the first day they open for business. These hot dog entrepreneurs would be safer selling crack cocaine on the streets of a low income neighborhood than they would be selling hot dogs at a turnpike rest stop. That's a pretty sad commentary on the morality of our present system of laws enacted by our Republican and Democratic politicians, who created, preside over, and maintain this system of subjugation and domination.

They want rigged, politicized markets that reward their friends and punish their enemies.

They want all of the restrictions and subsidies that benefit their campaign contributors to stay in place.

They want the laws that oppress the poor and grind their faces into the dust to do their job to suppress wages, increase rents, promote political and economic dependency, and discourage personal and family and communal responsibility.

I hear the protests -- "this isn't what we want." However, in politics you get what you vote for. This is what our Republican and Democratic politicians have consistently voted for over the past fifty

years. It's what they designed and implemented! It's what they maintain today. It's the way the system is designed to work.

It seems at best disingenuous for them to disclaim responsibility for these consequences.

And not all of these consequences are unintended. Most of them are deliberate attacks on the poor and they work exactly as their design dictates. If you don't believe this, go to your City Council and propose amendments that would allow manufactured housing and trailer houses anywhere in the city. Follow this with a demand to allow micro-apartments (granny, attic, basement, backyard) in any neighborhood and to eliminate minimum house and lot sizes. The howls of outrage and screams of protest will come quickly and your council will dismiss you as a fool (at best) or maybe (at worst) a dangerous agitator. It's much the same reaction that prevailed 50 years ago in the United States, when some people proposed the then-radical thought that people of African descent should be able to live anywhere they choose.

Is the plan that the poor will die?

One of the points made later in this book is "Expect and design for economic contraction." This is a really hard concept for us to get our minds around because we have lived all our lives in a inflationary, expanding economy. Sure there've been recessions and etc. but "we get over it" and get back to expanding business as usual. But those days may be over.

One of the major data points that screams "deflationary contraction" is the current fascination with austerity by governments worldwide. One reason our politicians are so intent on cutting programs like education and social services is because they know that there is no longer enough to go around. They are in office to make sure that when the budgets contract, their friends and political supporters will maintain their government checks. Meanwhile, those who aren't on their list of campaign contributors and supporters will see their government funding cut.

They attempt to hide this ugly and corrupt economic reality by cloaking it with ideology and principle. Government per se is bad, they say, government should be limited, it should not do all the stuff it is doing, government checks for people are bad. But that's only rhetoric. If we look at what these politicians actually do, we see that they are not at all opposed to activist government throwing money from helicopters. They are just picky about who gets the money. As far as they are concerned, in spite of their pretensions to Judeo-Christian morality, people receiving government food benefits are useless eaters. Their plan is that the poor will get sicker, more malnourished, more vulnerable to violence, thus their mortality rates will go up, including child mortality. In other words, the establishment's plan for the poor is that they will die, and the resources that presently support them will be redistributed to those who are more worthy and better able to use those resources.

As a matter of social justice, we should always resist this program of political genocide and advocate that the government stop its persecution of the poor.

What goes around, comes around.

The Bible says -- "Sow not in furrows of injustice lest you reap a seven fold harvest."

In other words, what goes around comes around. That seven-fold harvest falls upon us even as we speak. Things going from bad to worse, and while each party blames the other, a more likely explanation is that we reap the bitter fruits of the seeds of economic and ecological and social injustice and exploitation that we have sown for so many years.

This is not a problem unique to the United States. Around the world, the situation of the poor is getting worse. Everywhere we go, we find poor people are excluded

from full participation in their own lives and the lives of their nations. In India, the average number of calories eaten by hundreds of millions of poor people declined 13% between 1973 and today. The quality of the food is low, with almost all the calories coming from carbohydrates. Only 2.5% of the calories come from vegetables, meat, eggs, and fish. 21% of adults and half of all children under five are malnourished. Over the past five years, food prices soared 70%. Kwashiokor, the disease of protein starvation, is on the rise. The problem is not an absolute lack of food. India has plenty of food to feed everyone. People are too poor to buy food and the government's programs to help the poor with subsidized food are rife with corruption and political criminality. In one state alone, an estimated $14.5 billion in food aid was diverted to the private market over the past decade.

None of this is an accident. The world system works as it the political and economic elites designed it to work.

Yes, I know the amount of wealth in the world is not a static fixed amount. Wealth is constantly created – and it is also constantly destroyed – every moment of every day. But the evidence seems clear that wealth is centralizing and the corruption of national and the world economies by criminal elites condemn many to marginalization and poverty. It doesn't matter if the pie continually gets bigger if the rich and powerful get a continually larger slice of the pie. And what happens when the financial methamphetamine that is driving so much of what we refer to as "economic growth" stops getting us "high" any more?

People often feel it's not their problem because this isn't a problem for them.

They have jobs, they are comfortable in the middle class, but that sense of safety and security is only an illusion, as many millions have discovered since 2007. The same systems that drive the oppression of the poor are tearing into the middle class.

Although it's a slow moving catastrophe, the end result for our nation -- the ash heap of history -- is not in doubt. Our job is to manage that descent and to thus avoid the worst consequences of a violent and chaotic collapse. We can't do that without solidarity and enabling people to participate in their own lives. As the poor go, so will go the rest of the population.

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01171 Invisible Structure Inventory

When someone asked Thich Nhat Hahn, a noted Buddhist teacher, what we could do to save our world, he replied: "We must hear within ourselves the sound of the earth crying." *Floating around the internet.*

The basic assignment:

Make a spreadsheet or database that lists all of the invisible structures which are part of your life. Include any in which you no longer participate.

Classify them based on –

(1) those which are voluntary affiliations and

(2) invisible structures where participation and/or presence is involuntary or by default (based on factors beyond your control, e.g., birth into a particular family or race or nationality).

Involuntary or default affiliation examples –

-- You were born or adopted into a certain family (this includes people adopted at young ages).

-- You are of a particular country, state or province, county, city or town.

-- You belong to a certain race or mixture of races, etc.

Voluntary affiliation examples –

– Job or workplace, business, profession

– School

– Clubs or professional associations

– Political organizations.

– Religious affiliation based on an adulthood choice.

– All internet/cyberspace affiliations (Facebook, Twitter, Google+, My Space, websites you own or manage, online communities/bulletin boards where you read and/or post, discussion groups, etc.)

For each structure,

– Include the geographic location(s) for the structures.

– Dates of involvement

– Include organizations you no longer affiliate with.

-- If there are regional and/or local units of national or international organizations where you participate, list them.

-- Use **keywords** to classify the structures.

-- Indicate the voluntary or default nature of your association. “Default” includes all the structures you are in by default, birth, or other involuntary aspect. “Voluntary” are structures where you choose to be present.

-- Use one or more keywords to describe the governance of the organization (democratic, authoritarian, political, etc.)

-- Use one or more keywords to describe the purpose of the organization. If there is a divergence between the ideal or stated purpose of the organization, and the actual purpose of the organization, use more keywords to describe all of the purpose(s).

-- Use keywords to describe your role (leader, minion, owner, governance, operations, etc.)

-- If a structure is a community, identify it as such.

-- How often do you participate in the structure?

-- Add a keyword to your inventory describing whether they will assist or hurt you or are neutral towards achieving your goals.

Evaluate your invisible structures in different ways.

-- Sort by date to view them chronologically.

-- Sort by default/voluntary to get a snapshot of that aspect.

-- Sort by keywords describing your role(s).

-- Sort by purpose.

-- Sort by geographic area.

-- Sort by purpose and geographic area.

-- Sort by frequency of participation.

The purpose of the sorting evaluation is to increase your personal understanding of your involvement in invisible structures. Do you see any patterns? If so, make notes about any patterns you discern.

Invisible Structure Goals

Once you have engaged in long and thoughtful observation of your invisible structure situation, what's missing in your invisible structure "life"? What invisible structures do you need in your life to support your movement towards a more sustainable and just lifestyle by using permaculture design? What structures do you need to remove from your life because they hurt you or hold you back from achieving sustainability goals? Are there structures you want to work on to improve their ability to help you or to lessen their ability to hinder your movement towards a more sustainable way of living?

Make a list – your "first thoughts" – and then keep working on it as you move into and through your own personal permaculture journey. If you find yourself thinking, "I need something or someone to help me with this", or, "this looks hard," note that on your wish list that it "needs invisible structure assistance." Elaborate the idea as your experience grows and ideas mature.

For example, do you need better access to locally grown foods and locally made nonfood items? You could start a process to organize a cooperative that provides excellent access to locally grown foods and nonfood items. Or you could look for a farmers' market and if there isn't one in your area, start one.

As you study your goals, rank them as to importance.

Regarding your affiliations that are **helpful for sustainability** . . . observe and analyze your participation in the structures that are helpful. Is there something that can be done to optimize the support of that structure for your lifestyle design? Is this something that you can do? Or does the organization need to change or develop a new program or activity? Write all of this in your observation journal and include it as "grist for your design mill" as you work on your lifestyle design.

Regarding your affiliations that are **useless for sustainability** . . . ask yourself why you are there if the affiliation is voluntary. If an involuntary or default participation, examine your participation. Does your participation help or hurt your movement towards a more sustainable way of living? Or is it neutral?

You may not be able to get out of such structures. I am a citizen of the United States of America, which is presently mostly useless when it comes to sustainability. It's not possible for me to emigrate elsewhere. As a practical matter,

renouncing my citizenship would do nothing for sustainability. So I do what I can to change the direction of the US government, by working on areas where I do have control and influence. This starts with my personal life and goes out from there.

Regarding your affiliations that are **harmful for sustainability**. . . how can you minimize that harm? Can you withdraw your consent/affiliation? Can you help the structure become less harmful and more positive? If intervention is needed, where is the best place for that intervention? Can you do this by yourself (unlikely in most situations)? If not, where can you find help? To continue my nationality example. . . the government of the United States does a lot that is anti-sustainability. In the first place, I distinguish between my nationality and my government. I am a citizen of the United States and I love my country. The United States government is not the same thing as the United States as a country and people. I fear the government, I love my country.

Document all of this at every stage of the effort. Don't let random thoughts get away without jotting them down or recording an audio note. Sometimes those random thoughts that just creep into our brain apparently out of nowhere are the most valuable and important.

As you develop your lifestyle design, refer frequently to these lists. You may decide to include initiating organizing efforts for some of the invisible structures you need as part of your design decisions. One of the first iPermie design challenges involves creating an invisible structure – you own personal learning community.

Invisible structures are a fact of life. They can help or hinder you. Learning how to maximize the support of invisible structures, and how to minimize the harm they can do is one of the critical permaculture design skills that will support your successful lifestyle design effort.

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01181 Design Challenges in Invisible Structures

Design is creativity with strategy. *Unknown*

In permaculture, we learn design by actually doing design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has some small projects that you can work that will help you to develop design skills. Never forget that none of these challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

Design your involvement with invisible structures to support your iPermie goals.

1. After you have done a complete examination of your invisible structure involvement, do some design work on your future involvement with invisible structures. Which affiliations will you abandon? Which will you involve yourself more intensely? Which organizations need change and how do you participate in that change?

2. Pick one of the needs on your inventory of invisible structures that would help in your life and design it. What does it look like? How does it do its work? How are you involved with it? How does it get started?

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01191 Additional Invisible Structure Resources

Additional internet resources may be found at http://www.ipermie.net .

Callenbach, Ernest. Ecotopia. 2004, Banyan Tree Books, Berkeley.

Callenbach, Ernest, Ecotopia Emerging. 2004, Banyan Tree Books, Berkeley.

Graham, Stephen. Cities Under Siege: the New Military Urbanism. ISBN 9781844678365. Verso, New York, 2010.

Hess, Karl. Community Technology, Loompanics Unlimited, 1979, ISBN 1559501340.

Leinberger, Christopher B. The Option of Urbanism: Investing in the New American Dream. 2008, Island Press, Washington.

Newman, Peter; Jennings, Isabella. Cities as Sustainable Ecosystems: Principles and Practices. 2008, Island Press, Washington.

Schumacher, E.F. Small is Beautiful: Economics as if people mattered. 1973, Harper, ISBN 0060916303.

Shuman, Michael. Going Local: Creating Self Reliant Communities in a Global Age. ISBN 0415927684. Routledge, 6000 NW Broken Sound Parkway, Boca Raton, Florida 33487. 2000.

Steffen, Alex. Carbon Zero: Imagining Cities that can Save the Planet. Amazon Digital Services, 2012.

Weisman, Alan. Gaviotas, A Village to Reinvent the World. ISBN 1890132284. Chelsea Green Publishing Company, POB 428, White River Junction, Vermont 05001. 1995.

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Section 2: Food

If more of us valued food and cheer above hoarded gold, it would be a much merrier world. – J.R.R. Tolkien

"The only real stumbling block is fear of failure. In cooking you've got to have a what-the-hell attitude." – Julia Child

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02011 Food First
Why food is such a great place to start and the consequences of doing so.

02021 Household and Community Food Security
Ten principles on which to build a food system that cares for people, cares for the planet, and has a care for the future.

02031 Foodshed
Studying the geographies of your personal and community food system.

02041 Food justice
Justice for farmers, farm workers, customers, and all Creation. A definition of distributive justice and why it is important.

02051 Invisible structures and food
The invisible structures governing and regulating your food system are as critical as weather, soil, and fertility.

02061 Food system inventory
What can you know about your personal and community food system?

02061.1 Food System Inventory spreadsheet
A way to record your observations. Download at http://www.ipermie.net.

02071 Food without land
11 ways to produce food in cities even if you don't own any land. Part 1 of this important discussion.

02081 Permacultured kitchen
Applying permaculture principles to household and community food systems.

02091 Food Security for College Students
Moving your institution towards a more holistic food system.

02101 Menu planning
The most basic act of household and community food security is to prepare meals from basic ingredients. The role of menu planning in household frugality, nutrition, and food security.

02111 Casino shopping
Learning how to shop at a supermarket is a critical urban food skill

02121 Frugal shopping
15 shopping rules that will save you money.

02131 Bread
This is a great place to start making improvements in your household food system.

02141 Baking station
Mise in place for baking.

02151 Kitchen zones
Using this evaluation technique to create a kitchen that works for you and your household.

02161 Recipe conversion
Expanding recipes for quantity cooking.

02171 Food frugality
Seven principles to help keep the cost of your food affordable.

02181 Learning to cook
Why you need to do this and the most basic steps in that direction.

02191 Stock
A rich and nutritious stock is the basis for tasty and healthy soups, stews, gravies, and sauces.

02201 Gravy
Gravy is one of the founding blocks of civilization. Learn how to make it the way grandma did.

02211 Casseroles
Applying the "theory of casseroles" to make tasty low-cost meals.

02221 Fun foods and snacks
Supermarket junk food wastes money. Make your own tasty and more healthy treats.

02231 Cooking vegetables
A survey of the methods.

02241 Portable foods
Options available for food on the go that don't involve transnational food corporations.

02251 Food safety
Why it is important and what to watch out for. The problem of food-borne bacteria.

02251.1 Kitchen Sanitation
Download PDF from
http://www.ipermie.net

02261 Meats
A survey of more sustainable meat options.

02271 Kitchen records
Keeping track of what you eat, where you get it, and what it costs. Why this is helpful.

02281 Home Food Preservation
A survey of the popular methods.

02291 Home Food Storage
Store what you eat and eat what you store. Why keeping some of your household savings in food is essential.

02301 Design a Fermentation Station
More mise en place! What's that you say?

02311 Basic nutrition readings
USDA, Weston Price, Vegan, and Vegetarian options.

02321 Edible Landscaping
How to do it in the city.

02331 Food equipment
Useful for preparing, preserving and processing.

02341 Design a storage solution for your lifestyle food system
Food and cooking involve stuff. What to do with your food stuff when you are not cooking or eating.

02351 Kitchen skills
A list of the basics and more advanced areas.

02361 Compost
Because a rind is a terrible thing to waste.

02371 How to grow some of your own food
Part 2 of growing food in the city. Here is where you find the container gardening information.

02381 Avoiding Food Pollution
Discusses the prevalence of pesticide and herbicide residues on commercial produce. Provides lists of vegetables classified by extent of residues. Vegetables you should always eat organic.

02391 How to start a local food cooperative
Lessons learned from the real-life story of the Oklahoma Food Cooperative.

02401 Food Stamp Challenge
Our real-life experience keeping food purchases to a food stamp budget.

02411 Food Stamp Challenge Spreadsheet
Data from our experience (download at http://www.ipermie.net).

02421 Design a college food system.
What would your college food system look like if it were designed in accordance with permaculture principles?

02431 Design a personal food system
What does your personal food system look liked designed via permaculture principles?

02441 Natural Lawn Care
Maintaining your lawn as if you cared for people, cared for the planet, and cared for the future.

02451 Food Design Issues
Finding beneficial connections among the six design challenges of this section.

02461 Additional Resources for Food

Note about recipes: This book originates in the United States, and as the author and recipe compiler, my only cooking experience is with U.S. non-metric measurements. Those using metric measurements can consult US to Metric (and Metric to US) Conversions – http://www.convert-me.com/en/convert/cooking

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02011 Food First!

If you're afraid of butter, use cream. – Julia Child

People taking personal responsibility for lifestyles committed to the permaculture ethics of caring for the planet, caring for people, and caring for the future are a movement that will heal the Earth and create a more sustainable, just, and resilient way of living upon the land. Our iPermie goal is to help you catch the leading edge of this epic transformation that will change humanity and its relationship to the planet forever.

In other words . . . now is the time for practical plans to realize our dreams and visions of a better future.

The planet needs more people willing to take personal responsibility for creating a better future than the one that we see coming at us because of our millennia of bad choices. The world changes one person, one household at a time, as people decide to BE the change they want to SEE.

This is an ethical decision that each person must make for himself or herself. Parents can teach their children a better way of living. They can't make this intentional decision for them. What we can all hope as parents is that we can give our children the knowledge and skills they need to make their own informed ethical decision about taking responsibility for their lives upon the land.

Every journey has a starting place.

This transition seems complicated, but everybody has to start somewhere.

Permaculture tells us to "start at your doorstep." For most of us in urban areas, the **"doorstep to permaculture" is the kitchen.**

People have **more control over their food** than almost any other area of life and work. This is true even of college students eating in dormitory cafeterias.

It is the most **easily accessible and understandable place** for people to start.

The kitchen provides **great short-term rewards for time invested** in learning and work.

The permacultured kitchen offers an accessible way to **make lifestyle changes that have major (and multiple!) beneficial impacts on the environment, create social justice, and limit the damage** we do to the biosphere. The beneficial changes propagate outwards and may impact people and ecosystems many hundreds and even thousands of miles away. Everything connects!

Kitchen permaculture **increases family, household, and community food security**, and is an essential adaptation to the cardinal threats of peak oil, global climate instability, political criminality, and economic chaos.

Bad Food Habits Abound Everywhere

The sad truth of modern life is that many of us have formed bad habits with our food. Our over-processed, chemicalized, mechanized, just in time convenience food system isn't a free lunch. High blood pressure, diabetes, heart disease, cancer, all these are just the beginnings of sorrows. The way that conventional

agriculture grows supermarket food ravages the earth, destroys the fertility of the soil, and poisons the land with chemicals.

The supermarket agriculture system destroys the quality, variety, nutritional value, and TASTES of our foods. We're paying more, doing more, and getting less. Here is a better idea – do MORE with LESS. More joy, more beauty, more wisdom - less pollution, less chemicals, less destruction of the natural environment. We got into this situation one bad decision at a time and we will get out of it by one good, better, or best decision at a time.

This is not just about money. It's about the quality of your life and who controls your life. We're talking about fun, convenient, healthy and tasty meals. You can discover new tastes and food treasures, better ways to do food - ways that really are fun and easy to learn! Once you get used to them, they are convenient & easy. A better way of eating cares for people, cares for the planet, and has a care for the future.

Even so, kitchen permaculture design is for everybody!

Simple, sustainable, and frugal living is for everybody - rich and poor and everyone in between. People who let the food industry's tricks tell them what to do pay more money than is necessary and get a lot less than they should for their money. We say: spend your money differently and you can have more quality. Imagine that.

Permaculture is holistic.

Permaculture is a holistic design discipline that looks at all aspects of your ways and manners of living. It's a big field of study, and covers a lot of territory. Every journey has to start somewhere. Because we have such control over our personal and household food decisions and those consequences carry so much ecological weight, I say "FOOD FIRST!"

While food isn't everything, it is something that we all can understand.

It is one step in the direction of economic security. It provides instant rewards too -- good food and better health!

Wisdom, daydreaming, and risk-taking can introduce you to options that you never felt possible. Welcome to this journey!

A special note for college students. . .

If you live in a dorm and eat at a cafeteria, you may think you don't have much control over your food since you don't have your own kitchen and prepare your own meals. You have more control than you think.

You buy food outside of the cafeteria all the time. **Stop making bad food choices** and start making good food choices when you buy food. There's no good reason ever to buy cheap trashy junk foods, soda pop, and bottled waters.

You can **eat with the season**. Don't load up on fresh green salads during the winter months, when those fresh greens come across perhaps thousands of miles. If imported from poor countries, eating such foods is the moral equivalent of stealing food from the mouths of hungry children.

Don't waste food. Take only what you can eat. If you aren't sure you will like something, take only a small portion.

Avoid all soft drinks.

Support your local food system. Visit your local farmers market and buy some food there regularly. If you eat out, support locally owned fast food and sit-down restaurants. Avoid the national chain stores like the ecological plague they are. When you shop at a regular grocery store, avoid the national chains and patronize local and regionally owned supermarkets.

You have **influence over your cafeteria** administration. Schools compete to get and keep students. One way they do this

is with the quality of the foods offered in their cafeterias. Demand that your school administration to support a local food system and offer organic foods. Be persistent in your demands.

You won't be in a college dormitory forever. It just seems that way. When you get out, you'll need to know how to shop and cook. The information you need for that is in this section.

So here is a great place to begin your permaculture design journey – with your food.

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02021 Ten Principles of Household and Community Food Security.

This document is available at www.ipermie.net as a PDF suitable for printing and copying. It is licensed under Creative Commons for free non-commercial distribution and I encourage people to download the printable PDF, copy, and distribute it.

"Food security is not in the supermarket. It's not in the government. It's not at the emergency services division.
True food security is the historical normalcy of packing it in during the abundant times, building that in-house larder,
and resting easy knowing that our little ones are not dependent on next week's farmers' market
or the electronic cashiers at the supermarket. –
Joel Salatin, Folks, This Ain't Normal: A Farmer's Advice for Happier Hens, Healthier People, and a Better World

Permaculture tells us to "start at your doorstep." For most of us in urban areas, the "doorstep to permaculture" is the kitchen.

– People have more control over their food than almost any other area of life and work. This is true even of college students eating in dormitory cafeterias.

– It is the most easily accessible and understandable place for people to start.

– The kitchen provides great short-term rewards for time invested in learning and work.

The permacultured kitchen offers an accessible way to make lifestyle changes that have major (and multiple!) beneficial impacts on the environment, create social justice, and limit the damage we do to the ecologies and watersheds where we live.

The beneficial changes propagate outwards and may impact people and ecosystems many hundreds and even thousands of miles away. Everything connects!

Kitchen permaculture increases family, household, and community food security, and is an essential adaptation to the cardinal threats of peak oil, global climate instability, political criminality, and economic chaos.

We need food that is safe, nutritious, and tasty and that increases the quality of our food lives. Permaculture design can provide a description of the way forward into a more sustainable way of living that cares for people, cares for the planet, and has a care for the future.

These ten principles are a basic design for developing household and community food security. You can enter the process at any one of the ten principles and customize them based on your own personal situation.

1. Prepare meals from basic ingredients.

Somewhere along the line, one meal at a time, people became convinced that a low quality high priced frozen manufactured food-like substance from a big box national superstore was a better deal than a low cost, nutritious, and better tasting home cooked meal.

We think we are too busy to cook. It's Too Much Work. Our days are full of activities. We go, we come, we do this, we do that, and we do the other. We learned to devalue the domestic arts. Advertising conditions us to think that cooking is hard work and a useless way to

spend our time. Only unimportant people actually cook, people say who want to sell us their low quality high price frozen manufactured food-like substances, artificially flavored and fortified with "9 essential vitamins."

So it comes to pass that people just don't know how to cook.

Therefore. . . One of the most important "best sustainable practices" for food is preparing meals from basic ingredients. It is the entry level of household and community food security. Fortunately, this is a fun and rewarding activity with practically instant gratification. Preparing meals from basic ingredients takes much less time than people think it does. As with any other skill, there is a learning curve. With practice comes efficiency and tasty meals from your kitchen.

2. Eat with the season.

Our demand for out-of-season fresh vegetables and fruits, imported from long distances during the winter, is one of the more unsustainable aspects of our food systems. We want lettuce salads in the snows of January and fresh grapes, even though our gluttony may take food from the mouths of hungry children in third world countries. This demand drives the dispossession of traditional subsistence farmers in poor countries and sends them into the slums of the cities.

Permaculture design suggests temperance in our choice of foods. Eating out of season drives unsustainability. That's why the permaculture choice is to eat with the season. No green salads in the snows of winter – unless of course someone grows them in your locality with season extension methods that don't involve heating greenhouses with vast amounts of fossil fuels. Microgreens grown inside your sunny windows would be fine. Greens imported from far across the continents and seas? Just say "no way" to that kind of environmental devastation and injustice against the poor. So when you eat out, don't order and don't pay for out-of-season produce. Get the soup, not the salad, for an appetizer during the winter. Use your economic choices to help the restaurant business become more sustainable.

3. Don't eat meat or poultry from concentrated animal feeding operations. Eat meats from free ranging, humanely-managed flocks and herds or go vegetarian.

Yes, free-range meats may cost more. You can finesse that by simply eating less meat and eating less expensive meats. If you are more traditional, go with a "meatless Friday." If you are more modern, try a "meatless Monday." Conventional livestock production, which confines cattle in feedlots while feeding them an unnatural diet of grain and corn is a primary driver of the emissions that produce global climate instability. Research indicates that a pound of hamburger bought at a supermarket owned by a national chain might have DNA from as many as 100 different animals in it.

But wait – there's more, and it's even worse. Many stores and national fast-food restaurants add "pink slime" to their meats, a/k/a "lean finely textured beef." Corporations make It from mechanically separated meat trimmings (which can include cartilage, connective tissue, and sinew). The manufacturers treat the pink slime with ammonia to disinfect it. By law, as much as 15% of a ground beef product may be made of "pink slime" and the manufacturer doesn't have to say anything about it on the ingredient list.. About 70% of ground beef sold in national chain supermarkets contains pink slime. There's a reason supermarket ground beef is cheap and it's not because they buy quality ingredients.

When you buy supermarket meats, you pay for substandard food and you finance production practices that people consider cruel and inhumane. It is better to buy beef from producers who use more humane animal management practices and do not adulterate their meats with weird ingredients like pink slime. Know your farmer and where you food comes from.

If there was a truth in labeling law, supermarket chicken would be labeled – "Contents: one small tortured bird." Egg producers confine their birds in such small spaces that they routinely burn off their beaks because the chickens lives are so miserable they peck each other and themselves to death. Modern product line processing of meat chickens includes soaking the carcasses in a chlorine bath that as the day moves along becomes progressively more contaminated with stray chicken guts and feces.

If you can't find free range meats from trustworthy producers, my best advice is "go vegetarian."

4. Grow some food.

Many of us in urban areas live in apartments and don't have access to any land. Even so we have some food production possibilities.

-- Grow vegetables and herbs in pots on balconies, fire escapes, patios, and in sunny windows. Just because you can't grow a lot doesn't mean that you shouldn't grow some. You will be able to grow more food than you think in small areas. Vertical garden structures pack a lot of food into a small footprint.

-- Participate in a community garden.

-- Garden small bits of land. A 3' x 3' square patch of ground can grow more food than you think possible.

-- If you have small land, such as a house on a typical 1/8th acre urban plot, you can grow lots of food. Look at what these people did with their small front yard: http://www.resilientcommunities.com/a-resilient-home-transformation-youve-got-to-see/

-- Encourage your local government, schools, churches, and businesses to plant edible landscaping in parks and along streets. Perennial food production plants are great additions for urban and rural spaces. They increase the value of property, and provide high quality locally produced food.

5. Buy some food from your local area, preferably directly from its producers.

In the modern world, our cities' foodsheds are literally the world. This makes our cities' food supply chains long and complicated. This is a problem. The longer and more complicated the supply chain, the more brittle and unsustainable and the less resilient the food system. Encouraging food production in the immediate "neighborhood" of cities (a 100- to 150 mile radius, depending on the size of the city) is of critical importance for community food security.

It's not impossible. The large cities of the 19th century were almost entirely fed from the immediate foodshed around those cities.

If we want a more sustainable, just, local, humane, and resilient food system, there must be a market for the products of sustainable, just, local, humane, and resilient agricultural systems.

This means that people have to be willing to put their money down on the barrel-head and buy what local farms produce. As people make more and more of these kinds of purchasing decisions, the local market grows and that causes local production to grow. It is folly to expect a growth in local agriculture absent a cash market for that production.

It is not necessary to buy 100% local foods immediately. Most of us don't have that kind of access to locally produced foods. What is necessary is to buy "some" of your food from local production, even if it is only three or four pounds of meat or a few pounds of seasonal vegetables each month. This jump starts the production/buying cycle. Be a missionary about this! Encourage your friends, family, co-workers, and the general public to buy some local food.

Most areas will benefit from additional methods of buying from local producers. Typical structures that facilitate local

production are farmers' markets, roadside stands, Community Supported Agriculture programs, and food cooperatives. There may be municipal regulations that complicate or hinder the development of local agriculture marketplaces and those most be addressed by local governments.

One effective model is the local food cooperative, which is a food cooperative that distributes locally produced food and nonfood items. These kinds of cooperatives do not have stores. They operate via an online ordering system coupled with a volunteer, or mostly volunteer, delivery system. You can read a case study done by the Northwest Cooperative Development organization about Idaho's Bounty, one of the nation's local food cooperatives, which you can find online at http://www.nwcdc.coop/Resources/IBCCaseStudy.pdf .

6. Keep some of your household savings in the form of food.

In today's uncertain economy, people need resources that they can depend upon if they lose their job or have to take a cut in pay. Besides money in the bank, food storage is an excellent hedge against household hard times. Food storage is important for resilience since there are many things that could happen without warning overnight that could stop the steady workings of our food processing and distribution systems. In such a catastrophic event, grocery stores and local warehouses would empty quickly. Food storage is much more important than most people think. Ask the people of New York City impacted by hurricane Sandy about this. NB: Also store water.

7. Shop wisely and frugally at locally owned supermarkets.

Supermarket shopping will remain a reality for many of us for years going forward. Local food systems, even with all of the growth of the past decade, remain insufficiently developed to feed cities. Those of us living in dormitories on campus still shop for food on occasion. Smart shopping is an important survival skill for all of us.

Think about your food dollars as votes. Every time you spend a food dollar, you vote for something – good, bad, or indifferent. Make as many "good, better, and best" decisions as you can in the supermarket while avoiding as many bad choices as possible.

Supermarket permaculture tactics include –

-- Support local and regionally owned supermarket stores and chains and food cooperatives. Don't buy from national chain supermarkets.

-- Support locally owned convenience stores instead of nationally owned stores.

-- Support local and regional brands instead of national brands.

-- Support organic products (but don't buy organic vegetables out of season!). Use the Environmental Working Group's Shoppers Guide to Pesticides in Produce to decide what must be bought as organic, and what can be bought convention. Here's a hint: onions and corn on the cob are fine in their conventional form. But only eat organic strawberries, apples, celery, lettuce, or peaches. Never buy those in conventional produce sections. You may be consuming residues from as many as 20 different pesticides.

-- Buy low on the food chain – that is, purchase more basic ingredients and fewer prepared products.

8. Preserve and process food at home or in cooperation with neighbors.

You can make your own ketchup at home for less money than you can buy a name brand ketchup at the store. It will taste better and be more healthy. The time to buy produce for the year is during the summer, when production is high and prices are at their best. Preserve some of the summer bounty for eating later in the

winter. Freeze it, can it, dry it, eat it later. Very tasty.

Many of us will find it helpful to do processing and preserving in groups. Many hands do in fact make for lighter work. Organizations can support community capacities by stocking community kitchens (such as churches and schools) with food preservation and processing equipment. With a physical infrastructure in place, skills can be taught and groups organized to approach this job as a team.

9. Avoid eating at national chain or franchised restaurants or fast food locations. Choose locally-owned when eating out.

Always think of your food dollars as votes and always “vote local” when you eat out. National chains and franchises siphon dollars out of local economies and feed parasitic corporate aristocracies that don’t contribute to the local economy. It is as important to apply this principle when you eat restaurant or fast food meals or when you buy take-out as it is when you buy ingredients to prepare home-cooked meals.

10. Support public and private initiatives that promote organic gardening and farming, free-range and pastured flocks and herds, urban agriculture, local food systems, and community capacities for food security. Leave no one behind for the wolves to devour.

We are all in this together. There are many obstacles to local and community food security. Government rules and regulations can increase the work, expense, and confusion of locally producing and locally distributing foods (and nonfood necessary items too, like soap and clothing). The prevailing systems subsidize long and complicated supply chains by causing unnecessary problems for local producers and distributors. That way of doing things is an artifact of cheap energy and cheap money and those are going away bye bye forever.

So anything we can do to streamline the system, eliminate unnecessary market barriers, and prevent rent-seekers from over-regulating and cartelizing the local food marketplaces moves us onwards toward household and community food security.

Particular attention must be paid to increasing community food security capacities in low income areas and food deserts. Where markets fail, community food security groups must step up and offer technical support and material assistance for development of alternative food structures such as urban market garden initiatives, community canning and food-preservation kitchens, and organization of food cooperatives.

"This magical, marvelous food on our plate, this sustenance we absorb, has a story to tell. It has a journey. It leaves a footprint. It leaves a legacy. To eat with reckless abandon, without conscience, without knowledge; folks, this ain't normal." -- *Joel Salatin, Folks, This Ain't Normal: A Farmer's Advice for Happier Hens, Healthier People, and a Better World*

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02031 What is your foodshed?

That food in the United States travels an average of 1300 miles and changes hands half a dozen times before it is consumed (The Packer, 1992) is deeply problematic. What is eaten by the great majority of North Americans comes from a global everywhere, yet from nowhere that they know in particular. The distance from which their food comes represents their separation from the knowledge of how and by whom what they consume is produced, processed, and transported. If the production, processing, and transport of what they eat is destructive of the land and of human community -as it very often is -how can they understand the implications of their own participation in the global food system when those processes are located elsewhere and so are obscured from them? How can they act responsibly and effectively for change if they do not understand how the food system works and their own role within it?
Coming in to the Foodshed, Jack Kloppenburg, John Hendrickson, G.W. Stevenson

The term "foodshed" was first used 70 years ago to describe the flow of food from farms through processing facilities and thence to the final consumer. It was coined by a researcher concerned about the impact of a threatened rail strike on the food supply of New York City. Like its sister term "watershed," it describes the source of food for a particular location.

Generally, the foodsheds of most households in the United States incorporate the entire world.

However, many people are concerned – with good reason – about the constancy, persistence, and resilience of our present food system. Understanding the sources of your food is an important step toward sustainability.

Your local foodshed consists of --

– household food production,

– foods grown/sourced in your regional area. "Region" could be defined by an organization such as the Oklahoma Food Cooperative, or a farmers' market, which aggregate food from a region and make it available to your household. Or it could be an arbitrary line of (for example) 100 to 150 miles from your household. Or it could be a defined bio-region or watershed around your community.

Everything else is your "world foodshed" – the foods that come to your household from outside of your local foodshed.

This structure helps you identify and describe your household's foodshed as it is now. If you are not satisfied with the present description of your foodshed, it will help you to set goals for evolving your personal foodshed in a more sustainable, frugal, and resilient direction consistent with the ethics of permaculture.

Persons living on campus in dormitories can consult with their campus' food service provider to research the foodshed of the campus. It might be an interesting

project for a geography or food-studies class.

If not satisfied with the results, organize to encourage the school's administration to make changes in the way the school food system sources food for the campus cafeterias.

Understanding your foodshed and using it as a tool of sustainability is important to the process of developing a permaculture design for your life.

One tool that may help it to make a diagram of your local foodshed and world food dependencies so you can visualize what's going on in your food life. You are at the center of the diagram. Draw a circle around "you." label it "local food," and identify the foods you get locally from farmers or locally owned aggregators of local production.. Estimate what percent of your diet is within your local food shed.

Draw a larger circle around the local foodshed circle. This is your regional foodshed. These are the foods you buy from locally owned stores, supermarkets, and restaurants that originate in your region.

A third, larger circle, is for your world foodshed. Illustrate it with the foods you eat that come from the world foodshed. Estimate the amount of your diet that comes from the world foodshed. This includes foods bought from national chain stores and national brands, as well as foods imported from other countries.

This won't necessarily be an easy process at first because you probably don't have all the data you need. Because people typically don't buy a lot of local production, that might be the easiest to start with. As part of your observation, you will be developing records of your grocery purchases so as time goes by you can make this diagram more accurate.

Visualization helps make abstract concepts concrete. It's fine to say "Yeah, we like local foods," but once you get finished with your diagram, and you discover that about 1% of your food comes from a local source, you have a graphic illustration of the problems of your own personal foodshed.

Over time, the decisions you make in the permaculture design for your life will help you reduce your dependency on the world foodshed and bring your food "closer to home." Most people will start initially with shifting from national to regional and that is a fine place to start. Most areas don't have enough local production to accommodate a sudden surge in demand for local meats and vegetables and other foods. But everyone can start buying some local production, which helps build the local market over time.'

Understanding your foodshed is a critical aspect of the observation phase of the permaculture design for your life.

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02041 Food Justice

"When I give food to the poor, they call me a saint. When I ask why the poor have no food, they call me a communist." – *Dom Helder Camara: Essential Writings*

Distributive Justice is important to the realization of the permaculture solidarity ethics of care for the planet, care for people, and care for the future. The third ethic, care for the future, incorporates the need to responsibly put surplus into circulation – making it accessible so that others can use it. We refer to this process as distributive justice - - A/K/A justice in the distribution of the goods of creation.

This ethic relates to people on both ends of the food system – those who produce the food, and those who eat the food. A society's just economic systems should sustain a situation where --

– food producers receive just prices for their food,

– food workers (on the land and between the land and the customer) receive just wages, and

– customers in cities can afford to pay prices for food that accommodate the need for just wages for food workers and just prices for the agricultural commodities and receive a just value when they buy food.

Evidence of the lack of justice in our present system may be found in how bizarre this seems, as an economic concept, in the present situation.

Justice in Farm Country

There isn't a lot of justice in farm country these days.

Most farmers compete in a world-wide marketplace for food. Large producers have the advantage over smaller producers. If the profit on a bushel of wheat is only fifty cents, it takes a lot of bushels – and thus a lot of land plus high levels of fertilizer and other inputs – to earn a living. A farmer with 100 acres competes with farms of 10,000 acres and up.

The majority of the poor people in this world are subsistence farmers who grow most of what they eat plus a small surplus to sell. They compete with the over-production of the developed countries and often that just doesn't work for them. After the implementation of the North American Free Trade Act, which opened Mexican markets to US farm products, corn prices in Mexico plummeted. As a result many rural farmers lost their farms and this helped swell the flood of migrants to the United States or to the slums that ring the large cities south of the border. Yet, there was no discernible decline in the retail price of tortillas in Mexican cities so there was no benefit to the urban residents from the destruction of Mexico's rural corn growers.

Children go hungry in poor nations, while land that once grew food for their communities now grows food for export so that we in the wealthy countries can have strawberries and fresh greens in the midst of our January snows. Be wary of that nice strawberry snack during the winter, for nothing we do is without consequence, as permaculture constantly reminds us. It comes to you at the cost of hunger elsewhere and when you buy that

tasty winter strawberry, you enable injustice. And if its not an organic strawberry, it comes packaged with a heavy load of pesticides and herbicides.

The impact of the financial stress on farmers in this country can be seen in the production practices of conventional agriculture. Fence row to fence row planting is the rule. Farmers strive to produce at maximum levels all the time. This isn't just to the farmer, or to his or her land, or to the ecosystem in farm country.

When it comes to the price for their food, farmers are at the mercy of the world market. Farmers competing in the international food market do not set the price that they receive for their production. They take what the aggregator corporations offer who buy up the products of farm country and funnel that bounty into the maws of the transnational processors. By the time a wheat crop makes it to the supermarket, the farmer will receive less than a dime for the wheat in a loaf of bread out of a total purchase price upwards of three US dollars.

Justice in the Cities

The situation doesn't get much better when we get to the city. Customers are at the mercy of whatever the market decides to give them. Consolidation in the retail grocery market rapidly diminishes the number of choices for customers. Only four companies control half of all retail grocery sales – Wal Mart, Kroger, Costco, and Supervalu. In the 100 largest metropolitan areas, these four corporations control 72% of the grocery market. Consolidations boost the profits of grocery corporations. They do not produce price relief for customers.

Retail pricing schemes encourage customers to spend excessively on groceries and not get much in return. A stew of additives whose safety is at best dubious, whatever the various politicized government science agencies may say, drench the products of supermarkets. Processing drains nutritional value from our food and replaces it with high fructose corn syrup, flavors concocted in laboratories, and clever advertising schemes that make us think that drinking a sugared and caffeinated beverage is world peace and justice. Then we and our insurance companies spend piles of money to deal with chronic illnesses brought on by the unhealthy, denatured, and dumbed-down foods we eat.

Because access to food is a matter of access to money, many people cannot purchase a healthy and nutritious diet for their family. Cities are full of food deserts, where fast food and convenience stores are the only access to food for the residents. The reason that convenience stores sell a selection of regular grocery items is because that's where some people buy most of their family's food. That is a scary thought, in this land of abundance.

How shall we then live?

In a world of injustice, how shall we restore justice?

The journey to justice begins one decision at a time, as we always seek to be just in our relationships throughout the food chain.

Buying food directly, or "closely", from its producers is without a doubt the best choice. By spending our money with the farmers, we short-cut the expensive production chain, avoid processing tricks and pollutions with our food, and move towards a more just, resilient, and sustainable food system – one meal at a time. This is true when we buy as individuals, or when we buy as customers of restaurants or institutions such as schools. The customer receives a just, safe, nutritious, and non-adulterated product and the farmer receives a just price for his or her labor and investment.

If we can't make all best choices all the time, we can try to make as many best choices as we can.

Growing some of our own food, even if it is simply some herbs and tomatoes on the balcony or in a sunny window of a high rise apartment, contributes to food justice.

The more access to land that we have, the more we can grow and that benefits everybody. At schools, students can operate community gardens.

We must not leave anyone behind for the wolves to devour. If you garden, grow a row for the hungry, and support charities and organizations that work in food security for the poor with your time, talents, creativity, and financial and in-kind donations. To rephrase the common maxim, it's fine to give hungry people fish to eat. We also need to teach them how to fish – and help them find or make their own fishing equipment and build ponds for them to fish in. Food security is certainly a matter of actually giving people food. It is equally certainly a matter of empowering them to be in control of their own food destiny.

Support social, educational, economic, and political initiatives that promote justice in the food systems. Oppose economic and political initiatives that drive the present system of food injustice.

Succession works in our work for justice, just as it does everywhere else. No one should expect a mature canopy tree to spring into full grown glory overnight. Pioneer plants are species that grow quickly, often fix nitrogen, and produce seed profusely that spring up on disturbed and damaged lands . Other plants grow from deep roots of existing species, or seeds long dormant in the soil. All plants devote a lot of energy to reproduction. The various traits of the pioneer/surviving plants in the area greatly influence the path a succession process takes. Useful features include hardiness, ability to fix nitrogen and concentrate other nutrients, size, reproductive ability, longevity, etc.

This works for invisible structures also. For example, we could start by working on projects to get people to donate food to give to the poor. That's not really controversial. People can get into that. It makes them feel good and connected with their neighbors.

Over time, the activities could evolve a bit and include helping people plant gardens to feed themselves and to grow food to give to others. People who start by simply receiving food or donating food might be tempted to join in some kind of food production.

As this progresses, a cooperative might be organized to link the urban customers with rural producers. The process would go on, one incremental step at a time building on previous successes.

Observing nature gives us ideas for the present.

Many species have evolved traits that make them resilient in the face of disturbance. Redwood trees, for example, shed lower limbs as they grow, thus making them more resistant to fire and they can regrow from stumps. They have a thick and spongy bark that protects them from fire damage. In areas subject to periodic drought, frogs adapted so that as the drought progresses and water sources dry up, they find shelter and hibernate until the rains return. These adaptions help species survive through time. In human culture, we can think of ways to make our communities and cultural systems more resilient and adaptable in the face of rapidly changing circumstances.

Three factors govern the amount of disturbance a particular eco-system can absorb: – resilience (ability to restore itself after being damaged), – persistence (its ability to resist damage), and -- constancy (the ability to maintain itself without declining below an unsustainable minimum). A particular concern at present is the resilience of our existing communal and economic structures, their persistence in the face of serious problems, and how far we can go into devolution without falling into catastrophic collapse. What do structures and systems look like that would be more resilient in the face of the problems of peak oil, climate instability, political criminality, and economic irrationality?

"New species" can take root and grow, and those that fertilize their area (nitrogen

fixers, nutrient accumulators) will be more successful. In human culture, we can think of new ideas, new structures, filling niches in the disturbed cultural ecology and influencing/strengthening the areas around them.

New growth comes from previous stages, e.g. trees growing from stumps, seeds sprouting after going through fire (think pine cones), mulberries sending up sprouts from wide-spreading roots. In human culture, we can think of new twists on old ideas. The Oklahoma Food Cooperative, for example, is a hybrid of several old ideas/structures, adapted with new twists for the present situation. It helps move economic activity (nutrients) in ways that benefit the direct-marketing producers (pioneer species and legacy species re-growth).

As the situation develops, stronger manifestations of plant growth appear – woody shrubs, under-story trees, which themselves turn out to be the nurseries of the canopy trees. Many new producers stay in business, feeding ever-more people in cities, resulting in even more economic activity back and forth, leading to the development of new and even more creative forms of mutual and cooperative economic activity.

So we should not lose heart if it seems that goodness, beauty, and wisdom seems in short supply in the midst of the terribly disturbed social and cultural ecology which is "even as we speak" deteriorating daily. What we do here, and what goes on in a hundred thousand other places that we don't even know about, develops the adaptable structures, functions, and systems we need (on one hand) to bolster the resilience, persistence, and constancy of our local communities. It lays the groundwork for a regrowth of justice for all the earth and its creatures and people.

And so it comes about that a significant amount of progress can be made in your own personal food system as part of the lifestyle design for your life. That's how you do your part for a future of justice, beauty, resilience, and safety.

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02051 Invisible structures and local food systems

Training is everything. The peach was once a bitter almond; cauliflower is nothing but cabbage with a college education. – *Mark Twain*

Many factors influence the economic viability, environmental sustainability, and social justice of our food systems. Invisible structures, however, are without a doubt the most complicated, confusing, and frustrating of those factors, systems, and sectors. Weather and climate is simplicity personified compared to the complexity of invisible systems and structures that govern and define our food systems.

Invisible structures can make it easy to make good, better, and best food choices – or they can make it almost impossible to do what needs to be done. Joel Salatin, the Virginia farmer who is a leader in the locavore movement, often quips – "Everything I want to do is illegal!" In fact, he wrote a book with that title.

Regulatory Issues

A fundamental problem with any government regulatory system is that the targets of the regulation will attempt to gain control of the regulatory structures and distort or influence the process to the advantage of industry. While conceding the good faith of many in the food regulatory system, the food production regulation systems of this county have certainly been compromised by the corporations being regulated. Instead of focusing on food safety, the system denies market entry to smaller producers and limits the choices of urban and rural customers. This is why politics and economics rule when it comes to food regulations and science all too often takes a back seat. Even when there is a good faith goal of food safety, regulations can have unintended consequences which can be devastating to small producers.

Our food regulatory system does not recognize a difference between a small producer and a giant transnational food corporation. Someone cooking three chickens a week could be required to build an office, provide a phone, and pay the salary of a USDA inspector, depending on who buys their chicken pies!

Food may be regulated by multiple levels of government – national, state, county, and city! Sometimes the regulations contradict each other or are so complicated that it is difficult to figure out exactly what the rules are in a given situation. Inspectors appear to have a considerable amount of latitude. This can be good or bad, depending on the attitude and mood of the inspector.

Because of the complexity of the system, it can be hard for a producer to find out exactly which regulations apply to him or her. Depending on which government agency you talk to, you may get completely different answers, perhaps even contradictory of each other, as to what law and regulation require. This adds further entry barriers in the form of consulting and lawyers' fees, application and license fees, and time spent on research and the various application processes.

The regulatory system drives bigness and consolidation in the production and distribution of food. It is easier and more profitable to amortize regulatory expenses over $500 million in gross revenues than it is for someone with $50,000 in gross revenues.

Agricultural Policies

The policy of the USDA toward our farmers has been "get big or get out" since the 1950s. The roots of that consolidation policy actually go back to the Great Depression and the government decision that the U.S. needed to shift workers from farms to cities to ensure a steady supply of cheap labor for industrial production.

Those folks in Washington, D.C. just didn't think that concept through to the logical and inevitable conclusions. Fewer farmers mean fewer people living in rural towns and that means fewer children in rural schools, fewer parishioners in rural churches, and fewer shoppers at rural stores. Federal highway construction, instead of making it easier to "get to" rural towns, has made it easier to "get out of" rural towns and shop in regional centers instead of home towns. Driving the depopulation of the countryside is a host of regulations and policies.

We pay for these problems when we buy conventional food at chain supermarkets. And we get what we pay for.

Making it easier for people to make good, better, and best food choices.

What goes around comes around though, and invisible structures can be used to strengthen the cause of "beauty, wisdom, and goodness" as well as to support gluttony and greed. Structures such as farmers' markets, community supported agriculture programs, and local food cooperatives re-weave the connections between urban residents and rural farmers and offer markets for the production of more sustainable, just, and humane systems of agriculture and livestock production.

The more people that join together in such structures, the stronger the local food system becomes in that given area and across the nation. Here the permaculture diversity principle comes into play, as connections are made and strengthened across existing dividing lines of race, class, religion, ideology, and politics.

It is not unusual, for example, in local food circles, to find a conservative Christian fundamentalist Republican happily working right next to and with a socialist-feminist Wiccan lesbian. Usually, such people would not even talk to each other, much less work together toward a common purpose. It's not that such groups adopt a faux diversity, pretending that religious and political beliefs don't matter, because that's not what they do. Instead, they recognize that everyone has a right to eat good and healthy local food. It is in the self-interest of all to have an open table of fellowship without a political or religious litmus test when it comes to developing a local food system. Otherwise, we remain divided and thus easy prey for the political and economic aristocrats who profit from our tendency to focus on issues where we disagree rather than joining forces around issues where we agree.

Any movement that can bring together such apparently diametrically opposed groups of people, around a common table of local food fellowship, shows great potential for growing a future of hope and beauty.

Participation in the process of change to move our invisible structures toward supporting more just, sustainable, and humane food systems is more important than growing some of your own food.

If there aren't any organizations in your area working on food security, start one! Reach out to people in other areas and find the knowledge and information you need.

When I began the process that resulted in the organization of the Oklahoma Food Cooperative, none of us knew anything about how to do what we did. That was fine, because we didn't need to know everything that we know now at the beginning. All we needed then was a vision of what we wanted (an easy way for people in cities to buy food from rural producers). We took things one step at a

time, as the situation developed and progressed. Along the way, we learned much, we invented much, we ate a lot of good food. We developed a workable system that is successful, profitable, and can be scaled up or down. In other words, we did what we could, with what we had, where we were – a good example for all to follow.

We ignore the invisible structure situation to the mortal peril of our local food systems. Food is fundamental and it is grassroots. It is a great place to intervene in the system since implementation of food laws is primarily a local government duty and thus more responsive to local concerns.

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02061 Household Food Systems Inventory

"I know the look of an apple that is roasting and sizzling on the hearth on a winter's evening,
and I know the comfort that comes of eating it hot, along with some sugar and a drench of cream...
I know how the nuts taken in conjunction with winter apples, cider, and doughnuts,
make old people's tales and old jokes sound fresh and crisp and enchanting." – *Mark Twain*

Complete this inventory via a process that includes all members of the your household old enough to contribute meaningfully. This includes roommates, or if you are a household of one, it is Just You. The numbers below correspond to lines on the 02061.1 spreadsheet.

No one expects you to keep these kinds of records for the rest of your life. You may not want to do this much observation of your household's food systems right now. If not, that's fine, just understand that the purpose of these suggestions is not to gratuitously complicate your life. However you get there, each of us needs an understanding of --

What and how much do you eat? Are you cooking meals from basic ingredients at home? Or do you frequent fast food restaurants and buy a lot of take-out?

Where do you get what you eat? The supermarket? A farmers' market? A coop?

Where do you eat? How often do you eat at home? How often do you eat out? How often do you eat at the homes of friends? How often do you get take-out?

With whom do you eat? Do you eat by yourself? With your family or household? With friends? With strangers?

So we want to get a base line on what you eat, how much you eat, and where it comes from. We look at where you eat and with whom you eat.

Yes this will take some time. Which is fine, because we don't have time to be in a hurry. Think of your involvement as an investment in your future and the future of the planet.

Don't get uptight about this kind of observation. If you forget to write something down, don't chastise yourself or feel guilty. Just make better notes next time.

Your observation will almost certainly influence your food choices. While observing your personal food choices, you will make better food choices than you would otherwise. You may stop your hand even as it reaches for the junk food because you know you will have to write it down. Even though your only audience is yourself, you will subconsciously not want that written on your food inventory.

This is not a bad thing. We all need to learn to make better food choices. Keeping a food diary is well known as a method of helping people improve their diets.

Regarding the spreadsheet and its explanation below. . . you don't have to use this method. You can develop your own method. You could decide, for example, to simply write a narrative (like a diary or a journal or a blog) about the food you eat, where you get it, and etc. Some people like spreadsheets and work well with them and will understand the

explanation below immediately. Others won't, and that is just as fine as any other response.

I am not in the business of dictating a method of observation to you for your food or anything else. I will say "you must observe your situation" if you want to do permaculture design. I will also say – "the more accurate and comprehensive your observation, the better your design will be." I can offer the option below as one possible method. How you do your observation is up to you.

For persons living in dormitories and eating at college cafeterias: Complete as much of this as is relevant to your own situation, including noting the foods you eat with your meals in the cafeteria. Be sure to account for your off-campus eating and snacks, as it is unlikely that you take all of your meals on-campus. Regarding food production questions, you can answer those "in the future" when you have access to some garden land, or you can design a program to encourage on-campus food production for use in campus cafeterias. For "source" of your groceries for meals eaten in the cafeterias, enter "College Food Service" or just "Cafeteria".

For persons who have no land on which to grow food: Complete as much of this as is relevant to you. Later, as you do design work based on this inventory, you will consider how you can use local structures to access local foods, such as farmers markets and cooperatives. You can consider how you might be able to find some land on which you can garden in your city.

THE PRESENT SITUATION

1. Your Household

a. List all the household members (age and sex).

b. If you have a kitchen, or some other kind of resources to prepare foods, and/or any household food production. . . Describe the kitchen and any associated household food production.

c. A narrative describing the household's present food situation. Describe any participation in local/regional food shed. (Farmers markets, local food coop, direct purchases, etc.)

2. Household food log.

You can download a spreadsheet at www.ipermie.net or you can develop your own system. Depending on your existing household records, you can run this backwards or you can start it now and run it forward.

a. List all groceries bought for your household, by source, and amount paid, and all home production foods used during the analysis period.

b. If you don't buy groceries for most of your meals because you eat in a cafeteria. . . List any groceries you buy in a month (items to prepare in your dorm room, snacks, etc.

c. Make a "historical menu" list of foods for the period you keep the food log. Include this information for the entire household:

-- List all meals eaten out or take out, by person, and what you eat at those meals. If in a given day, the family eats breakfast and dinner together, and 3 family members eat separate lunches, the total number of meals for that day is 5 – two common meals, plus 3 separate meals.

-- Show the cost of meals eaten out/take out.

-- If you prepare meals at home. . . List the menus for all meals prepared at home or prepared for "carry-out" (i.e. lunches prepared at home and taken to eat at work or school).

-- Determine the cost of home-prepared meals as best you can.

-- Identify meals with home production foods, and with foods sourced from the local/regional foodshed.

-- If you don't prepare meals at home because you eat in a school cafeteria. . . List the meals you eat in the cafeteria and the foods you eat at those meals.

NB: This is not the same as the "list of grocery purchases" in 2-a, as presumably you will use some ingredients that are on-hand and not purchased during the month.. If you fully account for a particular meal, and use left-overs later, include only the cost of any new ingredients added, since you accounted for the cost of the left-over's when you served them for the first time. Alternatively, if you quantity cook, you cost the ingredients when served. If you bake two casseroles at a total cost of $5.00, the cost of each meal is $2.50,

c. List any home grown/processed ingredients used during the month, the number of meals in which you used the household-produced ingredients, and the amount used.

d. Log your time spent preparing and eating food. For eating out, count the travel time. Don't worry about accounting for 30 seconds eating a carrot stick or a chocolate bar. Guestimate "snacking time". Keep track of meal preparation time and time spent acquiring fast food/take-out. Do this by household member and location. If you eat in a school cafeteria and thus you don't prepare food, just account for the time eating.

e. From the information in your food log, make a summary list of foods actually eaten over the previous month, by "food", e.g. "Mashed potatoes, 10 times; roast beef, 3 times; Cheesy-poofs, 25 times, whatever. For take out/eaten out meals, note this on the log. E.g., hamburger eaten out, 6 times. You might have two lines for some foods, e.g. hamburger eaten out, and hamburgers

3. Summary of foods acquired.

Enter the total dollars for foods acquired for preparation at home, eating out, or take out brought home. Foods acquired for preparation at home includes any foods prepared for carry-out (lunches for work, school, etc.) Enter the percent of total food dollars for each category.

You may also find it interesting to determine how often you eat at home versus how often you eat out or bring home take-out.

4. Kitchen Skills, Resources and Work

a. If there are any defined roles in household food production, list them by household member, e.g. mother – cooks and shops, teenage son – washes dishes, takes out trash, complains often, etc.

b. List the food production/preparation skills of members of the household.

c. Household food production equipment on hand. It's not necessary to list every pot or skillet, instead, skillets – 6, stock pots – 3, food processor – 1, etc.

d. In an emergency situation, estimate how long your family could eat on the food you have presently on hand.

5. Household food production.

a. List perennial food/useful plants that you grow, and where you grow them. Estimate production and measure the space devoted to perennial food production (if any).

b. List annual food/useful plants you grow, and where you grow them (if any). Estimate production and measure the space devoted to annual food production.

6. Household materials cycling

a. Describe any household organic materials cycling you presently do (composting, vermiculture, etc.)

b. Describe any kitchen-related non-organic materials cycling you do (glass, metals, used appliances, etc.)

7. Kitchen energy

a. Prepare a table showing 12 months of household energy consumption and expense, showing amount spent (including taxes and fees) and amounts used in kilowatts of electricity, dekatherms or cubic feet of natural gas, gallons of propane, cords of wood, etc.

If you use utility services (natural gas or electricity), you can probably get this information from your utility.

Note any renewable energy you used (wind or water generated electricity, sustainably harvested wood, homestead biogas production, etc.)

8. Tables and Maps

The utility of this section is somewhat limited for college students and others without any land. If your local permaculture organization decides to work on college food systems as a project, or you get involved with a community garden, developing this info and the maps will be helpful.

-- Base map of kitchen area, and any other food production area(s) at the site.

-- A list of the "Needs and Yields/Benefits" of each element of your kitchen.

-- A sector analysis of your kitchen -- planetary energies (solar, wind, rain, weather, climate), Grid energies (electric, water, natural gas, waste disposal, sewage, communications), Fetched or delivered energies (gasoline, propane, wood, food), Invisible energies(the effects of invisible structures on you -- laws, crime, education etc.)

-- Describe the zones on your kitchen and how it fits within the place you live and the geographies of your life.

THE DESTINATION SITUATION

9. Household Food Goals

List the food goals of the household, by individual member and/or by consensus. Spend time talking with family members to develop this information.

What food system skills/techniques do the household members want to learn? (List by household member.)

What food system equipment does the household need or want?

Are any particular changes to the present set-up of the household's kitchen desired?

Does the household wish to increase its food storage? If so, by how much?

10. Household Food Production

List any changes desired to the household's food processing/preserving systems.

List additional perennial food producing or useful plants the household wants.

List additional annual food or useful plants the household wants to grow.

Do you want to expand the area dedicated to food production? If so, how much?

Are there any new foods you and your family want to incorporate into your diet?

Are you interested in growing anything for sale? If so, list items and the amount you desire to make from this activity.

List any improvements to the household's nutrient management systems you want to implement.

Anything else relating to the household's goals for its food production systems.

11. Materials and Resource Cycling

Describe any changes you want to the resources or materials cycling in your kitchen.

12. Energy

Describe any changes/improvements to your kitchen energy situation.

13. Miscellaneous

List any problems uncovered during the inventory that you want to solve.

List anything else developed in your research that you want to address with this design process.

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02071 Growing Food Without Land

"The average person is still under the aberrant delusion that food should be somebody else's responsibility until I'm ready to eat it." – *Joel Salatin, Folks, This Ain't Normal: A Farmer's Advice for Happier Hens, Healthier People, and a Better World*

Many people live in urban areas and don't have any land of their own on which to grow food. Here are ten ways that people can participate in food production activities even if they have no land of their own.

Community Gardens

A community garden assigns individual households a specific part of a larger garden, for that household's exclusive use. In other models, a group gardens the entire space cooperatively, and divides up the production. To find a community garden, contact a local food bank or social service directory organization or the American Community Garden Association – http://www.communitygarden.org/ .

Someone Else's Back Yard

You may not have any land, but someone you know – a friend, a relative, a co-worker – may have some land they would let you use for a garden – especially if you offer to provide them with fresh organic produce!

Rooftop Gardens

Rooftop gardens are the new urban frontier for growing food. Urban areas have thousands of acres of flat roofs. Nearly all of the annual vegetables can be grown in as little as 8 inches of potting soil. The primary issue with rooftop gardening is weight, so lightweight potting soils are best for rooftop growing. Most large urban areas have sources for such lightweight soils. An extensive collection of online resources for rooftop gardens is http://rooftopgarden.com/.

See this You Tube search for rooftop gardening: http://tinyurl.com/7vclpll.

Indoor Greenhouse Growing.

The pioneers of indoor greenhouse growing are marijuana growers, who produce a huge amount of their product every year in secret indoor growing systems. The concept however works just as well for tomatoes as it does for pot. Growing in an indoor greenhouse requires supplemental light to boost production. Use vertical systems to get more plants per square feet. I've seen estimates online of as many as 180 vegetable plants in an 8 ft x 8 ft growing area. Line the walls and ceiling with aluminum foil to bounce the available light around and make it more intense for the plants.

20 indoor gardening projects http://www.instructables.com/id/Indoor-Gardening/

Indoor gardening video http://www.youtube.com/watch?v=EHsVD3FzrG8

How to begin an indoor garden http://www.youtube.com/watch?v=kVwAnbvEiy0

You Tube search for "indoor vegetable garden: http://tinyurl.com/77487qf

Container Gardening

Container gardening is a great option for people living in apartments and dormitories who have zero land. Chapter 02371 covers this at much greater detail.

Microgreens

Microgreens are a step up from sprouting. Harvest them when they are ten days to two weeks old. Popular micro-green plants include --

– All the lettuces
– Other salad greens (arugula, mizuna, spinach)
– Brassicas (cabbage, kale, broccoli)
– Herbs
– Beets
– Radishes
– Peas

To grow Microgreens indoors:

Use a tray that is about 2 inches deep and as big or wide as you can accommodate in your available space.

Put about 1 inch of potting soil in your tray (preferably homemade, see 02371 for details) in the pan and scatter your seeds on top of the soil, covering them with about 1/8 inch of potting soil.

Wet the potting soil, and keep it wet. Keep it in a place where it will get at least four hours of sun every day.

Harvest them when they develop their first set of true leaves. This will be ten days to two weeks after planting them. These are the leaves that come after the initial "seed leaves." Simply snip the plants at the level of the soil.

Enjoy them as a salad, cook them as a side dish, or include them in stir fries.

Another method of growing microgreens does not use soil. Instead, plant the seeds on top of three or four layers of paper towels. Keep the towels moist during the growing period.

Both ways of growing microgreens benefit with a clear cover over the growing tray, to create a miniature greenhouse effect. With both microgreens and sprouting, your best deal will be to buy seeds in bulk quantities. Make sure you get untreated seed.

Sprouting

Sprouting is another easy method of home food production. It requires a supply of non-treated seeds. And the operative word in that sentence is "non-treated." Don't use seeds from small vegetable packets sold for gardening purposes. They're too expensive to use for sprouting. You may be able to find local supplies at garden or health stores, or bulk food departments in grocery stores. You can order them online from a variety of suppliers. It pays to shop around, as there is a lot of price differentiation.

The easiest sprouting equipment is a mason jar and ring. Cut a piece of metal window screen to fit the top of the jar (so it laps over the glass edges of the mouth of the jar). Put seeds in the jar, put the screen on top, screw on the ring, and voila, sprouting jar. Or you can use cheese cloth to cover the opening.

The first step in sprouting is to wash the seeds thoroughly. Before washing, examine them and pick out any foreign seeds or rocks (they do come to us from fields.) Put them in a colander or use your sprouting equipment to thoroughly rinse the seeds. Agitate them in the water and drain completely.

Next, soak the seeds in plenty of water. If you can't find a specific reference, soak them overnight. The amount of time

required for soaking varies depending on the seed. Check the internet or your seed source for soaking times. Agitate them in the water several times during this period, to make sure they don't clump. You want every seed to be exposed to plenty of water.

Sterilize your sprouting equipment. One of the advantages of the mason jar and metal window screen method is that you can boil them to sterilize them. Alternatively, you can spray the equipment with undiluted hydrogen peroxide, warmed to a temperature of 130 degrees, leave it on for one minute, and rinse it off with clean water. If using hydrogen peroxide at room temperature, let soak for 10 minutes (but this is not effective against listeria). Soak your sprouting equipment for at least two minutes in a sanitizing solution of one tablespoon of plain bleach to one gallon of water. Rinse. Undiluted white vinegar, used at 130 degrees temperature, should be left on the surface for 1 minute, before rinsing. Never mix hydrogen peroxide and vinegar together.

After soaking put your seeds in the sterilized and rinsed sprouting equipment. Rinse the seeds 2-3 times every day. Run the water into your sprouting equipment at the full pressure of your local tap. Use cool water. Shake and swirl the container to mix the seeds with the water. Do not skimp the water. They need a full and generous wash.

After rinsing thoroughly, drain thoroughly. Swirl and shake your sprouting equipment to remove as much water as possible.

– Don't take the seeds out and dry them, they need some moisture. They don't need excess moisture.

– Sprouts need air. Don't put the sprouting jar in a closed cabinet.

When your sprouts are ready to eat (5 to 7 days, depending on various factors too numerous to list here), after their final rinse, let them dry thoroughly. Once you stop the rinsing process, sprouts must be refrigerated. Don't want to refrigerate them wet. Once they have dried, put them in an enclosed container and keep refrigerated. They will generally keep up to 6 weeks. You should eat them more often so they don't hang around long.

A half pound of alfalfa seed will produce about 45 cups of sprouts.

Aquaponics

Aquaponics is about raising fish in containers and then using the water, fertilized by the fish, to grow food plants, with the water circulating back to the fish tank for a sort-of-closed system.

This system can be used by apartment dwellers. Consider how the number of 50 gallon aquariums there are out there, and 50 gallons happens to be the same size barrel or tank that many aquaponics practitioners use for their systems.

I don't have direct experience with this method of food production, so I will refer you to the links and videos for more information. It is certainly possible in an apartment to set up an attractive and productive aquaponics system. If you can handle a fish tank, you can raise fish and salad greens in your apartment.

http://www.aquariponics.com/

http://en.wikipedia.org/wiki/Aquaponics

http://aquaponics.ezjensen.com/

Apartment Aquaponics part 1: http://youtu.be/-8H30hFkVwk

Apartment Aquaponics part 2: initial setup http://youtu.be/BEbc75whUfg

Mini-aquaponics – http://youtu.be/J1RkJ_-BRkY

12 indoor aquaponics videos http://www.youtube.com/user/remeret

http://diyaquaponics.com/index.php

Mushroom Growing

Mushrooms grow on logs, and they can grow just as easily in a bedroom, kitchen, or utility room as they can on the floor of a forest. Here are some links with ideas about home mushroom cultivation:

http://www.motherearthnews.com/organic-gardening/growing-mushrooms-at-home.aspx

http://www.gardeningknowhow.com/indoor/grow-mushrooms.htm

Growing mushrooms at home without a kit – http://youtu.be/PH5_vB8-gWk

Basics of growing mushrooms – http://youtu.be/ZHJQrsZFQdE

How to grow shiitake mushrooms – http://youtu.be/0WQ2gY6W4Mg

How to grow shiitake mushrooms – http://youtu.be/2369npAmYJo

Gleaning/Foraging

Gleaning or foraging in urban areas has some limited utility for acquiring urban food sources. The problem is that if all of the residents of a typical city went out gleaning and foraging wild and yard plants for food, the available supply would be quickly depleted.

One thing that people can do, as part of their invisible structure designs, is to support urban edible landscapes. The more food our cities grow, the better our food situation will be.

Fishing

Finally, we come to fishing. Many cities locate on or near rivers or large lakes, and fishing is a traditional past-time. Alas, fishing has been complicated in recent years by water pollution. Before you go fishing, check with your local fish and game officials to find out if it is safe to eat any fish you might catch. "Time spent fishing is not deducted from a person's allotted lifetime."

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02081 Design Process, Principles, Strategies, and Techniques for the Permacultured Food System

The single greatest lesson the garden teaches is that our relationship to the planet need not be zero-sum,
and that as long as the sun still shines and people still can plan and plant, think and do, we can,
if we bother to try, find ways to provide for ourselves without diminishing the world.
– *Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals*

Gandhi said that the way toward personal and community empowerment that will nurture social change is to "be the change we want to see." One bad decision at a time, we come to the present impasse – a world teetering on the edge of the abyss of cultural collapse triggered by resource exhaustion, social injustice, financial bankruptcy, environmental degradation, and toxic political responses to these challenges.

We will find our rescue in a similar, incremental, manner – one good, better, or best decision at a time, as people take personal responsibility and become the change we want to see, at the grassroots of their culture. As this happens, our politics will evolve in more beneficial ways to meet the challenges of the future.

Here we look at permaculture design principles, strategies, and techniques from the viewpoint of household food systems.

This is a restatement of some of the material previously presented in the Basics section. This time around we focus on the food system.

If at present you live in a dormitory and eat at a school cafeteria, use this information to plan your future household food systems and to help your school make positive changes toward sustainability in its campus food systems.

Design Process

Local food systems grow from personal choices.

No action or inaction is without consequence.

If we want a more sustainable, humane, resilient, and just food production system, there must be a market for the products of more sustainable, humane, resilient, and just food production systems. Our present system is not sustainable and this needs fixing lest a disaster result.

Personal and household choices about where and how we spend our food money and time are therefore critical to the design of the permacultured kitchen.

This design process begins with observation of your situation and an inventory of what you have and do, what you need, and the challenges of getting from here to there. Once you have an understanding of what you want and where you are at the present time, you can evaluate your situation and decide on a plan of action to get yourself from where you are now to where you want to be.

Observe – Study – Evaluate – Design -- Implement

OSEDI! You hear this, over and over, throughout your iPermie experience, in relation to energy, housing, transportation, and all other aspects of your lifestyle.

Because a transition like this is complex, it helps to work from **a written lifestyle design plan** that you prepare after going through the observation, study, and evaluation of your situation. And in any such journey, our grandfathers' advice remains valid – Measure Twice, Cut Once.

This observation derives from the permaculture principle of working with edges. A person's food system is an often curious intersection of sectors, zones, opportunities, and personal likes and dislikes. We are conservative in our food habits, in that we stick to them and change comes slowly. Many household activities ("sectors" in permaculture jargon) intersect in the kitchen and the family's food systems. It is thus a productive place to start learning permaculture design and working with the concepts.

If it isn't broken, don't fix it. Don't make changes just to be busy. Don't jump the gun and start a lot of evolution without first thinking through the whole situation and designing your response.

Conservation and restraint are essential to the design process. Resist the urge to buy the latest or newest gadget just because, you know, "everyone does it." Take the time to really understand and know "where you are at" so you can make intelligent choices about what needs to change, and what can stay. Make the least possible change, for the greatest possible effect.

Design Principles

Forms and functions follow food.

Patterns are a key permaculture concept because energy and resources always follow the patterns laid out for them. We intelligently design some of those patterns and place them into the flows of resources and energy to achieve purposes. Other patterns are more accidental and evolutionary. Many patterns have been deliberately designed to extort, loot, waste, and destroy for private profit. We have the present food system we have because of the patterns laid out by law, custom, economics, and habit.

Modern consumer culture **degrades food to the status of a mere fuel and instant gratification tool** and devalues it of any greater cultural or existential meaning. That is the pattern that the supermarket system's food follows and thus we get what we get.

But food is not just fuel. **Food is life.** It speaks of our families and our cultures, our identity as persons and communities. Eating is an agricultural act and eating is a moral act and you are what you eat.

The physical design and layout of the kitchen is not the most important design work. The big questions are –

– What food is in the kitchen?

– Where did it come from?

– Who produced it?

– Do the groceries create social justice and contribute to ecological sustainability?

– Does the food taste good and is it nutritious?

-- Or do your groceries support oppression and environmental degradation?

-- Do you pay a high price for not-much-nutrition-or-taste?

-- What hidden costs does your food include? Diabetes? Risk of stroke? High cholesterol and heart disease? Destruction/depopulation of rural areas?

In other words, **what patterns direct the flows of energy and resources in your food system?** Don't doubt that you do have a food system. Even if you eat your meals in a college cafeteria, you are part of a food system.

The system wants you to think that you are a helpless pawn of circumstances. You have no control over your food. Just get used to it. Eat what the advertisements tell you to eat, and don't rock the boat.

That's not reality however.

You are not a helpless pawn.

You control your food.

The invitation of permaculture is to exercise that control in ways that care for people, care for the planet, and have a care for the future.

Focus on the food first, and then let the form and functions – the patterns – of the kitchen evolve as a reflection on your food.

Everything in the design plan serves more than one function. Stack functions.

This is a basic principle of energy conservation, which applies not only to things like fossil fuels, embodied energy, and human energy. The passive solar sun porch of my home provides --

– heat in the winter,
– a place for container growing,
-- nice views of outdoor areas,
– a sunny place where the cats laze around,
– a place to hang coats and umbrellas,
– a place to stack wood in the winter for the wood stove,
– the location of the kitchen recycling bin,
– ventilation in the summer, and
the main entry way to the house.

So it comes to pass, that because of these stacked functions, I get a lot of value out of a 5' x 22' space in my house, that formerly was of limited use.

Think about your food system in this way, and look for beneficial connections among its components.

Be Redundant. Meet essential needs in multiple ways.

Food/nutrition is a seriously essential aspect of life. Without food, quality of life declines immediately and 4-6 weeks later, death results. Each essential element of your permacultured food system needs a back-up. And then you want back-ups for the back-ups – multiple food sources – local, and regional.

If there are problems with grid distributed natural gas and/or electricity, you need a way to cook your food and to keep your freezer operating. Cooking alternatives include wood stoves, outdoor camp fires, outdoor bread ovens, solar cooking, propane camp stoves, kerosene or white gas stoves, retained heat cookers, etc.

You can keep your freezer going for a couple of days with a marine battery and an inverter sized to meet the power requirements of your freezer. An inverter allows you to run an appliance like a freezer, which requires AC power, on a battery, which stores DC power. The amount of time depends on the size of the battery, the power consumption of the freezer, and the ambient temperature. Alternatively, you could do more canning and fermenting and less freezing. Or in the event of a prolonged power outage, you could pressure can the meats in your freezer – IF you have a pressure canner and IF you know how to do this. This time to acquire food preservation equipment and skills is before the power grid goes down for a long period of time.

This kind of planning is important for everyone, including those who live on campus in dormitories. Everyone needs a back-up plan if the present situation deteriorates significantly and quickly.

Diversity.

Diversity is not just a numeric list of lots of stuff. It is the diversity of connections between different elements of a design that we want to increase the resilience and efficiency of the design. Consider the diversity of beneficial connections/integrations involved with a compost pile.

1. Compost connects with the garden which grows food for the family to eat.

2. Some of the food grown returns to the compost pile and helps fertilize future food.

3. Perhaps the household gives some of its surplus waste food to a farmer they buy from at a farmer's market, which comes back to them in the form of food.

4. A compost pile could be used to heat water for use in the house.

5. During cold weather, I notice birds hanging around the compost, taking advantage of the heat. The birds pay for the heat (and anything they may nibble), with their droppings, some of which will end up on the compost, others elsewhere. Providing help for birds in an urban area is a good thing in and of itself, since the birds are essential to the successful functioning of the urban ecosystem. So in actuality, providing some winter warmth for birds could be considered as me reimbursing them for what they do for me. (Reciprocity -- love – being the balance of giving and receiving.)

How about a list of the beneficial functions and connections of a south-facing window?

1. passive heat in the winter,

2. light for growing indoor plants,

3. a pleasant view outside to the garden, which gladdens the heart and brightens the house.

4. The indoor plants feed the family,

5. the waste goes to the compost,

6. compost fertilizes both the indoor plants and the outdoor garden,

7. an indoor and outdoor garden returns more food to the family, thanks to the garden outside, the south facing window on the house, and the container growing space inside.

8. Buckets of water can heat in the sun streaming in through the window.

Here are some other chains of beneficial connections:

– The household buys wind generated electricity from its utility, which in turn pays an annual lease payment to a rancher who raises all grass fed beef, which the family buys through a food coop that only sells locally-grown foods and non-food items. The coop supports the local food shed by providing an essential market for rural and urban producers. Some of the food imported ends up as compost or humanure, which may provide nutrients to the site, allowing more food to be produced, and etc.

– A campus cafeteria serves salad greens in winter, grown in a solar greenhouse, using worm castings and teas. Food waste from the cafeteria goes to the greenhouses. Some of it feeds the worms. Some of it composts. The compost piles generate heat which helps keep the greenhouse warm. The compost fertilizes summer vegetable growing on campus.

Appropriate Scale.

You don't need, and shouldn't plan for, a household nuclear reactor to cook your evening meal. While this is a somewhat extreme example, let's bring the scale down a bit and ask ourselves if we need a complicated and expensive machine – which requires maintenance, fossil fuel inputs, and regular replacement – to wash dishes? Question yourself about appropriate scale at each step of your design process.

What goes around, comes around.

Use the yields of your lifestyle and community to meet the needs of your community, as much as possible. Channel the resources being contributed to your life for optimal use and minimal waste. Yields of food include care for people (nutrition, health, happiness), and resources (compost materials, worm food, urine, humanure, mulch materials) that can meet the needs of other elements (plants, worms, soil), which in turn yield more food (caring for people) which creates more compost materials, worm food and etc. Also there are the birds, possums, raccoons, voles, and other denizens of the urban ecosystem. Love is the harmony of giving and receiving, is how my teacher Dan Hemenway describes this. When we receive, we must return and not waste.

STRATEGIES to IMPLEMENT KITCHEN PERMACULTURE DESIGN PRINCIPLES

This is not a list of all the possible strategies.

Energy Conservation. Demand destruction is the order of the day. We can shift our usage to lower power applications, and we can eliminate some uses of fossil fueled energy entirely.

Can I do this with zero fossil fuel energy? Can I do this with less fossil fuel energy?

These are design questions you must constantly ask.

Every item of stuff you own or use embodies energy in its manufacture and distribution.

Buying more new stuff = using more energy.

Buying less new stuff = using less energy.

This is not a minor point, because the industrial, manufacturing, and distribution sectors use more energy than the domestic.

Even in the city, many of us can access renewable energy by purchasing wind power electricity from your utility. Utilities often charge more for wind power energy, but the price is a more realistic price, as fossil fuel production externalizes costs and does not account for everything in the retail prices. As the price of natural gas rises (as it surely will), however, wind energy will cost less at the consumer level.

If you are a student, you can encourage your school to practice energy conservation and to invest in alternative, non-fossil fuel energy supplies.

Energy conservation works for human energy too. It can easily take an hour to drive a fossil fueled car to the store, park, hike across a 40 acre parking lot, navigate a crowded and poorly organized store, stand in line at the checkout, hike back across the acreage to the automobile, and then drive home – just to get "a few things for dinner." Your time is valuable and finite, so make the most of it through intelligent design. How you access the needs of your life is as important a design element as anything else.

Use Biological Resources. Fueled by sun and soil, air and water, biological resources can meet our needs and the needs of other elements of our designs without the expenditure of fossil fuels. They can be of particular assistance with the problem of "embedded energy," which is the energy involved with the production, manufacture, and distribution of commercial goods. For example, instead of using a foam kitchen sponge – manufactured with fossil fuels and a host of nasty chemicals – a better choice is to either grow natural luffa sponges or buy them from a farmer who grows them in your area. Luffa sponges are actually a higher quality choice than any foam sponge from a discount store. While growing, they make beautiful vines and showy yellow flowers.

Biological resources are important to the resolution of the thermodynamic impasse

that will be increasingly critical going forward. While everything science can see, measure, and analyze tells us that there are no exceptions to the laws of thermodynamics, sometimes nature seems bent on proving the existence of exceptions in its natural biological ecosystems. Plants convert the sun's energy with an efficiency we can't manage. Creative use of biological resources is absolutely essential to permaculture design.

Be Temperate in Your Choices. The virtue of temperance is the practice of balance – not too much, not too little, just the right amount. The average American table is a glutton's delight, loaded with every delicacy regardless of season. In reaction to the steady "dumbing down" of our diets by the commercial processing and distribution systems, we crave variety and novelty. The permacultured food system offers a wealth of tastes and food delights, without the environmental devastation and social injustice of the on-demand agribizness food system. Indeed, during certain seasons, at our house we may eat the same foods every day for a time. The authentic nature of the food and our kitchen experience, however, does not leave much room for boredom.

The permacultured food system avoids unsustainably harvested foods from the wild, such as most ocean fish, and products with a high degree of environmental degradation and social injustice in their production, such as non-fair trade certified coffee and chocolate and meats produced in Concentrated Animal Feeding Operations.

Temperance embodies the third permaculture ethic of caring for the future. Just because "we can," is not a reason (necessarily) "to do." When we read about "voluntary limits," we think something along the lines of "giving up" favorite foods or activities. In the real world, as our decisions become more informed with permaculture ethics and we design a plan to move toward more sustainability, the acceptance of voluntary limits actually opens us to new freedoms, better tastes, and interesting opportunities. Temperance is not a perpetual "Lent" of gloomy deprivation, nobody ever complains about the food at my house.

We start small or we don't start at all. Natural succession works in food systems as well as in forest gardens. We make thousands of food choices every year, and shifting a small fraction of your food choices in the "good - better - best" direction is a great place to start. Most people should not try to do everything at once; pick the low hanging fruit first, then move on to even better choices. Do one thing, and do it well, then do two! And after two comes three, four, and so on. Small, but intensive systems are productive and manageable and understandable.

Waste Not, Want Not! Recycle Resources. A permacultured food system has no waste. Someone or something – humans, animals, worms, composting micro flora and micro fauna – eats everything. Seek ways to recycle other waste, such as food packaging, and avoid stuff you can't recycle. If it can't go around, you don't want it to come around. As we look at our own situations, we will find areas where we waste resources and energy. Plug the leaks! Redirect the flows. Know where everything comes from and where it goes. If something doesn't go where you want it to go, make intelligent and informed decisions to redirect it to a more beneficial use.

Don't let the perfect become the enemy of the good. Think of your food decisions as Good – Better – Best. The best choice might be to choose a locally and organically grown product. That might not be available or you might not be able to afford the higher cost. A good or better choice might be a product made by a local or regional food processor. If you can't avoid all paper products (like paper towels or napkins), at least buy paper products made from recycled materials and that aren't bleached.

Don't let your inability to make perfect choices all the time freeze you into total

inaction. Nobody goes from 100% bad food choices to 100% good, better, or best choices overnight. Procrastination is equally problematic.

Learn to look at situations holistically. Wholes arise from parts. It can be hard at first to do this. So if you can't see the total solution in the beginning, step back and pick one thing that you can understand and work on that. Then look at your situation again and see if it is now understandable as a whole system. Everyone can find something to start with and that's where each person should begin. Slow down, simplify, make better and wiser choices.

One thing leads to another and this is how permaculture transforms from an esoteric science to a lived reality in your kitchen. Your work in the kitchen will become beautiful, and "The world will be saved by Beauty."

Design for Economy. Economy doesn't just happen. Most of us are well taught in the School of Substitute Money for Time. We are perennially short of time because we work long hours at a job to earn money that we use to substitute for time. Our culture's systems design us to be consumers. As Will Rogers said, "Too many people spend money they haven't earned, to buy things they don't want, to impress people they don't like."

Speaking of designing for economy. . . when it comes to food . . . a well-stocked home pantry is an enormous convenience in today's busy world. It can eliminate those fossil fueled jaunts to the supermarket to get "just one thing." Less time shopping = more time for other things. If you buy mostly non-perishables like pasta, salt, spices and pet food at a supermarket, there's really no reason to go to the supermarket more than once a month, or even once every two or three months.

Prices in local/regional markets and in supermarkets follow cycles. When canned goods are cheap, meat is expensive. When canned goods are cheap, something else is high priced. With food storage, you can buy what you need when prices are low, and not buy when prices are high.

This won't happen by accident, it takes conscious design to capture these energies, detect the patterns, and direct them in beneficial ways.

Design for Catastrophe. Every so often nature sends a reminder about the importance for designing for catastrophe. Besides hurricanes like Sandy and Katrina. . . there are a hundred things that could happen in a heartbeat that would disrupt the steady flow of trucks to and from warehouses and grocery stores that feed our urban areas. In an uncertain economy, people are at risk of losing their jobs and incomes. Weather can cause short or even longer-term disruptions in local food distribution.

A well-stocked home pantry is an essential aspect of family and community food security in the event of disruptions to the food distribution system or family income. Throughout nature, plants, animals, birds, and insects maintain storages of food. A good plan is to keep some of your household's savings in the form of food. Store what you eat, and eat what you store. Are you counting the functions that can be stacked on food storage?

Eat with the season. These days, everything tastes the same everywhere all the time, 24/7/365. Real life has annual rhythms and seasons, and so does food in the real world. We have learned by sad experience that by extravagant expenditures of energy and oppression we could have summer salads in winter. What does this willingness to take food from the hungry in the third world say about our personal and social moralities?

As the seasons change, so should our food. Summer is a time for extravagant salad greens and sweet ripe tomatoes and juicy strawberries. None of those are winter foods however. Make winter salads from winter vegetables like carrots, turnips, beets, and potatoes. Long-simmered soups are not particularly

desirable in the summer. In winter they hit the spot! If you want greens in the winter, grow them on a sun porch or household greenhouse or cold frame or hot bed. Don't buy them at a supermarket which imports them from third world countries.

Summer – Fall – Winter – Spring – as the seasons change, our diet evolves. This is not something bad – this is something to look forward to and to revel in. Reveling is one of the fundamental purposes of food, never forget that little detail.

The **physical layout of the kitchen may change** from season to season. In the summer, we set up a summer kitchen on our porch and cook outside when it is hot. When we process summer produce, we clear extra counter space, and bring food processing tools out of storage and set them up for work. The cooking goes on outside, which keeps the processing heat and humidity out of the interior of the house.

In the winter, we pull out the crock pots and roaster ovens. Besides cooking, they contribute heat and humidity, when we need it.

So goes the annual wheel of the cycle of the seasons, foods, and menus. Every season brings something unique to look forward to and enjoy. Welcome to the real world of real food!

Use invisible structures to make it easier for you to make better food choices. If your area has something like the Oklahoma Food Cooperative, or a system of farmers' markets, it will be easier for people in cities to buy food from farmers, and that is a win-win situation for everyone. If your state food safety regulations do not penalize small food producers, the local economy and ecology benefit. On the other hand, if your state food safety regulations treat a small producer with 50 chickens the same as Tyson with millions upon millions of chickens, the small producer will be at a serious disadvantage and this is not good for the local economy or for the local ecology. Invisible structures have serious impacts, for good or for ill, upon your local economy, your local ecology, and by extension, the planetary biosphere. Ignore this at your peril.

Don't leave anyone behind for the wolves to devour. Good food is not only for the middle and upper classes. It is a necessity for all people. Low income households can often achieve great increases in the quality of their life and health as they leave behind the typical Standard American Diet and shift to a better way of doing food. They often lack access to sources of information and food and the infrastructure that they need. Community and religious organizations can help by providing information, classes, encouragement and infrastructure. A modest investment would buy enough food processing equipment to set up a small scale canning operations in a church or community center kitchen. Instead of buying such equipment themselves, with money they don't have, low income people could use such community resources to do their own home food preservation. Gardening is like finding money growing in your back yard, and that can be of critical importance for low income households.

Withdraw your consent and support from invisible structures and systems that damage the earth and destroy local economies. We have the system we have because that's what we pay for. When we shop at giant big box chain stores, we vote to destroy the local economy. When we pay for the inhumane treatment of farm animals, by buying such products in stores, we get more inhumane treatment of farm animals. When we buy non-fair trade foods from poor countries, we take food from the mouths of hungry children. If we want these things to stop, we must stop subsidizing them with our time, talents, resources, energy, and money.

There's no other way to do it. People will continue to do what we pay them to do. If we want them to do something else, we have to pay them to do something else.

TECHNIQUES to IMPLEMENT PERMACULTURE STRATEGIES IN FOOD SYSTEM DEVELOPMENT

This is not a list of all the possible techniques.

Adjust your expectations for your food system. A local food system is about distributing basic foods; it does not look like a big box store. Don't expect all the ersatz "convenience" offered by manufactured foods. The good news is that while the process is not always easy, the change that the permacultured kitchen brings to your household is uniformly positive. The food will be more nutritious, it will taste better, you will feel better about your work in the kitchen.

Prepare Your Meals from Basic Ingredients. The permacultured kitchen offers meals prepared from basic ingredients. Not everybody has these skills in the beginning. That's why there's considerable information here at iPermie about how to cook plus pointers to other resources elsewhere.

People can develop better food preparation practices so that using basic ingredients fits into the busy modern lifestyle. As with any else, "practice makes perfect," or at least, you get a lot better at whatever it is you practice. This works for integrating the preparation of meals from basic ingredients.

I once complained to my grandmother that I couldn't make a decent pie crust. She said, "Bobby Max, the problem is you haven't made enough pies. When you have made 100 pies, then you will be able to make a great pie crust as quick as a whistle." She was right. Although I would never claim that my pie crust was as good as hers, mine is certainly good enough to serve to company and nobody complains about it. Nor do people have problems with my peach or apple filling made from home-grown fruit.

Your menus reflect your designs. Permaculture looks at whole systems. Before we ask -- "what do I have for dinner tonight" – first we must consider –

– What will I eat this season?

– How do I get my food?

People with a lot of experience might be able to get by without planning their meals. That doesn't describe most of us, especially in the beginning. Planning menus, adapting menus to food availabilities, and the acquisition and preparation of the ingredients are necessary design opportunities and areas where most of us need to learn skills and develop good work habits..

Learn how to preserve and process foods. I like "cheese whiz." I don't buy it – I make it from real cheese we buy from a farmer. We like roasted peanuts, so we buy peanuts in season from farmers and roast them all year long. We grow fruit, and make jams, jellies, salsas, pickles, condiments. Those without gardens can buy extra produce during its season and preserve it for winter eating. Food processing tools and equipment can be owned by individual households. Alternatively, community and religious organizations can purchase such equipment and make it available in community kitchens. Many food preservation and processing tasks are easier when done by a group.

Buy locally produced foods. Buy some of your food from local producers. Locally produced foods may cost more than the manufactured foods of the supermarkets, so incorporate them into your meals as your permaculture kitchen process develops. When you cook meals from basic ingredients, you avoid the high cost of prepared and packaged foods. As a result of changing your food preparation practices, you will be able to spend a little more for locally produced foods. If you don't have access to something like the Oklahoma Food Cooperative or a farmer's market, you may have to do some detective work to find farmers selling direct to the public, or local stores that stock local products.

At the supermarket, choose organic and fair trade and be frugal. For items

you buy through the commercial grocery trade, **follow the good-better-best decision tree.** Best would be to buy organic products, and if imported, look for fair trade certification. Good or better would be buying regular products made locally or regionally.

When you do shop at the supermarket, shop "low on the food chain." Buy basic ingredients that you can't source locally. Avoid the high prices of prepared supermarket foods (like frozen pizzas, frozen entrees, boxed dinners, etc.) You're paying a high price for low quality food and the packaging and the embodied energy.

Store and generic brands are a better deal than the national and international named brands. Cooperatives owned by the independent stores make them. That is always a better choice than buying from a transnational corporation. In the Oklahoma City area, the Always Save, Best Choice, Superior Selections, and Clearly Organic brands are products of Associated Wholesale Grocers, a cooperative of independent grocery stores.

Avoid meats from Concentrated Animal Feeding Operations. For families that eat meat, one of the most ecologically beneficial and important things you can do is to buy meats and poultry from local producers who do not use confined/concentrated animal feeding operation practices. Here again, never let the perfect become the enemy of the good. If you cannot buy all of your meat from local producers (because of cost or availability), buy some of your meat from local producers. The best choice may be to buy all your meat from local producers. If you can't do that, buying all or most or some of your ground meat from local producers is a good place to start.

Access to local and natural meats and poultry is often a challenge for urban residents. With a few exceptions, all meats in supermarkets originate in Concentrated Animal Feeding Operations, and every dollar spent for them subsidizes a food production system that creates social and environmental problems. One solution to the higher cost of locally produced meats is to "eat less meat" – set limits to your personal consumption . . . Eat less expensive cuts – more ground meat than roast or steaks. Do Meatless Mondays or Meatless Fridays every week.

With farmer-direct meats, the more you buy, the better the price. Consider this to be incentive to build community. Four households could go together and buy a whole beef from a farmer, or a whole pig. Where would you find someone willing to sell a whole beef? Start by asking at the farmers' market, look for phone listings for "custom butchers" in rural towns (they usually keep a list of farmers willing to sell meat directly to the public). Look for meats that are 100% forage fed and free ranging.

When buying a whole or half beef from the farmer, be aware of the different ways of pricing the product. It may be sold "live weight" – which is the weight of the animal before processing. About 40% of that live weight will end up as meat in your freezer. It may be priced as "hanging weight." About 65% of the hanging weight will end up as meat in your freezer. You can increase that useful percentage a bit by asking for the bones, which you can use to make soup and stock.

The common packaging term "Natural" or "All Natural" means nothing. It does not mean that the meat came from a free-ranging humanely managed herd. There's lots of feedlot beef and caged chicken meat sold in stores these days cheerily labeled "All Natural." Beware of supermarket products labeled "All Natural." As the popularity of more ecologically produced food increases, beware of the increase in faux foods.

Food Storage. Every family should keep some of the family's savings in the form of food as part of their design for catastrophe and for economy. Store what you eat, and eat what you store. Rotate your food storage. How much food? One month is the minimum. Two is better.

Everyone should pay attention to the signs of the times, however. As things continue to devolve, increase the amount of food you store. It's not beyond imagination to think of storing a year's supply of food, at least of basic necessities like wheat, rice, beans, corn, condiments, spices, seasonings, and sweetenings. Few people could afford to purchase this all at once, so design a system to slowly increase your household food storage as time passes and you have the resources. Don't plan to wait for a crisis and then attempt to stock up. The just-in-time inventory system means that stores empty quickly when demand surges.

We need community storage solutions for situations like this. Consider adding that to your list of invisible structure goals.

A second function stacked on food storage is that a well-stocked home pantry is an essential aspect of designing for economy. Buy in bulk when prices are low and you don't have to buy when prices are high.

Grow some of your own food. We live in an urban central city, on about 1/7th of an acre with a duplex, small house, sidewalks and driveway. We grow food on our former lawns. Because of our limited space, we do not aim for total self-sufficiency from our property. Instead, we grow foods that (in our opinion) produce a lot of value for the space they need – organic fruits, herbs, hot peppers, cooking greens (mustard, chard, spinach, collards), and lots of alliums (garlic, onion and garlic chives, shallots, walking onions, multiplying onions). We don't raise wheat or corn or animals because of space constraints (and city ordinances). However, we have easy access to these products through the Oklahoma Food Cooperative. People without land can join community gardens, and lots of people raise food on concrete using containers. We have grown potatoes in buckets on a driveway!

Start/join/adapt "invisible structures" that will grow and support an economically viable, environmentally sustainable, and socially just local food system. Start or join food cooperatives that sell local foods. Patronize farmers' markets and local food stands. Organize to repeal government regulations that penalize local food production and restrict the rights of people to purchase food. Start new organizations and/or help existing organizations to invest in food preservation and processing infrastructure for use by the local community. Encourage organizations you participate in to choose local foods for organizational or community events.

Shop at locally owned, independent stores. For items you source at supermarkets, the best choices are locally owned, independent stores or a food cooperative. Next best would be a regional chain. Worst are national/international chains. Consolidation in the conventional food processing and distributing, at both the retail and wholesale levels, is a serious problem. That's what we pay for when we shop at the national chains. Local and regional stores and cooperatives are more likely to reinvest in the local economy, whereas the national chains are "money sinks" that continually siphon money out of the local community.

Plant a row for the hungry. If you have land and grow some food, grow some extra produce that you can donate to local food banks that help low income households. Donate money to local food coops to buy food from farmers to give to the poor. Plant fruit and nut trees and berry bushes/canes at public housing developments, teach and organize the residents how to care for them and use their produce. Help low income people start urban and rural market gardening cooperatives to increase their income and provide more local food production. If you participate in a religious organization that has land, encourage your organization to plant a garden to feed the poor.

Patronize after-markets. When you need equipment for your food systems (and other purposes), shop at thrift stores, flea markets, garage sales, swap meets, classified ads. Buying new is the last

resort after good faith efforts to meet your "stuff needs" from the after market.

Keep good records of food purchases, food storage, and menus. In permaculture design, we often speak of the importance of keeping good records and finding accurate information. A full-scale permaculture design requires at least ten years of local/regional climate data (minimums and maximums by months of temperature, precipitation, hours of sunlight, heating and cooling degree days, etc.)

Most of us are busy people, and our culture has mostly abandoned the art of memorization. We need records of our food purchases so that we know over time what happens with our local food economy. This helps us to figure budgets and to understand how we can decrease our outgoing money flows by increasing on-site production. If you keep records for as long as a year, of all your off-site grocery purchases, and arrange them by your local/regional food shed and the international food system, this will be valuable data that you can use to discern ways to reduce your dependence upon the international food system, increase your participation in local food systems, and grow your domestic production.

Menu records are important for the conservation of human time and energy. If you have a historical set of food menus, you don't necessarily have to take the time to develop a new menu every week. You can pull something from your file and go with it.

A third set of important records are for your on-site food storage. Food storage must be cycled. Wheat can be stored for 30 years, if properly packaged for storage, and some wines and artisanal sausages and hams get better with age (to a point). That's not true for most foods. There is a defined length of time that they can be stored. Don't count on your ability to remember when you bought everything. It's particularly critical to keep a list of items in your freezer. These records help you plan shopping, which stacks the additional functions of design for economy and energy conservation on the process. It's not just "one more thing to do."

Never buy "fast food" from a national chain and never eat at a national chain restaurant. This is an implementation of the strategy of withdrawing your support from structures that devastate the planet. "Big fast food" is a plague upon the earth. Money spent at national chains leaves the local economy quickly. College students, who are known to consume large amounts of fast foods, should strictly avoid the national brands of fast food and buy locally and regionally owned fast food.

Use portable foods and "homemade take-out" to minimize eating out. Eating out is expensive. Hamburger is effectively $8 to $10/pound when purchased as a hamburger at a national fast food chain. You can get better quality food in your own kitchen if you make your meals from basic ingredients. Many expensive restaurants serve what is essentially peasant food – artisanal breads, casseroles, and less expensive cuts of meat dressed up with flavor and presentation. Generally, restaurants source their food from the national and international food shed, and thus you never know what's in the ground meat. The school lunch program in most areas is a food abomination. Use portable foods made in your kitchen to minimize the need to eat out. Have "homemade take-out" night, where you make favorite foods similar to those served at restaurants where your family likes to eat.

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02091 The Permacultured College's Food System

"I don't think it would have all got me quite so down if just once in a while -- just once in a while --
there was at least some polite little perfunctory implication that knowledge should lead to wisdom,
and that if it doesn't, it's just a disgusting waste of time! But there never is!
You never even hear any hints dropped on a campus that wisdom is supposed to be the goal of knowledge.
You hardly ever even hear the world 'wisdom' mentioned!"
– *J.D. Salinger, Franny and Zooey*

John woke up late in his bedroom at Any State University. Fortunately, he had some bulgur wheat cooking overnight in the thermos on his night stand. The night before he brought it to a boil with the hot plate and filled the thermos, flavoring it with cinnamon and honey and some raisins. He added a dollop of cream from the school dairy on top and spooned it in as he scanned the incoming email and checked his FB.

Mary, on the other hand, woke up early. She went to eat at the dorm cafeteria where she found a lot of choices. There were whole wheat sourdough pancakes, made with flour ground on-campus from wheat provided by the Any State Wheat Growers Association. Other choices were sourdough toast, bagels, English muffins, and raisin muffins. Eggs and dairy ingredients were from the school's own flocks and herds.

At the Egg Bar you could get eggs and omelets prepared "however you like 'em." There wasn't any avocado, there were tomatoes and hot peppers from the school's greenhouses and other campus buildings. The cereal section had a variety of choices made in the campus kitchens, using more of the donated wheat and corn. And then there were the steamed bulgur puddings and cooked oatmeal.

Mary was a vegetarian, of the lacto-ovo denomination, but the campus omnivores found plenty to eat. Breakfast sausage, ham, and bacon were on the menu, again from the school's own production activities. Vegans had breakfast sausages made from seitan produced in the cafeteria kitchen from the local wheat. And Mary enjoyed her vegan sausages – made in the cafeteria kitchen – with her tomato, onion, cheese, and hot pepper omelet. There was an abundance of dried fruit, dehydrated on campus from the college orchards the previous fall.

There was so much good food to eat, she didn't even notice that there wasn't any tropical fruit available. The campus food system did make citrus and bananas available on occasion. They were not available year-around, since the campus was not in a citrus and banana growing areas. They had agreements with cooperatives in those growing areas, and a few times a year would bring citrus and bananas north for everyone to enjoy. They had the same kind of deal with cooperatives of coffee, chocolate, and tea growers.

When Mary finished her meal, she dropped her plate off at the washing window, removing any leftover food and scraping her plate over the compost tub, as required by cafeteria policy. She placed

her cloth napkin in the napkin bin and the plate and cup in their appropriate racks for washing.

Depending on the volume of scraps and the needs, the food waste went to one of three places – the vermiculture project, compost piles, or the methane digesters.

The methane digesters provided gas for cooking, back-up heating of buildings, and some back-up electrical power generation. The amount of supplemental heat required these days was much less than was necessary in days of yore. When the school permaculture project began, one of the early projects was to cover every building on campus with a thick insulating foam. They covered this with stucco. The end result was to effectively insulated the buildings to R-50 on their walls and roofs. All of the campus windows had interior insulated window shutters installed. Each building acquired passive solar collection structures on their south faces. The roofs got solar collectors that heated both air and water. This changed the look of the campus considerably. Folks considered the new look to be extremely attractive.

Wind generators and a solar thermal system generated electricity. Backup generators burning biodiesel and methane were available if needed. LEDs replaced conventional light fixtures.

Each building had methane digesters in the basement, gravity fed by pipes from the rest rooms in the buildings above. Additional material, such as surplus food scraps, or animal manures, could be added outside of the pipeline system. Finished gas fueled building systems or went via pipes to a central storage area for distribution where needed. Additional digesters were co-located with the campus dairy, pig, and egg operations.

This diverse combination of site-located energy production and harvesting resources made it possible for the campus to completely disconnect from the natural gas and electrical grids. The sustainability of the campus food and energy systems were bragging points in the college's publicity materials.

The campus vermiculture project provided high grade fertilizers for use in the potting soils of the campus greenhouses and container growing systems. Every campus build grew food all months of the year. Thus, the students could have green salads in January, even though there was snow on the ground outside, and the greens were locally and organically grown on campus.

ASU buildings were like buildings on any campus in the early 21st century. They were way bigger than they needed to be, so there was lots of room for growing things. Campus employees and student volunteers tended the plants. The container gardens provided easy snacks as students would often break off a leaf of lettuce or a rib of celery to nibble on while on their way to or from class. Some buildings had grape vines and strawberry beds, columns, and barrels. Those were popular when fruiting and little of that fruit made it to the cafeteria. This was part of the design. The school grew the vegetables to benefit the students and faculty anyway, and if they ate it out of hand on the spot – that was several less things for the campus food service to worry about (cf. picking, transporting, serving).

The greenhouses were modeled after the insulated greenhouses first used in northern China, whose concepts came to North America via Manitoba growers. They required no back-up heat during the winter, and produced a plethora of salad greens and pot herbs.

The campus compost system provided fertilizers for the school's extensive garden system. Over time, nearly all of the annual outdoor garden beds had been replaced with edible plants, both annuals and perennials, and overall about 60% of the lawns on campus had been converted to food growing. The remaining lawn areas were pastures for the campus dairy goats and cattle. Weeder geese roamed freely. The livestock were quite tame and integrated well with the students. The

school raised catfish and tilapia in ponds as well as in tanks in the campus greenhouses.

John got out of his biology class just as the noon bells began to peal across the campus from the central clock-tower. Not wanting to go across campus to his dorm cafeteria, he stopped at a food cart and picked up a lunch time burrito consisting of a tortilla made fresh that morning, beans and hamburger cooked fresh that morning, salsa made by the cafeteria, and cheese from the campus dairy. He got two deviled eggs as a side dish and a large whole wheat snickerdoodle cookie for dessert. He couldn't believe how good the eggs were at this campus. He had never had such eggs in his entire life. That was pretty much true for the whole food system on campus. It boggled his mind but he didn't worry too much about it as he chowed down on his lunch.

All of the beef on campus came from the ASU herd. When the school went into raising its own beef, alumni donated all of the original herd. John filled his mug with a nice hot steamy herb tea made with mints grown on campus. When he finished, he returned the plate to the cart. If there were leftovers, there was a bin for that on the cart too. He took his covered mug with him because it was, after all, his mug. And carrying it with him was as much a part of his day as anything else he did. This campus did not have refrigerated water fountains. It had water taps and students carried their own cups and mugs with them. Each water tap had a small supply of cups for visitors on campus. All students and faculty brought their own cups with them to campus.

If he had gone to the cafeteria, he would have found luncheon meats (made without nitrates at the campus food processing center), campus-made breads and cheeses, and a variety of soups that suited the season. There was a deviled ham or deviled roast spread made with leftovers from campus dinners, and yes, deviled vegetable spreads for the vegans. Mary and John were really fond of those spreads. They were filling and extremely savory. From the viewpoint of campus food service, they were an inexpensive (and popular) way to avoid food waste.

Dinner that night for the omnivores was pot roast, with root vegetable side dishes, a green salad from the campus food system, gravy, homemade breads and rolls, cornbread, and dried apple cobbler for dessert with real whipped cream. That cream was so sweet it didn't require any additional sweetening when whipped, that's the power of pastured dairy right there in real life. The vegans had seitan chops with an Asian-inspired peanut sauce, vegetable side dishes as the rest, as well as vegan breads and dessert.

This must be an expensive food service plan, you may be thinking. It actually turned out to be less expensive than the old way of doing things. ASU used to contract with an outside vendor. The meant it not only had to pay for the actual cost of delivering food to the students, it had to support a bloated corporate leadership bureaucracy. As a result, ASU prices paid by the students were high and it was pretty standard institutional-grade junk food. The vertical integration and systems thinking that went into the design of the campus food system ended up actually reducing the students' cost since the energy operating costs declined significantly. Alumni donated all of the capital costs via a special capital appeal.

The students, faculty, and leadership of Any State University were happy with their permacultured campus food system. The State Board of Regents for Higher Education enjoys the reduced costs at the school and they intend to extend the "ASU Plan" statewide.

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02101 Menu Planning

"That many if not most people...who want fresh leafy greens in January buy them at the supermarket after they've been bleached and plastic-bag shipped from California or beyond is not a tribute to modern technology; it's an unprecedented abdication of personal responsibility and a ubiquitous benchmark of abnormality." – *Joel Salatin, Folks, This Ain't Normal: A Farmer's Advice for Happier Hens, Healthier People, and a Better World*

Menu planning is more than a necessary household "chore." It is an opportunity to develop your household's food systems to be more sustainable, resilient, and economical.

Menus are an essential design element of your permacultured kitchen.

Why? Good food doesn't happen by accident. A menu plan can:

– Increase the nutritional value of your meals, as you incorporate healthy principles of eating into your cooking.

– Help you become more sustainable – as you have the opportunity to incorporate more local and organic foods into your diet.

– Save time - consider how often people go to the store to get "just one thing" for dinner.

– Save money – by planning, careful shopping, and creative use of leftovers.

For college students, studying your school cafeteria menus provides opportunities to educate your campus food service people about whatever deficiencies or problems you find in their food service menus. Making menus is an important lifestyle skill for everyone.

Start small. If you aren't in the habit of doing menu planning, you don't have to plan a month of menus first time. Start planning maybe three days at a time and work your way up to your typical food shopping schedule. Your menu cycle will be closely linked with your income and shopping cycles.

Make a list. Make a list of the breakfast, lunch, and supper foods that your family likes to eat. Talk it over with your household. Make a second list of any new foods you want to try in the near future.

Make a third list of home production foods you have available, and foods available from your local/regional foodshed.

Do a "first cut." Use your lists to fill in the information for each day. For example, your list may include the following breakfasts: (1) biscuits and gravy, (2) pancakes, (3) omelets, (4) cereal, (5) breakfast casserole. You can get whole what flour, sausage, eggs, and granola from your regional food shed, so these meals will have good local content. That's a stacked function and that's good. Get the household involved if more than one person will eat from this menu.

Do a similar process for lunch and dinner.

Voila! You've just planned a week of meals. For the next few days, you don't have to wonder "what's for dinner?"

Check nutrition. Make sure your menus are nutritionally complete. If your household follows a particular "philosophy of food nutrition," plan your meals according to those principles. Whatever your philosophy of nutrition is, make sure your menu supports it. If you don't have a philosophy of nutrition, you should probably get one. There are readings later in this section which can help with that.

Make the menu more sustainable. Incorporate sustainable principles and strategies in your menu preparation:

Eat with the season. If you are able to grow or source some local foods, start your planning with those foods. (Students: work with your campus food service on this issue.)

Be temperate in your choice of foods. Just because you can, doesn't mean you should. (This is particularly important for students calling for beneficial changes in their campus food services.)

Stack functions. Cook once, eat three or four times. Plan to use leftovers in meals later in the day or week.

Shopping list. Write down the ingredients you will need and how much you will need. For example, suppose you plan to eat biscuits and gravy six times during the month, and you feed three people. Add it up:

½ C flour times 3 people = 1-1/2 C flour times 6 breakfasts = 9 C flour

½ C milk times 3 people = 1-1/2 C milk times 6 breakfasts = 9 C milk

Sausage = 1/8 lb. sausage times 6 breakfasts = 3/4 lb. sausage.

Source the ingredients. This involves determining what you already have on hand, what you need to buy, and where you can buy it (supermarket, food coop, farmers market, etc.)

I like to think of a "food source pyramid".

Most of the food comes from your household's production or from local farmers (via a food coop, farmers market, CSA, etc.).This is the base.

Next comes a layer of foods bought from the regional food shed, including store brands from regional cooperatives owned by local grocery stores. .

At the top, the smallest portion of the pyramid is for those foods you get from worldwide sources (citrus, chocolate, coffee, tea, bananas, etc.)

Save the menus and source lists. Save your menus, ingredient and source lists, so you don't have to reinvent the wheel every week. As you accumulate menus, you reduce your planning time. Eventually, this task becomes incorporated into your regular your routine and the detailed record keeping becomes less necessary. In the meantime, adequate records can help you learn good menu planning skills.

Eat, drink, and be happy! Prepare and serve your meals to your household! As we say in Oklahoma. . . Y'all bon appétit, you hear?

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02111Casino shopping

"The odds of going to the store for a loaf of bread and coming out with only a loaf of bread are three billion to one."
– *Erma Bombeck*

You don't have to go to Vegas to gamble! Just walk into a supermarket!

It's always easy to spend money in a casino. The same is true for grocery stores. Suppose you need milk and eggs. Are these items located conveniently at the front of the store? No way. You have to walk all the way to the back of the store. This isn't an accident of supermarket planning. The management knows that if you walk all the way to the back of the store for bread and milk, chances are good that you'll end up at the cash register with more than milk and eggs. If you walk out of a supermarket with money in your pocket, you've beaten a clever scheme whose purpose is to separate you from every dollar in your wallet.

Learning how to shop at a supermarket is a critical urban survival skill.

Here are some common store merchandising tricks and how to avoid them. LET THE BUYER BEWARE!

Wall of Values. Many stores feature large displays of "special" items in the front. The only way to know if these products are really good values is to compare prices. Sometimes items up front are higher priced than other items elsewhere.

Mixed Pricing. Higher priced items may be mixed with lower priced items. Know what you buy and how much it costs.

Price Tag Problems. Lower price tags may be located a few inches away from the item they refer to. The item directly above the low price tag may be more expensive. This is a big problem in deli sections.

Missing Tags. The high price item -- and alternatively -- the low price item may not have a price tag. Selection is price roulette. Put those items in a special part of your basket and check their prices as you go through the checkout line. If they are more than you want to pay, tell the clerk you don't want them.

Large Sizes Aren't Necessarily the Best Buy. Carry a calculator with you (or do the math with pencil and paper or in your head) to compare prices. Figure the price per ounce or pound or whatever the measurement may be. Large sizes can be more expensive per unit than the smaller sizes.

Fiddling with the Package Size. Sometimes the corporations keep the price the same, while they reduce the amount in the bottle, can, or package.

Big Displays Aren't Always the Best Buy. A big display only means the store bought a lot of something. The price may be a big deal or it may be a no deal. The only way to know is to compare prices.

Brand Name Games. Big corporations spend billions of dollars to convince you that Brand X is better than Brand Y. In reality, the brand name and the generic or store brand often come from the same food factory, they just get different labels on their way out the door. You can pay extra for the brand name, or buy the store

or generic brand and pocket the difference in price.

Coupon Games. This is the first cousin to Brand Name Game. Even with a coupon, the item may be more expensive than the store brand. If you just have to have the name brand, coupons are better than nothing. Don't fool yourself that you're getting the best deal. Stores that offer double coupons may have higher prices in general than other stores. The best strategy is to compare prices.

Look high and low on the shelf. Stores put the high-priced items at eye level on the shelf. Low-priced items will be either high or low on the shelf. Sometimes the low price item has an aisle display of something else in front of it so you can't see the better deal.

Meat Goes Down, Canned Goods Go Up. There's no such thing as a free bag of groceries. If meat prices are low, the prices of canned goods have probably gone up. If canned goods are cheap, the meat is expensive. This changes every week. Buy extra supplies when items are on sale. If you can keep at least a month's worth of basic groceries on hand (more is better), you insulate yourself from these regular "price mood swings" at the grocery store. If canned goods are high, don't buy canned goods that week, wait until they are cheaper. One tactic to help you beat this game is to keep a price book. It could be as simple as stapling your grocery receipts in a notebook. Or you could enter the information into a spreadsheet to review before you go shopping. You will discover that your local store has a regular schedule as to when its items go on sale.

Watch out for the 1st and the 15th of the month. In the United States, many people get government benefits and paychecks on these dates. Stores nearly always have some great deals at these times, but other items may go up. While you can take advantage of the deals, you may want to wait for the rest of your list. Watch the price of powdered milk at these dates and just before. Geography counts: powdered milk is often much less expensive at suburban stores. Food storage helps you even out the peaks in grocery prices.

The Snack Food Game. The biggest money-losing games - the absolute worst deals - in the grocery store – are the snack foods. You pay a big price for a few cents worth of popcorn and sugar or potatoes, grease, and salt. No, I am not against treats. I just know that it is always cheaper, more tasty and healthy to make your own snack foods. When it gets to the point that you need a chemistry degree to decipher an ingredient list, that's the time to learn to make your own treats.

Look for alternative ways of getting food. Shop at farmers markets, or join a food cooperative that features local producers, and maybe grow some of your own food. Gardening is like finding money growing in your back yard. If you don't have land, learn about container gardening. Look for a community garden.

Don't blame the grocers too much. They are just trying to make a buck like everybody else. They profit from the fact that people have more money than time and/or they've never really learned how to cook. Some of the problems (especially in the meat and deli sections) may be caused by customers moving things around.

But **don't be fooled by the merchandising games.** The store has a legal right to price its merchandise. You have a legal right to buy or not buy the merchandise. The store won't go broke because you decided to get a better deal and save money. By shopping smart, you encourage grocers to offer real deals, not trick deals. Genuine deals are out there. You must look carefully, with your eyes wide open and your calculator and pencil in hand,

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02121Frugal Shopping

"The need for social interaction ... is very much a part of why women shop. All our interviewees commented at some point that social interaction was part of the shopping experience. Many people now live alone in 'dormitory' suburbs, are often working from home or in isolated jobs, may be home with young children or part of the aging population of retiring baby boomers. All these groups need social connection, and shopping strips and malls provide many opportunities for reliable, safe and interesting social connections." – *Stella Minahan, Michael Beverland*

You too can find fun and fortune by avoiding grocery merchandising tricks! Here are 15 Shopping Rules that save you money!

The First Rule Is: **STAY OUT OF GROCERY STORES.** Of course, you think you have to go to the store to buy food, but remember this bit of commercial truth: the more times you go to the store, the more money you will spend. Organize your shopping to limit the number of trips to the store. Never go to the store for "just one thing." Buying food directly from farmers and growing some of your own food are two ways to avoid or limit your trips into grocery stores.

The Second Rule is: **Plan Carefully.** Plan every meal including your snacks. Add up the list of ingredients and make a shopping list from that plan. Buy only those items on your list. Never go to the store without a list. Beware of impulse buys.

Rule the Third: **Scout the Territory.** Check the advertisements for specials. If there are two or three stores close by, each with good deals on various items you want to buy, cherry pick the best deals in the individual stores.

Eat Before You Shop. Never go to a grocery store hungry. Shop after a meal or a big snack.

If you have kids who watch television – **Don't Take Them Grocery Shopping.** Television programs kids to say – "Mommy, buy this" – during shopping. Yielding to whining is a good way to go broke. The items advertised on TV are almost always the most expensive items. Teach your kids to ignore television advertising. All kids need to learn discipline and responsibility and this is one way to teach them these important values. Show your kids how planning meals and snacks, and shopping smart, is part of what it takes to succeed in life.

Keep Track Of What You Buy. Using a calculator and/or pencil and paper, keep a running total of everything in your basket. That way you know what you've bought and how much you have left to spend from your budget.

Avoid The Name Brand Game. And its first cousin, the **Coupon Game**. Buy the store brands, unless a price comparison brings the big brands or the coupon deal into competition. Coupon items are often more expensive than store brands, even when you include the value of the coupon. Stores that offer "double coupons" often have higher prices in general.

Avoid Prepared Foods. Learn to Cook. You deserve first class meals. Prepare

your meals from basic ingredients. Make your own sauces and gravies, snacks and meals from basic ingredients. You pay a premium price when you buy prepared foods that are inferior in taste and nutrition to those you can prepare yourself for your family.

Watch Out For The Snack Food Games. The lesson is: You can have two or three times the snacks at one fourth the price. Make your own snack foods. Get the kids involved! It's more fun, more better tasting, more healthy, more nutritious, more money left for other things. There is no snack -- from potato chips to sugar-coated popcorn, and on past pizza, burritos, and bean dip - - that you cannot do a more better job with yourself.

Meat-Smart Shopping. A value priced roast -- slow cooked in water, seasoned with onions, celery, carrots and pepper -- is every bit as tasty and as tender as the big bucks roast and the high priced steak. A better way to buy meat is to find local farmers and buy meats through them. If you have to buy supermarket meats, my advice is to eat less meat due to the grave concerns about the production practices involved with supermarket meats. Regarding supermarket chicken, our best advice is "don't buy it under any circumstances," even though it is often really cheap. If you could follow a supermarket chicken from egg to market, you would understand why we say this, and why it is cheap.

Cheese Hints. Sliced or shredded cheese is rarely a good buy. Sliced cheese packaged in individual cellophane packages is a worst buy. The cellophane isn't for convenience, the product is so low in quality it won't keep together unless individually wrapped. For sandwiches, a cheese slicer saves you money. For the convenience of grated cheese, buy a pound and grate it all at once! Remember, a lot of the products sold as "cheese" in a supermarket really aren't cheese. They are cheese-flavored manufactured food-like substances. It is only courtesy of an act of Congress that they can be referred to as "cheese." Buy real cheese and slice it yourself.

Don't Shop In A Hurry. Good shopping takes time. You'll want to compare prices, check out more than one store, etc. Why not enjoy your shopping excursion?

Watch Out For Non-Grocery Items. Do you really need to buy these products at the grocery store? Are they perhaps cheaper at a dollar store or discount center? And consider using alternatives to expensive packaged cleaning products, such as bleach to clean toilets and porcelain sinks, baking soda to clean the refrigerator, and ammonia for floors, walls, ovens. Warning: never mix chlorine bleach or cleanser with anything other than laundry soap as it can produce dangerous fumes when combined with some other products.

BAKE YOUR OWN! Avoid the high priced bread section at supermarkets, make your own breads, pies, cakes, cookies, and other such goodies. Teach the kids to help. Tastes better, costs less! If you must buy bread, go to the local bakery outlet/bread store and purchase your bread items there. No, you don't have to have an oven to bake bread. You can make stove top flat breads with any recipe for bread. Pinch off a piece about the size of a golf ball, flatten it, bake it a couple of minutes on each side on top of the stove in a hot skillet. Voila! Flat breads! Naan! Whatever you want to call them, make extra because everyone will want more and will gobble them up as fast as you can make them. If you know how to do this, you will be a hero to friends, family, and housemates.

It's OK To Save A Few Cents. Save a few cents on every item, and it adds up. Since money is scarce, you can use that "free" money for other necessary items.

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02131Bread

"The smell of good bread baking, like the sound of lightly flowing water, is indescribable in its evocation of innocence and delight... it is one of those almost hypnotic businesses, like a dance from some ancient ceremony. It leaves you filled with one of the world's sweetest smells... there is no chiropractic treatment, no Yoga exercise, no hour of meditation in a music-throbbing chapel. that will leave you emptier of bad thoughts than this homely ceremony of making bread."
– *M.F.K. Fisher, The Art of Eating*

Some say that "Bread and Beer" made civilization possible. We'll leave beer for later, and talk about bread for now.

Some folks think baking your own bread is somehow complicated. But people invented bread baking a long time ago. So, how difficult can it really be?

It takes less of the cook's time than –

– getting into the car,

– driving across town to a grocery store,

-- finding a parking place,

– hiking across a forty acre parking lot,

– finding the bread section – always located as far as possible from the front doors,

-- standing in line to pay.

– All this work so you can buy a cheap loaf of inferior bread.

There are about ten million different recipes for bread. My focus is on the basics. One of the fun things about baking bread is that even if you make a mistake, the result is so much better tasting than anything you buy at the grocery store that everyone will think you are a genius. Bread making may not be the answer to life, the universe, and everything. It isn't making nuclear bombs and destroying the rain forests either.

If you learn how to make bread, you will be popular forever with friends, family, and housemates. You will never lack for an inexpensive gift that will be treasured and savored without exception.

When it comes to making bread, it doesn't matter how much or how little of a kitchen you have.

While we mostly think of baking bread in an oven, bread can be baked on top of a stove, on a hot plate, a griddle, or in a crockpot. Even if you live in a dormitory room with no kitchen, you can make your own flat bread and cook it on a hot plate or electric skillet. You can bake a loaf of bread in a crockpot! (You'll have lots of friends when you do this. They will all want to help you eat the bread.)

And make it you should, there can be no doubt about that. Once you've done it a few times, it is so simple you'll wonder why everyone doesn't make their own bread.

Here are five reasons you should bake your own bread:

Taste – there is nothing quite like the taste of freshly baked bread, still warm.

Food safety – when you read the list of ingredients of an ordinary typical loaf of

white bread sold in a supermarket, you'll need a degree in chemistry to understand what's happening in your food. Consider this list of ingredients for a loaf of store-bought whole-wheat bread. Besides ordinary non-scary things like flour, water, oil, salt, and yeast, we have:

– mono and diglycerides,
– exthoxylated mono and diglycerides,
– sodium stearoyl lactylate,
– calcium iodate,
– calcium dioxide,
– datem,
– calcium sulfate,
– ammonium sulfate,
– dicalcium phosphate,
– diammonium phosphate,
– calcium propionate.

And then there is the dreaded high fructose corn syrup. Blecch. . .

Better for the environment, starting with "not wrapped in plastic" and going on to "wheat bought directly from a farmer," if you can manage that. That's easier than you think in most areas.

Makes you popular with friends, roommates, and spouses. If you can bake bread, you will be a popular person when mealtime comes around.

Home baking is frugal. A decent one-pound loaf of bread can easily cost you three dollars or more at a supermarket. A cheap loaf of balloon bread, will cost you at least $1.50. Certified organic wheat flour, bought directly from a farmer, or even at a grocery store, is around sixty cents/pound. That's the primary cost of a loaf of home-baked bread. Multiply that out over a year, and see how much money you can save.

The Simplest Method for Baking Bread

The simplest and quickest method for baking bread is, in general, known as the "No-Knead Method." It is popularized in the "Artisan Bread in 5 Minutes" book. This method saves time because you make more dough than you need for one loaf with this method and keep it in a covered bowl in your refrigerator. You can have fresh-baked bread every day without having to make dough every day.

IMPORTANT NOTE ABOUT HANDLING DOUGH: Before handling dough, put cooking oil on your hands. This makes the dough-handling process much easier. Replenish the oil as necessary to keep the dough from sticking to your hands.

Miscellaneous Dough Mixing Note: Always add wet ingredients to dry. Don't add dry ingredients to wet.

Ingredients

– 3 cups water (just a little above body temperature, warm like a baby's bottle),

– 1-1/2 tablespoons yeast,

– 1 tablespoon salt (or to taste)

– 6-1/2 cups of whole wheat flour. Or white flour. Or half whole wheat, half white.

This will make enough dough for about 4 one-pound loaves of bread.

Mix all the ingredients, let rise at least 2 hours in a covered bowl. You can use it for bread-making any time after 2 hours, but it will be easier to shape if it sits in the refrigerator for at least three hours.

Make the dough in a covered container that you can put in the fridge. This should not be an air-tight container, as the dough will give off a small amount of gas as it sits. If it is an air-tight container, when you put it in the refrigerator, cover it loosely – just set the lid on, without clicking it in place to produce the air-tight environment. It will give off small amounts of gas as it sits in the refrigerator and you don't want your container to explode.

You can keep dough in this way in the refrigerator for as along as a week. Use it as you need it.

To make **skillet flat breads** from this dough:

Pinch off pieces of dough, about the size of a golf ball, and roll them flat with a rolling pin, or pat them flat in your hands, pulling and stretching them a bit.

The dough is a little sticky so I sprinkle the rolling pin and surface with extra flour and dust the ball of dough with flour.

Cook on a flat cast iron skillet, with just a bit of oil, on each side until done, medium-high heat, about 2 minutes each side.

To make a **round loaf** with this dough:

Sprinkle a flat cookie sheet (no sides) or a flat cutting board or a baker's peel (if you have one) with some cornmeal. Don't be stingy with the cornmeal. The cornmeal keeps the dough from sticking to the pan.

Dust your dough with some flour, then cut off a one pound piece. This is a piece of dough about the size of a grapefruit. Use a serrated knife.

Form the dough into a ball. Gently stretch it and wrap it under itself. If you look at the bottom, it will look like four folds. These flatten out during the rest of the process.

Put your ball of dough on your cutting board/cookie sheet/peel. Let it sit about 40 minutes.

Preheat the oven to 450 degrees for 20 minutes of preheating. If you have a baking stone, or an unglazed quarry tile (the "unglazed" part is really important), put it in the oven. Put an empty pan with sides on a lower shelf in the oven.

If you don't have a baking stone, the next best pan is cast iron.

If you don't have cast iron, use a regular cookie sheet. With the cookie sheet, it will help to put the dough on parchment paper, which most grocery stores sell. Preheat the cast iron and the cookie sheet in accordance with the instructions for the baking stone.

At the end of 20 minutes oven preheating, sprinkle some flour on top of the dough, and using your serrated knife, slash the dough about 1/4 inch deep across the top. You can make a cross, or a tic-tac-toe pattern, or several parallel cuts.

Open the oven, and in a quick forward jerking movement, slide the dough onto the stone (or into the pan) and pour a cup of water in the empty pan on the lower rack. Close the oven door quickly to trap the steam inside. Bake for about 30 minutes, or until the crust is dark and firm. Remove the bread from the stone (or pan) and place on a wire rack to cool. Allow it to cool before slicing because the baking continues inside the loaf. If you cut it too quickly, it will remain doughy inside. Waiting for the loaf to cool is the hardest part of baking.

How to bake bread in a crockpot –

http://www.artisanbreadinfive.com/2012/05/29/crock-pot-bread-baking-fast-bread-in-a-slow-cooker

To make hot rolls with this dough:

Pinch off pieces of dough about the size of a golf ball.

Place on a baking sheet and let sit for about 30-45 minutes.

Bake at 450 degrees for about 15 minutes until golden brown and done.

Additional resources for this method of baking bread are:

http://www.motherearthnews.com/Real-Food/Artisan-Bread-In-Five-Minutes-A-Day.aspx

The website for the authors of the Artisan Bread in 5 Minutes/Day is http://www.artisanbreadinfive.com/. It has lots of FAQs, a blog, online discussion, and recipes.

One of my favorite bread sites is Breadtopia – http://www.breadtopia.com/

– a rich site with deep wisdom on baking which also has video tutorials.

A More Traditional Bread Recipe

The information below is the basic way that I made bread for decades before learning about the Artisan Bread method.

There are different ways and techniques to bake bread using a thousand different ingredients. The recipe below is for a basic white bread loaf from the recipe taught to me by my grandmother Opal Marie Newsome Cassidy. It works nicely as a hot roll instead of a loaf. If your family isn't used to whole wheat breads, start your transition to baking your own bread with something they are familiar with – the basic "white bread."

Buy yeast at a bakery supply store or large warehouse store. It is much cheaper in bulk than the little packets sold in grocery stores. Depending on your local market conditions, you will find a better deal for yeast at bakery supply stores or a warehouse grocery. A standard industry package is two one-pound containers of yeast packaged together and sold as a unit. Once opened, store unused yeast in an airtight jar. If you aren't going to use it often, keep it in the refrigerator.

An even more frugal strategy is to make sour dough breads, then you don't have to buy yeast!

Your Basic Bread Recipe

This kind of bread takes more time than the "Quick Breads," because it has to "rise." The actual involvement of the cook is about 15-20 minutes, max. Bread is basically liquid, flour, oil, and yeast. The various possible combinations of these ingredients produce the different kinds of breads. Once you understand the Your Basic Bread recipe, feel free to experiment.

Begin by measuring into a large mixing bowl 1 cup of warm water -- and the emphasis here is warm, not hot, about the temperature of a baby's bottle.

Add 1 tbsp of sugar, stir to dissolve.

Add 2 tbsp of yeast (or two packets). Sprinkle the yeast onto the top of the entire surface of the water, so the little yeast buds are all moistened. Let this sit for about five minutes. The yeast will begin to bubble and form a foam on the top of the water. What's happening is that the little "yeastie beasties" are busily going to work, doing what they do. It's called a bloom.

Add 3 tbsp of oil or melted (and cooled) butter, 1 cup milk, 1 tsp salt (or less, depending on personal taste), and 2 more tbsp of sugar or honey.

Mix well, add three cups of flour and stir 50 times clockwise, and 50 times counterclockwise, or use your mixer for 2 minutes. The "100 stirs" is a bit arbitrary, that's what my grandmother said, probably based on something her mother told her. You want to mix the batter well so the gluten does its job in the flour. If you have a mixer, you can use it on low for this step. Mix about a minute with the mixer. At the end of this step, when you dip a spoon in the batter and raise it out of the bowl, the batter kind of strings its way off the spoon back into the bowl. You can use a hand mixer for this step.

Add another 3 to 4 cups of flour and mix until the dough forms a good ball, coming away from the sides of the bowl. (You may need to add a little more flour.) Turn the dough out of the bowl onto a floured surface and let it sit for ten minutes (if you are in a hurry, you can skip this waiting time.) Knead the dough five to ten minutes. If you have a dough hook for your stand mixer, you can use that for five minutes. The dough should be just a little bit sticky. If it is too sticky, however, sprinkle with flour during the kneading process. The perfect "feeling" is "like a baby's butt."

To knead the dough, flatten the dough and fold it over, pressing on it with your hands. Turn the dough on its side and do the same thing. Flatten, fold, press, turn – flatten, fold, press, turn and so on and so forth for about five to ten minutes. Get the kids involved here.

When you have finished kneading the bread, roll it into a big round ball and put it in an oiled bowl, rolling the dough around in the bowl so a thin film of oil covers the dough, and cover the bowl with a cloth or paper towels. This keeps the dough from drying out as it rises. Cover the bowl with a towel.

Let it rise in a warm place for about an hour. It should double in size (that's those little yeastie beasties doing their job). "Pat down" the dough. That is, open your hand and pat it a few times on top to deflate it. It goes “poof” and the dough flattens out a bit. That's OK. It's what it's supposed to do. Let it rise again until almost double, for about another 30 minutes. Rising times can vary depending on the temperature and humidity. A sunny space on the counter is a great place for dough to rise.

Divide the dough into two equal parts and let it rest for 10 minutes. Shape into loaves and put into pans. Let it rise again, until sides of dough reach the pan and the top is well rounded (30 minutes to 1 hour). Be sure to grease the loaf pans first. (Shortening is best for greasing any baking pan, that's about the only thing it’s good for.)

To make dough into loaves:

Flatten it into a rectangle. The width should be about an inch longer than the length of the pan, the length should be about 12 inches.

Fold dough in half lengthwise.

Flatten into a rectangle about 15 inches long and five inches wide.

Press down on dough with hands. Fold in thirds by overlapping the ends.

Press with your hands. Fold toward you, 1/3 of the way at a time, pressing on each fold with the heel of your hand, to form a round cylinder with the dough.

Roll back and forth.

Seal each end by pressing with the edge of your hands. Smooth the loaf with your hands so it is even. Put in a nine-inch loaf pan with the edge down.

Bake the loaves at 425 degrees for about 25 to 30 minutes. The loaf pans should not touch each other or the sides of the oven. To test for "doneness,” tap the crust. It should sound "hollow.” If it doesn't, bake a few minutes more.

When done, immediately remove the loaves from the pans. Set on wire racks or across the edges of the loaf pans so that air can circulate around it. Let it cool before slicing and eating. Do not skip this step. If you slice freshly baked bread too quickly, the inside remains damp and "doughy.”

Brush the baked loaves with melted butter after removing them from the pan, to make a soft, tender crust.

TIPS FOR MAKING WHOLE WHEAT BREAD

Fresh flour is important! The best homemade bread is made from freshly ground whole-wheat bread. One issue with store-bought whole wheat flour is freshness. Since whole wheat flour sells in smaller quantities than white flours, it may sit on the shelf for a while. Furthermore, whole wheat flour, being a live food with all of the natural oils of the original grain, should be stored refrigerated. I was never satisfied with my whole wheat bread baking that I did with whole wheat flour bought from a store until I got access to freshly ground whole wheat flour. A home grain mill is a good investment.

If you add dairy, instead of plain milk I always use buttermilk, yogurt, or sweet milk with some vinegar added (about a half tablespoon per cup and I let it sit a couple of minutes before using). *Sour liquids are best with whole wheat flour*.

It's OK to *mix some white flour with whole wheat flour*. Especially at first, if your family isn't used to whole wheat breads, make your doughs with half whole wheat and half white flour. Use a

non-bleached, organic white flour if you can find it.

In the summer, when maybe you don't want to heat up the house by running the oven, *make stove-top flat breads.* Take a pinch of dough, about the size of a golf ball, and roll it flat like a tortilla. Cook quickly on a griddle or flat-bottomed pan, with just a drop of oil. Flip once to cook it on both sides. We like this so much we make it year round, as it is a quick way to have homemade bread. I make a big batch of dough once a week and make flatbreads all week long.

Some Fun and Tasty Variations.

To make **raisin bread,** add one cup raisins to the dough when you knead it.

For **sweet roll dough** (such as for making cinnamon rolls), increase oil or butter to ½ cup, add 2 beaten eggs, increase sweetening to ½ cup, use 1-1/2 cups milk, reduce water to ½ cup. Make into desired rolls after the second rising.

For a slightly more elegant **Dinner Roll,** prepare dough according to the sweet roll recipe, except – don't add extra sweetener, use 1 cup water and 1-1/4 cups milk. Dinner rolls bake in a 400 degree oven for 15 to 20 minutes, until golden brown. Form dinner rolls by rolling dough into small balls (after second rising), let rise a half hour, then bake.

Potato Rolls: add 1cup mashed potatoes to the water and yeast. This makes a good dough for keeping in the refrigerator for use as needed. Save water from boiling potatoes and use it to make bread. Just add in place of regular water.

For **Crescent Rolls,** after first rising, divide dough in half. Roll each half into a circle, spread some melted butter over the dough. Cut like a pie, and roll each piece up starting with the large end first. Let rise until double, bake at 400 degrees until golden.

Stuffed Crescent Rolls. Make Crescent Rolls as above, only before rolling up, spread dough with some kind of filling (sweet or savory), roll up, let rise, and bake.

Freezing bread: Use good freezer bags or freeze in glass mason jars. Allow about 3 hours to thaw a 1 pound loaf of bread. Slices of frozen bread can be toasted in the toaster without thawing. Frozen rolls and biscuits can go directly from the freezer to the oven. Heat in a slow oven (275-300 degrees) for 10 to 15 minutes.

Cinnamon Rolls

– Sweet roll dough

– sugar

– cinnamon

– melted butter

Roll sweet roll dough into a rectangle, spread with melted butter, sprinkle with sugar and cinnamon. Roll up and pinch seam to close (sometimes it helps to dip your fingers in water as you pinch the seam). Cut into 1 inch rolls. The best way to do this is to slice the dough with a thread or dental floss. Holding the string in both hands, slide it underneath the roll of dough, then cross your hands so the thread pulls through the soft dough.

In a 9 X 13 inch pan, mix together the following: ½ cup butter (melted), ½ cup brown sugar, 2 tablespoons honey. Coat the bottom of the pan with this mixture. Set the cinnamon rolls in the pan (don't crowd them). Let rise for 30 minutes or so. Bake at 350 degrees until done, about 20 to 25 minutes. This makes a cinnamon roll with a crunchy caramelized bottom. If you don't want the crunchy bottom, just place rolls in a greased pan to rise and bake. When you make this recipe, be sure to double it, or you won't have any left over to have with your coffee the next day.

MAKING BREAD IS EASY AS ONE-TWO-THREE-FOUR!

1. Put 1 cup of warm water plus one tablespoon sugar in a mixing bowl. Add two tablespoons of yeast. Let sit for about five minutes.

2. Add 1 cup of milk, dash of salt, 2 tablespoons of sugar, 3-4 tablespoons of oil or melted (and cooled) butter, and 3-4 more cups of flour, as needed. Stir 50 times clockwise, and 50 times counterclockwise.

3. Add another 3 to 4 cups of flour and mix until the dough forms a good ball. Turn dough out of the bowl onto a floured surface and let it sit for ten minutes. Knead the dough for 5 to 10 minutes.

4. Let rise in a greased bowl for about an hour (it should double in size). Punch down the dough. Let it rise again for 30 to 45 minutes. Divide into two equal parts and shape into loaves. Place in loaf pans and bake at 425 degrees for about 25-30 minutes.

Homemade Bread for Busy People

Originally written in 2004, this anticipated the Artisan Bread method.

Make a big batch of dough once each week & keep it tightly covered in the fridge. Each day, take some out, form into biscuits, buns, or loaves, let rise, and voila, daily home-baked bread. Use more yeast (up to double) for refrigerator dough.

Quick Breads

Quick breads use baking powder and/or baking soda to make the flour rise and are ready in less than 45 minutes, start to finish. Dry ingredients can be assembled ahead of time into mixes and they are convenient, nutritious, and oh so tasty. One of the secrets to good quick breads is to thoroughly combine the fat and the flour. You can use a mixer to do this. You can substitute whole wheat flour for white flour in any of these recipes. Food scientists tell us that you never need more than 1 teaspoon of baking powder per cup of dry ingredient (many recipes notwithstanding). With baking powder, more is not necessarily better.

Best Basic Buttermilk Biscuits

– 2 cups flour

– 1/2 tsp baking soda

– 3-4 tbsp butter or oil

– 2/3 cup milk plus ½ tablespoon vinegar or – 2/3 cup buttermilk or 2/3 cup evaporated milk plus 1/2 tablespoon vinegar

– 2 tsp baking powder

– 1/2 teaspoon salt

Mix dry ingredients, add butter (or oil), mix thoroughly. Mix vinegar with milk, let it set for few minutes, add to dry ingredients (or use real buttermilk). Knead about 20 times. Roll11/2 inch thick, cut into biscuits, or form by hand into buns. Bake at 400 degrees for 10 to 12 minutes. This basic recipe can be used as a topping for casseroles, meat or vegetable pies, and with extra sugar can be a quick raised cinnamon roll dough. Using evaporated milk instead of whole milk adds a nice texture to the finished biscuits.

As an alternative to baking in the oven, you can make flat bread with biscuit dough and bake it on top of the stove (or on a hot plate) with a skillet, as described above in the yeast flat bread section.

Or just deep fry the biscuits and drizzle them with honey. Hehehe.

Best Biscuit Mix

– 6 cups flour

– 3/4 cup oil or butter

– 6 tsp baking powder

– 1-1/2 tsp salt

Mix dry ingredients, add oil or butter, mix well. Store in a tightly covered, airtight container, in a cool place. This makes enough for 3 bakings of biscuits.

To make biscuits for 3 people, combine 2 cups mix with 3/4 cup milk or buttermilk.

For dumplings, use 1 cup biscuit mix ½ cup milk, and add 1 beaten egg. For cheese biscuits: add ½ cup grated cheese to recipe for biscuits.

Cornbread

– 2 cups corn meal

– 2 tsp baking powder

– 1-1/4 cup milk or buttermilk

– 4 tablespoons oil

– 2 eggs, beaten

Mix dry ingredients, add oil or butter, mix thoroughly, beat the eggs in the milk, add to dry ingredients, stir quickly and thoroughly. Bake in 400 degree oven until done. To test for doneness, insert a knife into the middle, and if it comes out clean, the cornbread is done - takes about 20-25 minutes. Instead of baking, you can cook this batter like pancakes on a griddle.

Don't add sugar to cornbread. The fall of Western Civilization began when people started adding sugar to cornbread.

Dumplings

– 1-1/2 cups flour

– 3 tbsp butter

– 1-1/2 tsp baking powder

– 3/4 cup milk

– dash of salt

– 2 eggs

Mix dry ingredients, add butter and mix thoroughly. Beat the eggs in the milk and add to dry ingredients. Stir only until blended. Drop by spoonfuls into boiling soup. Reduce heat, cook slowly for ten minutes with kettle covered and ten minutes uncovered.

Quick Cinnamon Rolls

Add 4 tablespoons of sugar and 2 tablespoons oil or butter to 2 cups Biscuit

Mix, add 2/3 cup water and mix thoroughly (or use your favorite recipe for biscuit dough).

Roll dough into a rectangle, 1/4 inch thick.

Spread dough with 2 tbsp melted butter.

Sprinkle with mixture of 1/4 cup sugar and 1-2 tsp cinnamon, add raisins if desired.

Roll up, beginning at the wide side, and seal the seam well by lightly wetting and then pinching the edge of the dough.

Cut into 1" slices using a string. (Loop the string under and around the dough, cross over the top, and pull, voila, quick sliced dough.)

Place cut side down on greased baking sheet or in greased muffin cups. Bake in 400 degree oven about 12-15 minutes. Spread with Quick White Icing. Makes about 16.

Your Basic Muffin

– 1 egg

– 2 cups flour

– 1 cup milk

– 1/4 cup sugar

– 2-3 tbsp butter

– 2 tsp baking powder

Mix dry ingredients together. Beat milk and egg, stir melted butter into dry ingredients, add milk to dry ingredients. Stir fast until flour is moistened. Batter will be lumpy. Do not over mix. Fill greased muffin cups 2/3 full. Bake 20 to 25 minutes in 400 degree oven. Makes 12 medium muffins.

Variations:

Jelly - fill muffin cups half full of batter, drop a scant teaspoon of jam or jelly in center of batter, add more batter to fill cup 2/3 full.

Blueberry: Add 3/4 to 1 cup blueberries, fresh or canned.

Apple: Add ½ tsp cinnamon to dry ingredients, add 1 cup grated raw apple, decrease milk to ½ cup, decrease flour to 1-1/2 cups. Make 25 to 30 minutes.

Maple syrup muffins: Substitute ½ cup maple syrup for ½ cup of the milk.

Cocoa Muffins

– 2 cups biscuit mix

– 4 tbsp cocoa

– 1 egg

– 1/4 cup sugar or honey

– 2/3 cup or water

Beat egg slightly, mix dry ingredients, and egg and liquids, stir until moistened. Fill muffin cups 2/3 full. Bake in 400 degree oven for 15 - 18 minutes. Makes about 12.

HOW TO MAKE AND MAINTAIN A SOURDOUGH STARTER

Ingredients:

– 1 cup flour

– 1 cup water (or more, enough to give it the consistency of pancake batter)

Use a glass container that will hold at least 3 times the volume of the ingredients (like a large mason jar). Mix the ingredients vigorously with a wooden or plastic spoon to incorporate air into the mixture.

Loosely cover the jar with a cloth set it in a warm place. A temperature of 70-80 degrees is ideal. If it is cooler that's fine, it will just take a bit longer. Every day feed it with ½ cup of flour mixed with ½ cup of water. When it gets bubbly-frothy, it's done! There will be a pleasant beer-sour smell. This will take maybe 3-4 days, or less, or more. It's not an exact "same thing every time" event. That's about as simple as it gets.

Generally refrigerate the starter, using a container with a loose lid. If you're using something like a mayonnaise jar, put a little pin hole in the lid. The batter slowly gives off gases, and you don't want pressure to build up in the jar.

If civilization crashes, or there is a prolonged power outage, however, sour dough starter does just fine outside of the refrigerator as long as you use it regularly, like every day. This is what our great-grandmothers did. If civilization crashes, you will want to use the sour dough starter every day, assuming you stored wheat or have other access to flour.

Never use all of the starter. Take out 1 cup starter to use in a recipe. Add a half cup of water and a half cup of flour back to the starter.

Alternatively, make extra "sponge" (the first step of sourdough baking, more about that below), and replenish your starter with one or two cups of that. If you want to increase the amount of sourdough start, add more flour and water.

From time to time, some liquid may separate out from the starter and rise to the top, just mix that back in with the starter. Or if your start is rather runny, you can drain it off. It's booze, btw, a/k/a alcohol.

Use it regularly! That's what its for. If you use it daily, you will want two or three times the daily amount you use. You can start with a larger amount of flour and water or increase the amount as you feed it.

To adapt a standard recipe to use sour dough, eliminate any leavening (baking powder, soda, or yeast) and an equivalent amount of the liquid and flour. Most people make a start that is half flour and half water so one cup of starter equals a half cup of flour and a half cup of water..

> If you add 1 cup sour dough starter, and the recipe calls for two cups liquid, add 1-1/2 cup liquid plus 1 cup sourdough starter. Reduce the amount of flour by 1/2 cup.

Sour dough products take a longer to rise than those leavened with commercial yeast so allow for that.

The general rule of thumb is that one cup of sour dough starter is about the equivalent of one packet of yeast (which is about a tablespoon of yeast).

Yes, you can use whole wheat flour for a sourdough start. Some folks wouldn't do it any other way.

If you do not bake with the sourdough regularly, feed it a half cup of flour and a half cup of water every week. Sour dough is populated by living yeastie beasties! They must be fed!

Sourdough starts can last for decades, if used regularly and/or fed appropriately. It is a colony of living organisms, your own personal kitchen assistants that help you prepare wonderful baked goods for your family.

Online resources for sour dough baking.

http://www.nyx.net/~dgreenw/sourdoughfaqs.html

http://www.preparedpantry.com/recipehowtomakeeasysourdoughbread.aspx

http://www.joejaworski.com/bread/bread1.htm

http://www.scientificpsychic.com/alpha/food/sourdough-bread.html

http://www.artisanbreadbaking.com/breads/sourdough_12_20/sourdough_12_20.htm

Some useful bread-making equipment:

You can bake bread with nothing more than a pan to put the bread in and an oven to bake it. If you don't have an oven, you can make flat breads on a skillet on a stove top or electric hot plate. There are a few items that will enhance your bread making experience.

A hand crank flour mill. These start at $25 used at flea markets and swap meets and run $50 and up brand new. The reason these are helpful is that the best bread uses freshly ground wheat. Whole wheat flour doesn't sell as quickly as white flour, and unless you can decipher the arcane brand markings, you have no way of knowing how fresh the flour is. It's cheaper to buy organic wheat at farmers markets, or at a store with a bulk food department, than it is to buy organic flour. Organic whole wheat flour needs to be refrigerated to keep fresh, and you rarely see that at stores. Keep your eyes open for a good deal and get yourself a hand crank flour mill. If you have extra bucks, you can get an electric mill. Buy one with a hand crank so if the power is out, you can still grind flour. You'll need to grind 6-7 cups of wheat to make four loaves of bread, or one cup of wheat to make a half dozen biscuits. Everyone doesn't need to personally own one. You could own one in conjunction with some neighbors. Organizations like churches could buy them and let people use them. And you can grind wheat without a flour mill, by using a coffee grinder or food processor.

A baking stone. These are around $35 and up. That's pricey, however, you only need one. A lower-cost version are UNGLAZED QUARRY TILES. These are typically ½" to 3/4" thick (thicker is better than thinner, 1 inch would be great). Absolutely make sure they are UNGLAZED. Clean them when you bring them home with water and baking soda, which is what you use to clean them after baking. Don't use dish detergent as the tiles or baking stones are absorbent. Look for these tiles at stores that sell tiles. Note that with a baking stone or tiles you are set-up to make a mighty tasty pizza.

A pizza peel. Use this to slide dough (or pizza) onto the hot baking stones. They run $10-$15, or you can use a small cutting board or flat cookie sheet for the same purpose.

Measuring cups. Most recipes measure ingredients by volume, so you need some measuring cups and spoons. Never forget that while cooking is an art, baking is a science. If you want to make dough in

larger quantities than double a recipes, you need to weigh the ingredients for the best results. If you will make large quantities of dough, you will need a kitchen scale.

Baking pans. If you're not going for the French artisan look, you'll want some loaf pans, cookie sheets, and muffin pans. You can often find these items value priced at thrift stores and flea markets.

Most basic – a hot plate and a skillet, for stove-top baking of flat breads.

MY NO MESS BREAD MAKING METHOD

by Vinay Gupta (from about 2003), used with permission of the author.

Tools: one small cup, two large (12?+) steel bowls, a baking sheet and a cover.

1. Ingredients: white flour, brown sugar, water, salt, olive oil and freeze dried yeast.

2. Fill one steel bowl to three inches deep with hot tap water. This is the heating bowl.

3. Put one cup of very hot, and one cup of cold water in the other bowl. This is the mixing bowl. You mix the water this way to get the temperature about right.

4. Add half a cup of sugar to the mixing bowl. Sprinkle yeast until the surface of the water is dense with yeast flakes. Stir.

5. Place mixing bowl into heating bowl, so that it floats in the hot water. Place somewhere warm and cover.

6. This allows the yeast a near-optimal environment to rise in: consistently warm and pleasant. Bread rises very fast and very evenly in such an environment, unlike the more usual hit-and-miss winter breadmaking experience.

7. Leave the yeast until it has a thick head like a beer. (say half an hour – if it doesn't do so, you killed it with too-hot water.)

8. To the foamed yeast, add half a cup of olive oil. Coat the sides of the bowl if possible.

9. Add six cups of white flour and about a teaspoon or two of salt.

10. Oil your hands. This is important.

11. Knead all ingredients in the bowl. At first the dough has uneven consistency, but as you first mix, then fold-in-half-and-flatten the dough repeatedly, it gains an even, smooth, pleasant texture. At some point it begins to get stiffer rapidly and as you fold, the surface tears. That's enough. This takes about five minutes.

12. Doing this in the bowl results in almost no mess unlike the regular approach of a floured surface. If things stick, add a little more oil. Using oil as the lubricant rather than dry flour completely changes the bread making experience from a dusty, powdery mess to a clean, elegant process.

13. Refill the heating bowl to three inches deep with hot water. Float the mixing bowl in the water, and cover again.

14. Once the dough has doubled in volume (half an hour – if it's taking longer, a warmer environment or more yeast!), briefly re-knead it into a nice ball, add more hot water to the heating bowl if it needs it, and leave it to rise again. If you intend to make more than one loaf, cut the dough into two parts at this point in the process and have each part rise separately.

15. Put your oven on about 350F to 400F (175C-200C and gas 4-6) to pre-heat

16. When the dough has reached roughly the size it had when you punched it down, oil a baking sheet and place the dough on it. Oil a little wider than the dough – it will spread. A series of half-inch deep, one inch wide slits in the top of the dough will result in a pleasingly crusty loaf – without them the surface is a little smooth.

17. Place in the oven for about half an hour. Over-done is a gives an very tough crust and is a little dry by the second day. Under-done is an inedible doughy mess inside the loaf. So wait until it's good and brown before you take it out.

19. Take the hot loaf, and flip it upside down. The crust will support it, and this allows the bottom of the loaf (where moisture can collect during cooking) to dry if it is a tad damp.

20. Result: one beautiful loaf.

21. Aftermath: and this is the good bit – there's one slightly oily steel bowl, one fairly clean baking sheet and a floury cup. And that's it. Messless bread making.

22. Total labor for the entire process is no more than twenty minutes including all preparation and clean up.

This may not seem like a big deal, but it is: the Incremental process improvements – knead-in-bowl, oil-as-lubricant, float-in-heating-bowl mean that I can actually bake regularly despite being an undomesticated lazy bastard. Incremental process improvements can produce discontinuities: I bake bread all the time!

There's a principle here about how many small aggravations in a process (flour everywhere, uncertain rising) can prevent it from actually becoming a regular part of life, and how tiny technological improvements can smooth those over. But it's not until you get the last kink out of the system that it flows.

Give this breadmaking algorithm a try – you'll love the bread and I think there's a lesson in the repetition of a process until it reaches refinement.'

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02141 Designing a Baking Station

"How can a nation be called great if its bread tastes like Kleenex?" – *Julia Child*

A baking station has everything you need to bake, conveniently located in one spot. In the training of classical chefs, they know this as "mise en place" which literally means "putting in place."

If everything you need for baking is already in one place, you eliminate one time-consuming aspect of cooking – finding everything you need. A baking station can be adapted to any cooking situation. In a dorm room inhabited by one or two people, it could be a box in a closet that you get out when you want to make some bread in your crockpot or flatbread on your electric skillet. In a full size kitchen, for a large household, it could be a dedicated place in the kitchen equipped with everything you need.

One way to learn permaculture design on the "lifestyle scale" is to do permaculture design for smaller projects, like this baking station.

Observe. What do you want to achieve with baking? What are your goals? What functions does baking require? What items do you need to bake? That list includes ingredients, cooking equipment, pans, measuring cups and spoons, maybe a food processor or stand mixer. Make a list, including the most common ingredients. Make a needs and benefits list – OK, this step might be considered overkill BUT you need to learn how to make a needs and benefits list anyway, so there is more than one function stacked on this basic project.

What do you do when you bake? What are the motions and tasks of baking? What space does baking require?

Do any of these motions or tasks fall into reasonably discrete categories? (Hint: don't forget "Clean up when finished.")

Who does the baking? One person by himself or herself? The whole family? Rotating jobs?

Where do you bake at present? How much does your baking require?

What beneficial connections are there between this activity and other activities/elements of your life and home?

Study and Evaluate. What is the source of the ingredients? Do you have the right equipment? Do you have the necessary skills? Do others need to learn these skills?

Do you have enough space? Need more?

How often do you bake? Do you want to bake more often? What do you like the most about baking? What do you like the least?

Will you design a temporary station, to be set up for each baking session and taken down after clean up? Or will it be a permanent place in your kitchen.

Are additional beneficial connections required or needed? For example . . . a local source for flour . . . a local source for dairy . . . an invisible structure to connect you with local flour and dairy and other ingredients (like a food coop or farmers' market) . . . people to bake for, etc.

Design. Make your design decisions based on your observation and evaluation.

Start with – if you don't bake, do you want to learn to bake? What skills and equipment do you need to acquire? If you don't bake, how will you get your bread?

What beneficial connections are there among the parts of this project?

What beneficial connections link this project and the rest of your lifestyle?

Where does this project live in your dwelling?

When will you do it?

What are the details?

How does this happen?

How can you do this with less fossil fuel?

Can you do this with no fossil fuel?

How will you do this if fossil fuel is not available?

Do you want to make changes to the sources of your ingredients?

Anything you can move down the Local Food Pyramid?

For practice and good design, run your testing questions from 00381 through this project.

Stage your decisions. What comes first when you implement your design decision? Middle? Last? Never mind the fact that this is a small design, put first things first and second things second and third things third. This gives you a feeling of what it is like to organize a set of tasks such as this.

Budget. If any of this will cost money, get some estimates and develop a budget. Decide on a source of funds.

Write the report. Write the report and add it to your permaculture design plan.

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02151 Zones in the Permacultured Kitchen

No one who cooks, cooks alone. Even at her most solitary, a cook in the kitchen is surrounded by
generations of cooks past, the advice and menus of cooks present,
the wisdom of cookbook writers." – *Laurie Colwin*

Permaculture uses zones as a way of analyzing and evaluating the uses of specific parts of a site. While the concept developed for application to homestead properties of several acres or more, the principles can be applied at any scale where you do permaculture design work, because zones are always based on the context and the central viewpoint of the designer..

The Basics section has documents on the topics of zones and sectors. The traditional permaculture zone system looks like this:

Zone 1 -- The area closest to the house and/or along frequently traveled pathways through the site. Design elements placed here are those that need the most frequent attention from the household's residents. E.g., "Plucking plants" like greens and salad makings, kitchen herbs, etc.

Zone 2 -- The area, not quite so close "to the back door of the house," where we put elements which need attention, but not quite as much as the Zone 1 elements. This could include some perennial fruit production (smaller trees, cane fruit, bushes, etc.), compost piles or bins, vermiculture projects, and annuals like corn or hot peppers or beans which don't require daily attention.

Zone 3 -- A larger area of food production which needs not-so-much attention, e.g., a wheat or hay field or a fruit and nut orchard of larger trees.

Zone 4 -- Semi-wild – forage for animals, firewood, semi-managed.

Zone 5 -- Wild – undisturbed by human management.

This isn't just a rhetorical construct to make things look tidy. Placement of elements and activities is an important aspect of energy conservation (remember human energy). These zones are not concentric circles (although in theory they could be). They may meander around depending on the lay of the land, the size of the site, and the typical pathways to and through the site.

Now let's look at the zone concept and apply it to your kitchen.

Kitchen Zone 1 -- The areas used most frequently. This is the traditional kitchen "work triangle" of refrigerator, stove, and sink, with a food prep area somewhere along these lines of travel. If you "watch yourself" while working in the kitchen, you will see that you go through this pattern many times during the course of a day's food production. This area should receive a lot of attention and study. As you prepare foods, do you spend much time looking for utensils and ingredients? Are there items you rarely use cluttering up the work triangle while other items, which you use frequently, are not conveniently located?

Kitchen Zone 2 -- As you continue to observe your food prep habits, you decide the location of the Zone 2 of your kitchen. What is the area of next-most-intensive

use? Possibly the food pantry and equipment storage? Shelves that are harder to reach?

Kitchen Zone 3 -- Compared to the intensity of use of the kitchen work triangle in zone 1, the traditional permaculture zone 1 (actual food production areas with plucking plants, herbs, annual plants that need frequent attention/harvest, etc.) moves to Zone 3. For those who have no land, we could reference a container garden in a sunny window or on a balcony or sidewalk with herbs and maybe a tomato or two and some salad greens and radishes. Don't discount the contribution that techniques like container growing, microgreens, and sprouting can make to your diet. You will be amazed at how much food you can grow in a small space. If you don't have any household food production, the Kitchen Zone 4 described below moves up to your personal Kitchen Zone 3.

Kitchen Zone 4 – These are the places where you source food you don't produce yourself which comes from your region. This would be farmers markets, cooperatives, and etc.

Kitchen Zone 5 –Food sources such as locally owned supermarkets carrying regional and store brands.

Using zones in your design.

Zones are important to help you develop a design that is comfortable for your family and that works well for household. The kitchen work triangle is the center of household activity in the kitchen. Make sure the intensive activities of this area are well planned and integrated into the design.

As you work with your maps, you may want to make cutouts of various elements so that you can move them around and visualize different configurations of the necessary/desired elements and systems.

By careful observation and design attention to the patterns of activity in your food systems, you can develop systems that make the work go easier and more productive, and conservative of human effort.

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02161 Converting a home recipe to a quantity cooking recipe.

The more you know, the more you can create. There's no end to imagination in the kitchen. – *Julia Child via Lynn Gilbert*

Quantity cooking is a way to save time in the kitchen by using a freezer to store prepared foods and meals.

You set aside an afternoon, or a day, or some other time frame, and you prepare a large amount of food.

Then you freeze the food for "fast and easy" meals later. This is popularly known as the "Once a Month Cooking Method," although it more often is a "Once a Week" method.

As with anything else, it is best to start small and work your way into bigger projects as you acquire more expertise and experience.

If you decide to use quantity cooking as a way to increase the economy of your home kitchen, there are many sources for recipes and techniques. Just do an internet search for "Once a Month Cooking."

You probably have some favorite recipes that you would like to convert to quantity cooking. A general rule of thumb is that except for baked goods (breads, pies, cakes, etc.) you can increase a recipe up to four times the original amounts with good success. See this resource –

Adapting home recipes for quantity cooking.

http://www.ellenskitchen.com/bigpots/homekit1.html

Baked goods like pies, cakes, breads, and etc. **cannot be multiplied by their volume measurements.** You might get away with doubling a recipe for biscuits or bread. Anything more than that requires the use of weights instead of volume measurements. To multiply a baking recipe, measure the weight of the ingredients and multiply the weights by the number of times you wish to increase the recipe. If a recipe calls for 8 cups flour, 2 eggs, 2 cups milk, 1 tablespoon of yeast, etc. . . . you first weigh the flour, eggs, yeast, and milk. If your 8 cups of flour weigh 2.5 pounds, and you want to multiply the recipe four times, you would need 10 pounds of flour, not 32 cups.

How to measure ingredients

http://www.baking911.com/howto/measure.htm A comprehensive look at how to measure ingredients for baking.

Calculators

Sites with calculators to convert recipe quantities and ingredients.

Volume conversions

http://www.onlineconversion.com/cooking_volume.htm

Weight to volume conversions

http://www.onlineconversion.com/weight_volume_cooking.htm

Butter conversions

http://www.onlineconversion.com/cooking_butter.htm

Oven temperature conversions

http://www.onlineconversion.com/cooking_gasmark.htm

US to Metric (and Metric to US) Conversions

http://www.convert-me.com/en/convert/cooking

Weights and measures

http://www.cooks.com/rec/convert/

Recipe calculator

Use this calculator to automatically increase or decrease ingredient quantities to half, double, or triple your recipe.

http://www.fruitfromwashington.com/Recipes/scale/recipeconversions.php

Butter to olive oil conversions

http://www.goodcooking.com/conversions/butt_oil.htm

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02171 Seven Steps to Kitchen Frugality and Tasty Food!

I have three precious things which I hold fast and prize. The first is gentleness; the second is frugality; the third is humility, which keeps me from putting myself before others. Be gentle and you can be bold; be frugal and you can be liberal; avoid putting yourself before others and you can become a leader among men. – *Lao Tzu*

1. Food is not just fuel, food is the way we maintain life. It speaks of our families and our cultures, our identities as persons, families, communities, "You are what you eat," as they say. Eating is an agricultural act and eating is a moral act. Our food choices have impacts far beyond our own kitchens. The nice thing about that is what's best for us in the kitchen is best for the planet. This is why the way forward abandons manufactured fast foods in favor of slow food, true food, good food, loving and healing food, nutritious food, tasty food.

2. Develop an appropriate level of organization in your kitchen. Plan your meals and organize your shopping. In the beginning, plan more, not less. In the beginning it is best to write everything down and make lists and schedules. As you gain more experience you can improvise more. The busier you are, the more necessary it is that you do this. Many people waste a tremendous amount of money in grocery stores because we buy on impulse or because we think we might need something sometime in the future for some unknown recipe. We waste time as we wander around aimlessly, not sure of what we want to buy. We miss something first time around and have to backtrack all the way across the store to get it. We get home and find we forgot something we actually needed so we go back to the store and end up with more junk that we didn't really need because we went in to get "just one thing."

3. Cook your meals from basic ingredients. Stop buying mixes and prepared foods. Shop smart, and shop wisely. Practice does make for perfect food! Tasty too!

4. Start a garden. If you have no land, find a community garden or start a container garden. Get some food processing equipment and skills. Learn weekly, monthly, and seasonal food processing. Grow as much food as you can, and preserve food you grow in the summer for eating in the winter. If you don't have a freezer, get one. Or, share a freezer with a neighbor. Neighborhoods could establish a service center, with washers, freezer space, meeting rooms, a commercial size kitchen, food processing equipment, and other neighborhood amenities. Work with your neighbors!

5. Keep some of your household savings in the form of food. Store what you eat and eat what you store. Stock up on basic staples and increase the amount of food you keep in your pantry so that you are not vulnerable to weekly or monthly mood swings in supermarket prices. Note that this is the equivalent of having your own in-home convenience store. The more times you go to the store, the more money you will spend. Shop less and you will spend this. To do this successfully, you must keep more food on hand in your

pantry. Be clever in your storage solutions if you live in a small space.

6. Set aside one or two afternoons at a regular interval and "cook ahead." Look at your meal plan, and do what you can ahead of time on these "cook days." Use your freezer to help you prepare quick meals of "slow food" later in the week or month. You can make bread dough for a week in 20 minutes. If you will need 4 pounds of fried ground beef for 3 meals, fry all 4 pounds on Cook Day and freeze it until you need it. Make soup stocks and freeze them for use later. Keep a bag of cooked, frozen meatballs, and a bag of cooked, frozen hamburger patties in your freezer, and there are the basic ingredients for spaghetti and meatballs, Oklahoma meatballs, hamburgers, or Redneck Salisbury Steak. Do one or two projects at a time, don't attempt too much at first. Don't be afraid to start small. That's the best way.

7. Buy some food from local farmers. As you get more experience with this easy and convenient approach to slow food, you will save money on your food bills because you change your shopping and cooking habits. Now you can look for better quality ingredients from local sources like farmers' markets and food coops, even if they cost a bit more. You will find that you can spend a little more for quality local ingredients (depending of course on your access to them) - such as locally grown organic produce, free-ranging and grass fed meats, olive oil instead of shortening, butter instead of margarine - while at the same time spending less overall on your groceries.

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02181 Learning to Cook

Tell me and I forget, teach me and I may remember, involve me and I learn.
– *Benjamin Franklin*

Unless you hire someone to cook for you, or eat all your meals at restaurants, or eat at a school cafeteria, most of us need to know how to cook.

By “cooking” I mean something beyond sticking a frozen entree and some side dishes into the oven or microwave, or picking up take-out on your way home from work.

Warming up a breakfast sandwich from a fast food restaurant does not count as cooking.

Many people think of cooking as a complicated deal and maybe for some people it is. It doesn’t have to be a hassle. Many tasty foods are easy to prepare. We’ll talk about them in a bit. First, let’s think about recipes.

As with anything else, there is a learning curve. Things that seem hard at first, won’t be as hard when you have done them a dozen times.

How to read a recipe.

A recipe involves a list of ingredients, measurements of those ingredients, and the steps of preparation.

To understand a recipe, read it out loud -- slowly, twice.

Think about what you read. What ingredients does it require? Cooking steps? What pans and kitchen utensils will you need?

Read it again. How long does it take to cook? Is it a meal-all-by-itself, or do you need a couple of other recipes to make up a full meal?

Read it again, and this time, say "first", "second", "third", "fourth" and so on in front of each sentence or step in the recipe.

Get all the kitchen utensils and ingredients you need to prepare the food together in one spot, whatever you need to prepare this dish. Chefs call this "mise en place".

Measure the ingredients into separate little bowls.

Using the recipe as your guide, put the ingredients together as described in the recipe. Eat the tasty food you have prepared yourself.

Now that we have an overview of the process, let’s look at the three components – ingredients, measurements, and preparation steps – in detail.

Ingredients

Each recipe has a list of ingredients and you need to pay close attention to those ingredients.

While it is sometimes possible to substitute ingredients, that isn’t always true.

To take an extreme example – you can’t substitute champagne for milk if you want to make sausage gravy. You could substitute as much as half the milk with water, or you could use a smaller amount

of cream mixed with water, or you could use soy milk or rice milk or goat milk. But champagne? No way.

At the end of this section there is a list of common ingredient substitutions.

Give particular attention to the specific words used in ingredient lists.

“One cup of chopped nuts” is not exactly the same as “One cup of nuts, chopped”. The “one cup of chopped nuts” is a cup of nuts already chopped. The “one cup of nuts, chopped” is one full cup of unchopped nuts, that you chopped before using them in the recipe.

Some recipes may call for particular brands. A recipe for a green bean casserole may say something like “2 cans green beans (of a particular brand)”. It is always safe to ignore the brand and simply use 2 cans of green beans, of whatever label.

Measurements

Measurements must always be done with actual measuring cups and spoons. Don’t reach into a drawer and pull out a common spoon to measure a teaspoon or a tablespoon.

In the United States, we use the traditional non-metric “English” system (although the English don’t use this system anymore, they are on the metric system).

In most home cooking, we use measurements of volume – teaspoons, tablespoons, cups, fluid ounces, pints, quarts, and gallons. These are often abbreviated in recipes as:

tsp -- teaspoon

tbsp -- tablespoon

C -- cup

oz -- ounce

pt -- pint

qt -- quart

gal -- gallon

Be precise when you measure ingredients. Over-fill the spoon or cup and level it off with a butter knife. Don’t shake down or compress the ingredient in the measuring spoon or cup unless the recipe calls for that. If it does, it will say something like “packed.”

Don’t measure ingredients over the mixing bowl. It’s easy to spill something over the edge of the measuring cup or spoon and you end up with an extra ingredient amount added in a way that makes it impossible to measure.

A set of measuring spoons – in the United States – comes with the following measurements:

1/8 teaspoon

1/4 teaspoon

½ teaspoon

1 teaspoon

½ tablespoon

1 tablespoon (the equivalent of 3 teaspoons)

A set of measuring cups in the United States comes with these cups:

1/8 cup

1/4 cup

1/3 cup

½ cup

2/3 cup

1 cup

Sometimes you will see 2 and 4 cup measuring cups. A four cup measurement is handy if you plan to do a lot of baking or quantity cooking.

Measurement equivalencies:

3 teaspoons (tsp)= 1 tablespoon (tbsp)

4 tablespoons= 1/4 Cup ©

5-1/2 tablespoons= 1/3 C

8 tablespoons= ½ Cup

11 tablespoons= 2/3 C

16 tablespoons= 1 Cup= 8 fluid ounces

2 cups= 1 pint= 16 fluid ounces

2 pints (4 C)= 1 quart= 32 fluid ounces

2 quarts (8 Cups)= ½ gallon= 64 fluid ounces

4 quarts (16 cups)= 1 gallon= 128 fluid ounces

Metric cooking measurements:
http://www.jsward.com/cooking/cooking-metric.shtml

Many US measuring cups also have their metric equivalents.

Preparation Steps

The first step in preparing any recipe is not usually listed. Professional chefs refer to this as "mise en place" – or "get everything together that you need before you start".

POP QUIZ! How many times has mise en place been mentioned thus far? What does the frequency of the references indicate about its importance?

Find all the utensils, pots, bowls, and equipment that you need and set it out for convenient use during preparation.

Get all the ingredients – and while you can measure them as you cook, many people start by measuring every ingredient into small containers and setting them with the bowls or pans for easy and convenient access during the preparation process.

The next step is to prepare the recipe exactly as the recipe states. The first time you prepare a recipe, do it "by the book". Later, after you have used a recipe a few times, you may decide to change the preparation sequence a bit.

Here are some common terms found in recipes and their meanings:

Baste -- Spoon a liquid over a food during baking or grilling.

Blanch -- Place a sliced vegetable in rapidly boiling water for a specified period, take it out and put immediately in cold water to stop the cooking process. This preserves the color and crispness of the vegetable. It makes it easier to peel and skin vegetables and fruits.

Beat -- Use a spoon or whisk to vigorously and rapidly stir food in a circular manner to mix the ingredients together.

Brown -- A term applied to cooking meat, where you cook the meat for a few minutes on each side in a pan, with a small amount of oil, so that the surface of the meat turns brown. This is the first step in roasting or braising some cuts of meat which are less tender.

Braise -- After browning, cook the food in a heavy covered pan, over low heat on top of the stove, with liquid. This method works for both meat and vegetables.

Chop -- Cut the food into small pieces, about ½ inch in diameter.

Deep Fry -- Cooking a food submerged or floating in oil or fat. Because of the high temperatures, deep frying often cooks foods quickly.

Deglaze -- After frying or other cooked and removed from the pan, add a small amount of liquid and stir vigorously while the pan is still hot in order to loosen in bits stuck to the pan. These little bits are delicious, and this liquid – which may be water, wine, or a marinade – becomes the foundation of a gravy or sauce or may be added to a soup.

Dice -- Cut foods into pieces about 1/4 inch in diameter.

Mince -- Cut foods into the smallest possible pieces with a knife. Not a puree, however.

Pan Fry -- Cooking larger pieces (meat or vegetables) in a pan with a minimal amount of oil. Because of the size of the

foods, they will need to be flipped and cooked on both sides.

Sauté -- Cooking something in a pan, with oil, over medium or high heat. Cut the food into slices or small pieces before sautéing. This method browns the food, while preserving texture, flavor, and moisture.

Stir -- Use a spoon or whisk in circular motions to combine ingredients. Not as vigorous an action as beating.

Additional Resources

This is only the barest minimum of instruction on how to cook. I suggest finding someone who knows how to cook and learning from them. Alternatively, you can go online and find quite a bit of cooking instructional material. Here are some of the better sites that can be used for this purpose.

Cooking 101 from About.com

http://busycooks.about.com/od/cookinglessons/u/Cooking101.htm

eGullet Forums. The eGullet Society for Culinary Arts and Letters is a great place to ask questions and browse archives.

http://forums.egullet.org/index.php?app=forums

Cooking 101 from Arizona, a great collection of cooking how-to's.

http://www.azcentral.com/style/hfe/cooking101/

How to Cook from Better Homes and Gardens, video tutorials on a variety of cooking subjects.

http://www.bhg.com/recipes/how-to/

Cooking Primers from Epicurious, a collection of basic tutorials on selected culinary topics.

http://www.epicurious.com/articlesguides/howtocook/primers

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02191 Making the Perfect Soup Stock

"Yes," said Cook. That is soup that you are smelling. The princess, not that you would know or care, is missing, bless her good-hearted self. and times are terrible. and when times are terrible, soup is the answer. Don't it smell like the answer?" – *Kate DiCamillo*

A great soup, sauce, or gravy begins with a great "stock." Prepare stock with beef, pork, chicken, or vegetables simmered in water for a long time so that the water becomes intensely flavored. The best restaurants make their own stocks and that is one of the secrets of their success. You can add a lot of quality and flavor and nutrition to your home cooked meals if you make your own stocks. You can save a lot of money too. Making your own stock is frugal and healthy for you too!

Leftovers are fine!

Use leftover chicken, or the "less favorable" pieces like backs and necks, leftover veggies, leftover roast, trimmings from vegetables (like potato skins), and bones. You can freeze leftovers and thaw them when ready to make stock. If the frozen leftovers (meats, bones, etc.) have already been cooked, that's good because then you don't need to roast them first. Any stock recipe can be adapted based on what you have on hand. If you have doubts about a particular vegetable, cook it by itself in some water and see how it tastes.

Soup Bones.

Besides the leftovers from roasts and other such baked meats, you can buy soup bones. The best source would be local, and from pastured beef or buffalo. You're looking for large bones, with chunks of meat attached. Usually these soup bones are cheap.

If you start with raw uncooked soup bones, first you need to roast them.

When roasting the bones in the oven, DO NOT LET THEM TURN BLACK! You want a nice brown, NOT black. If they burn, trim the burned part off or get more bones and start again as burned bones will make the stock bitter.

You can ask your butcher for "beef trimmings," which will be bits of meat and fat, if you use trimmings (or stew meat, which some people do although that cut is more expensive), add it to the roasting pan when you put the bones in the oven. Deglaze the roasting pan and pour all of the small bits and pieces into the stock pot. This means pouring a little water into the bottom of the hot roasting pan, and using a spatula to move it back and forth so all the little tasty bits of meat and fat come lose and thus pour easily into the stock pot. We refer to these bits and pieces as "fond" and they are full of flavor.

I discuss this process in greater detail in the section below on making beef stock.

Veggies.

We traditionally make stocks with a **mirepoix,** a mixture of carrots, onions, and celery. Locally grown celery can be scarce in some areas and non-organically grown celery and carrots are among the vegetables listed as "high in pesticide residue" on the Environmental Working Group's Shopper's Guide to Pesticides.

Spend the extra money for organic celery and carrots or don't use celery and carrots when you make stock. Onions are among the lowest in pesticide residues so if money is tight, it is OK to buy and use the non-organic onions sold at supermarkets.

One low-cost garden herb that can substitute for celery is lovage. Use less, however, as the flavor is more intense than celery.

I roast the veggies with the bones. As an alternative to roasting, you can dice the veggies and sauté them in butter or olive oil until they caramelize (turn a bit brown). This adds rich and robust flavors to the beef stock. Add the celery toward the end of the sauté process as celery has so much water it doesn't caramelize well.

Do not use vegetables in the cabbage family (cabbage, broccoli, kale, turnips, cauliflower) to make stock, as their strong flavors can overpower the other flavors of the stock. Don't use ground or powdered herbs. Use whole peppercorns rather than ground black pepper. You can use either dried or fresh herbs.

Don't add salt. Always add salt to the recipe in which you use the stock.

Stock Cooking Notes.

The cookbooks say that the best pots for making stock are tall and narrow. I have made stock in several different shapes of pots that turned out quite tasty. Meat stocks benefit from long, slow cooking (eight hours at least, I simmer my beef stocks overnight for 18 hours). Vegetable stocks, on the other hand, complete their cooking in an hour.

You can make stock in a crockpot, although you obviously can't make as much at one time in a crockpot as you can in a larger pot. If you're living alone in a dormitory room, that's all that you need!

After you roast the bones and veggies, put them in a pot and add plenty of water. Turn the heat on high until bubbles start to drift up, and then turn it down. You don't want the stock to boil when the bones, meat, and vegetables are in the pot. You want just a slow simmer. Do not stir the stock. Skim off any scum that rises to the top during the cooking process. You will skim it several times during the cooking process.

Eight to eighteen hours later . . . when you finish cooking the stock, strain it to remove any bits and pieces. Refrigerate it overnight and remove any fat that congeals on the top of the liquid. Bring it to a boil, and cook it until it reduces its volume. The more you reduce the volume, the stronger tasting the resulting stock and the less you will use in a recipe. Professional chefs reduce it so much that when refrigerated, it congeals and turns to a jelly-like solid. The advantage of reducing the volume is that it takes less room to store in your freezer. If you have considerably reduced the volume of the stock, you add water to it when you use it in a recipe. Think of it as a homemade bouillon cube, except that you don't dehydrate it into a powder and press it into a cube.

Pick the meat off the bones and save it for use in other recipes. Even though it has been simmered for a long time, the meat will still contribute flavor and texture when added to a soup or casserole. I like to make a sandwich spread from it by mixing it with chopped onion, chopped pickles, mayo, and mustard. Freeze the leftover meat in meal-size portions until needed. (Waste not, want not.)

Since stock making can be quite a production, make more than you will need and freeze it for later. It is easy to make stock for a month or two in one session. Freezing is the easiest method of preservation. You can preserve stock by canning so it stores at room temperature. That requires a pressure canner.

In pursuit of a plastic-free kitchen, I use glass canning jars to freeze stock and leftover meats from stock making. I stocked up on half pint jars, which work well for this purpose. For meats or any solid food, wide-mouth canning jars are best.

Use stock often in gravies and sauces to add amazing flavor, texture, and incredible nutrition to your meals. Drink it hot, with a sprinkling of herbs and a bit of salt. The more you reduce the volume of the stock, the stronger its taste. I don't take mine all the way down to the demi glace stage (the near-solid form referred to above). I dilute mine with at least an equal amount of water when using as a gravy or soup or drink.

Rules of Thumb for Ingredients.

You need 1 pound of bones/meat for each 2 quarts of water.

Use onions, carrots, celery, at a ratio of 2-1-1.

That is, for every two parts of onions, you want 1 part each of carrots and celery.

The amount of carrots and celery together equals the amount of onions.

For four quarts stock, use about 3/4 lbs of onions and a quarter pound each of celery and carrots (about 2 pounds of bones/meat).

For 8 quarts stock, you want about 1-1/2 pounds of onions and ½ pound each of celery and carrots (and 4 pounds of bones/meat).

For a 16 quart batch of stock, start with 3 pounds of onions, and 1 pound each of celery and carrots (and 8 pounds of bones/meat).

The reason it looks like there is more onion than the sum of the carrots and celery is that you peel the onions. This loses some weight.

Stock is very forgiving so these measurements do not have to be absolutely precise. Indeed, they are "rules of thumb" so you can use a little more or less. Use more carrots, for example, if you want a sweeter tasting stock.

Use a little tomato paste. For a large 16-20 quart batch, you can add a small can of tomato paste to enrich the color. As an alternative, you could use a food brush and paint the bones with a light coating of tomato paste before you roast them. Or not, as you prefer.

Chicken Soup Stock

If you make a small batch, say 4 quarts, of chicken stock, you'll want:

-- 2 pounds of chicken (which could be backs and necks, or even chicken feet)

-- 3/4 pound onions (about 2-3 onions)

-- 1/4 pound each celery and carrots (this would be about 2 carrots and a couple of ribs of celery).

For a large batch (16 quarts), you'll want:

-- 8 pounds chicken

-- 3 pounds onions

-- 1 pound each of carrots and celery

Peel onions before chopping. Chop the vegetables in large pieces, do not include the leaves from the celery (they can be bitter). Put the ingredients in a soup pot and cover with water. Simmer for 1 hour. Skim off any scum or froth that rises to the top, also any fat. Note that "simmer" is not a rapid boil. Turn the heat up high when you start. When bubbles start to form, turn the heat down so that the stock simmers. The surface of the stock will appear to "shimmer" and steam but will not rapidly boil.

If you use whole raw chickens, at the one-hour point remove the chicken from the water and take out the breast meat and use it for another recipe. At the one-hour mark, this will be "perfectly poached chicken breast." It's a good time to remove the skin. Or if your using backs/necks, chicken leftovers, etc., just let it continue to cook.

Turn it down low and simmer it overnight, or if you are in a hurry, at least four hours. Always resist the urge to stir. If you simmer it overnight, rather than all day when you can watch it, make sure there is plenty of water in the pot.

When finished, strain and use immediately, or refrigerate until the fat congeals at the top, remove the fat and use it then or freeze the stock for use later. You can reduce it by boiling before you freeze it as described above.

The recipe directions above make a "white" stock, which is a light color. If you want a darker poultry stock, with deeper flavors, roast the chicken pieces and vegetables first, and add some tomato paste to the simmering stock. If you make a roast chicken or turkey, save the bones and make stock!

After holidays, use the bones and leftover meat from your turkey to make a brown turkey stock.

Beef Stock

For a four quart quantity of beef or buffalo or pork stock, you'll want:

-- 2 pounds of bones with meat attached

-- 3/4 pound onions (about 2-3 onions)

-- 1/4 pound each celery and carrots (this would be about 2 carrots and a couple of ribs of celery).

For a large batch (16 quarts), you'll want:

-- 8 pounds of bones with meat

-- 3 pounds onions

-- 1 pound each of carrots and celery

Preheat oven to 350 degrees F (230 degrees C). Slice onion. Chop scrubbed celery and carrots into 1-inch chunks. In a large shallow roasting pan place soup bones, onion, and carrots.

Bake, uncovered until the bones are well browned, turning occasionally. Drain off fat.

Since this can be messy, line the pan with aluminum foil or parchment paper to facilitate the cleanup.

Place the browned bones, onion, and carrots in a large soup pot or Dutch oven. Put the empty roasting pan on a burner and add about a cup water and move it around with a spoon or spatula in order to "deglaze" the pan, pour this and any little bits and pieces of meat or vegetables into the soup pot. If you want to know, we call these bits and pieces "fond" and they add LOTS of flavor.

If you plan to add some tomato paste, for a nice flavor burst "paint" the roast bones with the tomato paste before adding them to the stock pot.

Turn the heat on high until bubbles start to form. Reduce heat immediately. Cover and simmer for at least eight hours, you can go as long as 12 (all day or overnight). Skim any scum that rises up. Beef stocks make more froth and scum than poultry stocks, so you will need to skim it often for the first couple of hours.

Adding the vegetables at the beginning of the simmering process will enhance the flavor of the vegetables in the stock. The carrots will give it a sweeter taste. If you want a less sweet stock, or want the flavor of the vegetables to be more subdued, add them later in the cooking. I always add mine at the beginning, as I like a richly flavored stock.

When finished cooking, strain the stock. If you do not use it immediately, refrigerate it and remove the fat that congeals at the top.

After removing the fat, you can reduce the volume of the stock by boiling. This makes it thicker and stronger so that you use less when cooking. It reduces the amount of room in the freezer required for storage.

What to do with the meat and poultry left from making stock:

Save the bits and pieces of meat left from your stock-making adventure. They can be used in casseroles, soups, meat pies, or any dish that calls from some chopped meat. Adding some heat helps boost the flavor. Your dog and cat will love the snacks. Waste not, want not! If you've made a lot of stock, and the meat leftovers are more than you can handle in a day or

two, freeze the remainder in meal size portions for use later.

Salt. No, we didn't add any salt. And you shouldn't either. Add salt when you use the stock in its final recipe, don't add salt to the stock while it cooks.

Basic Vegetable Stock

-- 1 tbsp olive oil

-- 3 onions

-- 4 carrots

-- 1 cup tomatoes

-- 1 cup sliced mushrooms

-- 8 cloves garlic, minced

-- 4 stalks celery

-- 2 quarts water

-- 12 peppercorns

Optional herbs:

-- 8 sprigs fresh parsley

-- 6 sprigs fresh thyme

-- 2 bay leaves

Chop the vegetables finely. The greater the surface area, the more quickly vegetables will yield their flavor. Heat oil in a soup pot. Add ingredients except the water and peppercorns. Sauté for 5 to 10 minutes, stirring frequently, until the onions are mostly transparent and starting to caramelize a bit. Add water and peppercorns. Simmer, uncovered, for about 45 minutes. Strain. Do not boil. Feed the vegetables to your worms or compost.

Other ingredients to consider: eggplant, asparagus (butt ends), corn cobs, bell peppers, pea pods, chard (stems and leaves), celery root parings, marjoram (stems and leaves), basil, potato parings . . . Get the idea?

For an even more in depth look at stock making, including pictures, visit these pages at the eGullet Society for Culinary Arts and Sciences:

Unit 1: ingredients and equipment http://forums.egullet.org/index.php?/topic/25256-stocks-and-sauces-class-unit-1-day1/ or http://tinyurl.com/ydkmwur .

Unit 2: Simmering the basic stocks.

http://forums.egullet.org/index.php?//topic/25414-simmering-the-basic-stocks-unit-2-day-2/ or http://tinyurl.com/ydehebb .

Unit 3: Straining, defatting, reducing

http://forums.egullet.org/index.php?//topic/25440-stocks-straining-defatting-and-reducing-unit-3/ or http://tinyurl.com/ybpwgn5 .

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02201 Country Gravy

Give us this day our daily taste. Restore to us soups that spoons will not sink in and sauces which are never the same twice.
Raise up among us stews with more gravy than we have bread to blot it with.
Give us pasta with a hundred fillings. *Robert Farrar Capon*

Most of us remember the gravies from our grandmothers' tables. Somehow gravy just isn't the same anymore. There's a simple reason for that. People don't make gravy the way your grandmother did it. They buy a powdered gravy mix and use that. The problem is that gravy mix leaves a lot to be desired when it comes to taste and nutrition. This is sad because homemade gravy is one of the most frugal and tasty recipes you can find. Even though it is cheap, it is better than any of the canned gravies or mixes in the supermarket.

Gravy over toast makes a frugal and filling breakfast, lunch, or dinner. Leftover gravy can be combined with cooked pasta and vegetables, or hamburger and pasta for your own homemade "hamburger helper" (which is all that hamburger helper is - pasta and gravy). Make gravy with your own homemade stock and get a double burst of flavor and nutrition.

The Basic Rules of Thumb for Gravy.

A tasty, rich, and luscious gravy that you would brag about to others contains fat, flavored liquid, and something to thicken the liquid.

Thin: 1 tbsp oil or butter, 1 tbsp flour, 1 cup liquid.

Medium: 2 tbsp oil or butter, 2 tbsp flour, 1 cup liquid

Thick: 1/4 cup oil or butter, 1/4 cup flour, 1 cup milk

Bacon fat? NON-hydrogenated lard? Hamburger fat? Olive oil? Sunflower oil? Yes! Yes! Yes! Yes! Yes!

There are lots of concerns about using hydrogenated shortenings and margarine. I don't use them.

Roux Rules.

Put the oil, butter, or lard in a pan, over medium heat, add the flour to it, and stir it so the flour and butter or oil mix thoroughly. Chefs refer to this mixture of oil and flour as the ROUX, which is pronounced ROO.

Generally, for a white sauce, let the roux bubble over medium heat for about a minute, stirring constantly. Remove from heat, add liquid, turn heat back on, stir until thickened. Of the thin, medium, and thick gravies, the consistency I like best is the medium. Do not leave roux cooking unattended. If you must step away from the stove, turn off the heat until you can return your full attention to the roux.

I use white flour for gravy roux, or I sift whole wheat flour before adding it to the oil or butter.

Freezing Roux.

Making the roux is the most time-consuming aspect of making gravy (or a sauce). Cooked roux freezes well. So make a larger batch than you need and freeze in convenient portions for use later. I make a large amount of it and freeze it in metal ice trays. After the cubes freeze, I pop them out of the tray and put them in a larger container of some sort in the freezer. Always label the container so you know what it is. When I want gravy, I just plop one or two of the frozen "ice cubes" of roux into a pan, melt and warm it, add the liquid, and voila, gravy. To make a larger quantity for freezing, use equal portions of fat and flour, e.g., 1 lb butter or oil and 1 lb flour. I never use hydrogenated shortening. Non-hydrogenated lard would be just fine.

Liquid.

A liquid that is full of flavor will make a delicious gravy. Use your own homemade stocks or broth/juices from roasts or hams or even leftover soups. When you fry meat, you can deglaze the pan (pour water into the hot pan and stir vigorously so the flavor and bits of food are combined with the water) and make the gravy with the pan water. Use milk for cream gravies like sausage and bacon. In a pinch, you can make a broth with bouillon and use that to make gravy. Your own homemade stock will be more tasty and nutritious. Use vegetable stock to make a vegan gravy.

Oil, butter, meat fats.

If you use butter, cook the roux at a lower temperature so that the butter itself doesn't burn. If you like a darker roux, it is better to use oil as a dark butter roux can take a long time. Olive oil is the primary oil I use in making roux. I occasionally use meat fats from pork, beef, or chicken. Non-hydrogenated lard is great. Never use hydrogenated shortenings. The best fat is from cooked meats. Don't use all of it though! Pour off the fat and measure back into the pan only what you need.

The Skillet. A cast iron skillet is great for making gravy. You can make it in an electric skillet, or with a skillet on a hot plate or a camp stove, if you don't have a regular stove.

Microwave roux? Yes, if you don't care about the various issues regarding microwave ovens. . . you can use a microwave to make roux. Mix the fat and flour and microwave about 5 minutes total or until it reaches the color you want. Stop every minute or so and stir the roux with a spoon or whisk until it starts to brown. Be warned that when microwaving roux, it can go from "just right" to "burned" quicker than you think possible. Once it starts to actually brown, check it every 20-30 seconds until it gets just right.

What is "just right" when it comes to the color of the roux? That's something you need to decide for yourself. The darker the roux, the less it thickens, so the more roux you need. If you want brown gravy, use a darker roux. Make white sauce with a lighter roux.

Measure! It is best to measure the liquid, oil, and flour. Yes, your grandmother did it by sight and yes you will eventually be able to do this too, but probably not at first. I always figure 1/3 to ½ cup of gravy per person, at least.

Always make extra gravy! It freezes just fine. Use it within a month.

Adding extra flavor to gravy. You can always add extra flavor to gravies. Before adding the flour to the oil, add some sliced/chopped garlic, onions or shallots, and a chopped fresh or dried pepper. We especially like chipotle peppers in brown gravy. Sometimes we add dried mixed "Italian herbs" like oregano, basil, rosemary, and thyme, and of course black pepper. The amount of salt a gravy requires depends on the taste of the eaters. Be wary of adding too much salt.

Gravy Recipes.

These make a 2 cup quantity. They can be multiplied to make larger quantities of

gravy. There is a recipe for a gallon of gravy in this chapter.

Country Brown Gravy.

With a simple white sauce, you don't let the flour brown. You sauté it for just a bit and then add the milk. With true country gravy, brown the flour. One of the old names for country gravy is "scorch gravy," and that's because you brown the flour right to the point where it turns dark brown BUT doesn't actually burn. Once you get to that point, move fast - turn off the fire, add the liquid all at once and stir like crazy, continuing to stir frequently as you turn the fire back on and cook the gravy until it thickens to the consistency you want.

Because deciding how much "brown" is enough is such a judgment call, you may not want to go very far in the beginning, only sauté the flour until it is a light brown. You need to stir the roux constantly when you cook it. The browner you make the roux, the less it will thicken, so if you make a darker brown roux, make more, as a dark brown roux has only about 1/3 the thickening power of a lighter colored roux.

After you have made gravy maybe 50 times, you will develop your own eye for how dark you will like the roux. Note that stirring "Constantly" means just that. Don't stop! Don't splatter any roux on you or anyone standing close by, because it is EXTREMELY hot and can raise a blister faster than you can wipe it off.

You can make this kind of brown gravy with either milk or stock. If you make it with a light chicken stock, it is Velouté, one of the five Mother Sauces of French cuisine. If you use a vegetable stock, you make **Country Vegan Gravy.**

Sausage Gravy

Crumble sausage in a pan (say 1/8th lb for 2 cups gravy) and fry until done. Remove sausage and measure the fat in the pan, adding more oil or butter to make a total of 4 tablespoons. Add 4 tablespoons of flour and sauté until the flour is a light brown. Turn off the burner. Add 2 cups milk (or 1 cup milk, 1 cup water) and mix vigorously. Turn the burner back on, add the fried sausage to the gravy, continue to stir until the gravy thickens to your desired consistency.

Pork Chop or Sliced Ham Gravy

Fry the pork chops or sliced ham in one pan. Take out of pan and set aside on a plate. In a second pan, melt 4 tablespoons of butter or put 4 tablespoons of oil in the pan. Add 4 tablespoons flour, and sauté until the flour is brown as you like it. Turn the fire back on under the pork chop pan and heat it up if it has cooled down. When it is hot, pour 2 cups water or stock on it and stir/scrape the pan vigorously to deglaze it and mix the little flavored bits (known in the trade as the fond) with the water. Add this richly flavored water to the bubbling roux.

Bacon Gravy

Fry your bacon and measure 4 tablespoons of the fat into the gravy pan. Add 4 tablespoons of flour, fry until light brown. Add 2 cups of milk, or 1 cup milk and 1 cup water, stir until thickened to desired consistency.

Pot Roast or Ham Gravy

This is the traditional brown gravy you make from the juices of a pot roast or a whole ham cooked in your oven or in a crockpot. Pour the juices/broth into a container and skim the fat off the top. Put 4 tablespoons of the fat into a pan, add 4 tablespoons flour, and sauté until the flour is medium to dark brown. Pour the broth into the roux, stirring constantly, turn the burner back on and continue stirring until it thickens to the desired consistency. If you don't have enough broth, you can add water to make the desired amount of liquid.

Brown Gravy without the Roast . . .

If you have some frozen or left over beef stock (or chicken or vegetable stock), use that as the liquid and make gravy without having to make a roast. If all else fails,

you can make the pot roast/ham gravy recipe above and use bouillon for the liquid. Make the roux from butter and flour. If you made the roux with a mirepoix, you have made Espagnole, one of the five Mother Sauces of French cuisine.

Hamburger Gravy

Fry hamburger, drain fat, measure back into meat 4 tbsp of hamburger fat, add 4 tbsp. flour, stir. To make a cream gravy, use a light brown roux and 2 cups milk (or 1 cup milk and 1 cup water or beef stock). If you want a brown beef gravy, make a more brown roux and add 2 cups beef stock instead of milk. Cook until thickened. Serve over rice, toast, or biscuits.

Gallons of Gravy

This recipe makes 50, 1/3 cup servings of gravy:

1 cup fat or oil

1 cup flour

1 tablespoon salt

1 gallon meat or poultry stock

Use at least a three-quart skillet. Put the oil and flour, salt and pepper, and cook for about five minutes, stirring constantly. Start adding stock, stirring with a whisk, and cook until it thickens. For added flavor, cooked 1 pound diced carrots, 1-1/2 cups chopped onions, and ½ cup chopped celery with the stock.

White Sauce

Make the roux with butter and flour. Use milk for the liquid, with a dash of salt and pepper. Add some onion and thyme to the roux and it becomes the traditional béchamel sauce, another one of the Five Mother Sauces of French cuisine.

Cheese sauce

To 1 cup white sauce, add 1/4 tsp dry mustard and ½ cup grated cheese.

Mushroom sauce

Sauté 1 cup sliced mushrooms and 1 tsp grated onion in the butter or oil for white sauce, then proceed as you would to make white sauce. For a brown mushroom sauce, use beef stock instead of milk and make a brown roux.

Red Sauce

To 1 cup white sauce, add 3 tbsp tomato sauce. The white sauce can be made with milk or with a light chicken stock.

Velouté sauce

Same as white sauce, only use a light stock or vegetable broth in place of milk. Another one of the Five Mother Sauces of French cuisine.

Espagnole sauce:

A rich sauce made with a dark beef stock, brown roux, mirepoix. In Oklahoma this would be a traditional pot roast gravy. In France, it is one of the Five Mother Sauces.

Mornay sauce:

To Velouté sauce, add 1 cup milk, 1/8 tsp cayenne pepper, and 1 cup grated cheese.

Tomato Mushroom

Fry one strip of sliced bacon, add 1 tbsp flour, 1-1/2 tsp sugar, and a dash of salt. Cook until smooth and bubbly. Remove from heat, stir in 1 cup tomato juice or juice from canned tomatoes. Bring to boil, stirring constantly. Add about ½ cup sautéed mushrooms.

The French Sauce Tradition

For a rich education in traditional sauce making in the French tradition, see these following pages at the eGullet Society for Culinary Arts and Sciences. This is a continuation from Units 1, 2, and 3 referenced in 30701 Stock-making.

Unit 4, Stock-based sauces

http://forums.egullet.org/index.php?/topic/25584-stock-based-sauces-unit-4-day-4/ or http://tinyurl.com/yapzjw8

Cream Sauces

http://forums.egullet.org/index.php?//topic/27189-cream-sauces/ or http://tinyurl.com/yetyrx9

Non-stock Sauces (includes mayo and red-eye gravy)

http://forums.egullet.org/index.php?/topic/29574-non-stock-based-sauces/ or http://tinyurl.com/ykpcku5

When Gravy Goes Wrong . . .

The most common problem with gravy is that it doesn't get thick enough. If this happens to you, take an empty jar (like a peanut butter jar or a half-pint mason jar), add 1/4 cup water and 2 tablespoons flour. Put the jar lid on and shake it vigorously to mix the flour and the water. If there are any blobs of flour on top of the water, skim them off (or pour through a strainer). Add a little bit of this mixture to the bubbling gravy and stir, keep doing this until it thickens to the desired consistency.

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02211 Casseroles

A family in my sister's neighborhood was recently stricken with a double tragedy, when both the young mother and her three-year-old son were diagnosed with cancer. When Catherine told me about this, I could only say, shocked, "Dear God, that family needs grace." She replied firmly, "That family needs casseroles," and proceeded to organize the entire neighborhood into bringing that family dinner, in shifts, every single night, for an entire year. I do not know if my sister fully recognizes that this IS grace. -- *Elizabeth Gilbert, Eat, Pray, Love*

There are six categories of ingredients that make a casserole:

1. Protein – hamburger, ham, chicken, beans, etc.

2. Vegetables – whatever you like

3. Fillers – pasta, rice, potatoes

4. Gravy or Sauce

5. Topping

6. Seasonings and spices

The basic food ingredients of a casserole are the protein, vegetables, and fillers.

Creamy liquid or gravy holds these ingredients together.

Top the casserole with dough, pastry, or a crumb crust (such as crumbled crackers mixed with melted butter). The topping usually is crunchy and a variety of textures is one of the factors that makes good food good.

The seasonings and spices support the flavors you combine to make the casserole.

Casseroles can be made ahead of time and frozen for reheating later, thus saving time. If you're making one, you might as well make two and freeze one for later.

When cooking a casserole that you plan to freeze, undercook it by about 10 minutes. If there is a crumb topping, do not put it on until ready to reheat for serving. Quickly cool the casserole to stop the cooking (you can set the covered pan in a larger pan of ice water.)

To save on the number of casserole dishes you need, before putting the casserole into the dish, line it with aluminum foil. When frozen, lift the foil out of the dish, wrap to exclude all air, return to it to the freezer until needed. When ready to reheat, put it back into a baking dish, with the aluminum foil for reheating (this saves time in cleaning the baking dish afterwards). It doesn't have to be thawed before reheating. Casseroles can be stored for about three months.

Label and date any casseroles you put into the freezer.

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02221 Fun Foods

If we're not willing to settle for junk living, we certainly shouldn't settle for junk food.
– *Sally Edwards*

There is no money waster in the grocery store like the junk food section. You can make your own fun foods for a fraction of the supermarket cost.

Not only are these thrifty snacks, they taste better than any two month old cellophane sack of sugared popcorn could possibly taste.

You have zero control over the ingredients of supermarket junk food. If you read the product ingredient lists, you find plenty of words that are almost impossible to pronounce. That is always, without exception, a problem when it comes to food. How much Russian Roulette do you think you should play with your life?

Don't get cheated by the junk food rip-off! Don’t get cancer from unpronounceable food additives in junk food!

Make your own fun foods for convenience, nutrition, safety, taste, and affordability.

Donuts

Best Biscuit recipe (found in 02131)
Cinnamon sugar or Quick White Icing
Oil or shortening

Make biscuit dough and roll into biscuits. Pinch a hole in the middle. Drop into hot oil, fry until brown on both sides. Drain, dust with cinnamon sugar or ice with Quick White Icing or drizzle with honey. For yeast raised biscuits, substitute sweet roll dough for biscuits.

Hot Cocoa

For each cup of cocoa, mix ½ to 1 tbsp sugar, 1 tbsp cocoa, and 1/4 cup water. Cook over low heat, stirring constantly, about 1 minute. Add 3/4 cup milk. Heat, but do not boil. For an added touch, add a drop of vanilla and beat just before serving.

Vegetable Batter

3/4 cup flour
1/4 tsp baking soda
1/4 cup cornstarch
1-1/2 tsp baking powder
1 cup water
1 egg

Combine ingredients and mix well. Slice vegetables into rings, sticks, or chunks. Dip into batter, deep fry in hot oil. Variation: (1) Use milk instead of water for a creamier batter. (2) Use beer instead of water. (3) Add seasonings to the batter, such as black pepper, garlic powder, ground cayenne pepper, dried herbs.

Sean's Should Be Famous Onion Ring Method

1 can beer
2 eggs
flour
Habanero Salsa
baking powder (1 tsp per cup of flour) | Spices and Herbs

Cut the onions into rings. Mix the dry ingredients. Beat the eggs with the beer and the habanero salsa but don't mix with the dry ingredients. Dip the rings into the

beer/egg mixture, then into the dry mixture so they are thoroughly covered with flour. Dip again in beer/egg and again in dry mixture. If you don't have habanero salsa, use cayenne pepper in the dry ingredients.

Hot Peanuts

2 tbsp. red pepper
4 garlic cloves
1 tsp chili powder
3 tbsp. oil
Dry unsalted shelled peanuts.

Heat crushed red pepper in oil for one minute. Crush garlic and add to oil, add peanuts. Cover over medium heat for five minutes. Remove from heat, add salt and chili powder. Drain on paper towels.

Caramel Popcorn

2 quarts popped corn
2 sticks butter
1/2 cup corn syrup
1-1/3 cup sugar
1 tsp vanilla nuts (optional)

Mix syrup, sugar, butter, and vanilla. Cook until it is a light caramel color. Pour over popcorn and nut mixture. Press into large pan. Cool and break into pieces.

Red Necked Nuts

1-1/2 cup nuts (peanuts, pecans, almonds, whatever you like)
1/2 cup sugar
1/2 tsp vanilla
2 tbsp. butter

Line a baking sheet with greased foil. In a heavy skillet, combine nuts, sugar, butter. Cook over medium heat, stirring constantly, for eight minutes or until sugar melts and turns a rich brown color. Remove from heat, stir in vanilla. Spread onto prepared baking sheet. Cool, break into small clusters, store tightly covered. Wash the pan immediately afterwards, while it is still hot, so the water sizzles when it hits the pan.

Beer Nuts

1 cup sugar
1/4 tsp maple flavoring
1/2 cup water
shelled raw peanuts (about a pound)

Combine all ingredient in saucepan. Cook until liquid is gone (10 to 15 minutes). Spread on a greased cookie sheet, sprinkle with salt. Bake 45 minutes at 350 degrees.

Bread Pudding

2 cups dry bread
2 cups milk
2 eggs
vanilla
1/2 cup sugar or honey
dash salt, raisins
Optional: raisins or other dried fruit and/or nuts

Beat eggs, milk, sugar, salt, and vanilla together. Crumble bread and add to the milk mixture, add raisins/dried fruit/nuts. Crumbling the bread finer gives a finer texture to the finished product. Mix together. Bake in dish set in a larger pan of water for one hour at 300 degrees or until set in the middle. Test this by inserting a knife at the middle; if it comes out clean, its done. Variations: make this a breakfast casserole. Don't add sugar or honey, raisins or other dried fruits or nuts. Instead, added shredded cheese, chopped onions, fried breakfast meats (sausage, ham, bacon). This is a good way to make a few eggs and a small amount of breakfast meat go a long way. Mix it the night before, bake at breakfast.

Yummy Fritter Batter

1 cup flour
1 tsp baking powder
dash of salt
1 tbsp. melted butter
1 egg
1/2 cup milk

Combine flour, baking powder and salt, stir to blend, add unbeaten egg and melted butter, stir until well blended. Add milk, mix well. Let stand 30 minutes. **Ham fritters:** add 1 cup minced ham, drop by spoonfuls into hot oil and deep fry. **Banana Fritters:** peel and quarter six bananas, use fruit juice instead of milk (optional), dip bananas in batter and sauté

in butter until golden on all sides. **Apple Fritters**: use fruit juice as liquid, peel, core, and dice two cups of apples, add the apples to the batter, drop by spoonfuls into hot oil, deep fry. **For peach or apricot fritters**, use the canned fruit syrup for the liquid, chop peaches or apricots and mix with batter, fry as with the apple fritters. **For beer batter,** use beer instead of milk, use 2 eggs.

Corn Dogs

2 cups flour
2 cups corn meal
2 tbsp baking powder
2 tsp salt
2 -3 tbsp. sugar (optional, to taste)
1 egg, beaten
2 cups milk
hot dogs
corn starch

Mix dry ingredients, add egg and milk, mix well. Let batter stand for 30 minutes. Roll hot dogs in corn starch so they are well coated. Dip them into batter, deep fry in hot oil. When done on one side, they should turn over by themselves.

Variation: add 1/4 cup melted butter to batter, and instead of frying, bake coated hot dogs in 350 degree oven for 10 to 15 minutes until batter is done. Favorite spices can be added to the batter, if you like spicy foods, had some hot salsa or cayenne pepper to the batter.

Beer Batter for Corn Dogs, Shrimp, or Fried Dill Pickles

1 cup flour
1 teaspoon sugar
2 teaspoons season salt
1 teaspoon baking powder
1/2 tsp cayenne pepper
1/2 cup milk
2 eggs
Enough beer for a medium batter

Mix all ingredients together well. For fried dill pickles, use dill pickle slices. Blot them dry with a cloth or paper towel. Dip in flour, then dip in batter, deep fry, flipping them after about 30 seconds, until golden brown.

Pigs in a Blanket

Roll unbaked biscuits into flat rectangles and wrap around wieners. Bake in 375 degree oven until biscuits are done, about 10 minutes. Melt a little cheese into some hot dog chili sauce or chili.. Pour over wieners and biscuits. Vegetarian variation: roll biscuit dough around whole baked/cooked carrots or parsnips, brushed with melted butter and sprinkled with brown sugar.

Beef Jerky

2 tsp onion powder
1 tsp salt
3 lb roast
2 tsp garlic powder
2 tsp pepper
1/2 C soy sauce
1/2 cup Worcestershire sauce

Trim all fat from roast and slice very thin. Combine all ingredients except meat, mix well. Add meat and let marinate overnight in the refrigerator (cover tightly). Arrange strips of marinated meat over oven rack, directly on the rack (line the bottom of the oven with foil to catch drips). Bake at 200 degrees with the oven door slightly open for six to eight hours. Store in tightly covered container.

Refried Beans

Put some bacon fat in a skillet, add cooked beans, and mash them. If they are too dry, add some of the bean liquid. You can add spices (cumin, garlic, crushed red pepper). To make a bean dip, add some salsa.

Hot Dog Chili Sauce

Cooked Pinto Beans & liquid
Barbecue sauce
Beef Bouillon (or your own home-made beef or pork stock
Spices

Mash the cooked pinto beans like you were making refried beans, and add liquid until it is the typical consistency of canned hot dog chili sauce. Add chili/garlic/onion powder, beef bouillon (about 1 tsp/cup), and some of your

favorite barbecue sauce. Make a bunch and freeze in portions for use later.

Pizza Dough

1 tbsp yeast
3 to 3-1/2 cups flour
2 tbsp oil
1 cup warm water
1 tsp salt
1 tbsp sugar

Mix sugar & warm water, sprinkle yeast on the water, let sit for 5 to 10 minutes, until yeast bubbles up. Add salt, oil, flour (in that order). Knead until smooth and let rise 1 hour. Roll to desired size of pizza (makes 1 thick, or 2 thin crusts). Top with tomato sauce (or spaghetti sauce), add cheese, fried hamburger or sausage, or whatever else you like on a pizza. Bake at 350 degrees until done (about 20 minutes).

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02231 Cooking Vegetables

Households that have lost the soul of cooking from their routines may not know what they are missing:
the song of a stir-fry sizzle, the small talk of clinking measuring spoons, the yeasty scent of rising dough,
the painting of flavors onto a pizza before it slides into the oven.
– *Barbara Kingsolver, Animal, Vegetable, Miracle*

Most people don't think a lot about how they cook vegetables. If they eat meat, they focus on the meat main dish and the veggies are a canned side show. Vegetables are much more than opening a can and heating it on the stove top. As you permaculture design your lifestyle, you will discover new vegetables and you will need to learn more about cooking them. Here is a quick tour around the various ways of cooking vegetables. Why not try a different way of cooking vegetables every night until you go through this entire list? That would be a fun and tasty experiment.

Boiling
Bring the water to a boil before adding the vegetables. If you want to preserve color, don't boil longer than seven minutes. Cutting the vegetables into smaller pieces will promote faster cooking. Don't overcook! Save the cooking water for making soups or sauces.

Braising
Cut the vegetables into pieces (small to medium). Place some butter, lard, or oil in a pan and add vegetables, over medium heat. Season liberally. Stir so they are uniformly coated with oil. When they have a bit of color from cooking, turn the heat down and add a small amount of liquid. When that is gone, add some more liquid. Continue this process until the vegetables finish cooking. Stir frequently.

Poaching
Cook poached vegetables in liquid (water, wine, stock, etc.) at a temperature less than boiling, about180 degrees. If you don't have a food thermometer, start with the heat on high until bubbles start to drift up. Then turn down the heat, so the bubbles stop, while the top of the liquid continues to shimmer a bit.

Steaming
This requires a steaming basket which sets inside a pot. Bring the water to a boil before adding vegetables to the steaming basket. Don't pack it too tightly or the food will not cook evenly. Cover the pot with the lid while steaming the vegetables.

Broiling
This cooks with heat located above the vegetable. Brush the vegetable lightly with oil before broiling. Don't burn!

Grilling
Use a grill pan to keep small vegetables from falling through the racks on your grill. Baste with a liquid to keep the vegetables moist.

Roasting
Coat lightly with oil, sprinkle with seasonings to personal taste, and bake at 400 degrees until done. Some possible seasonings include salt, black pepper, crushed cayenne pepper, rosemary, sage, thyme.

Sauté
Cut the vegetables into small pieces. Use a pan big enough so that the vegetables will all be in a single layer in the pan. Put oil into the pan and heat it before adding the vegetables and seasonings.

Stir-fry
Similar to sauté. Cut the vegetables into smaller pieces over a higher heat in a wok.

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02241 Portable Foods

There he got out the luncheon-basket and packed a simple meal, in which, remembering the stranger's origin and preferences,
he took care to include a yard of long French bread, a sausage out of which the garlic sang, some cheese
which lay down and cried, and a long-necked straw-covered flask wherein lay bottled sunshine shed
and garnered on far Southern slopes. – *Kenneth Grahame, The Wind in the Willows*

Here are some issues to think about when eating out.

Eating out is expensive. My feeling is that most of us need additional resources to pay off debt and make necessary adaptations in our lifestyles, and "eating out money" is one resource that can be redirected to important household sustainability issues.

Restaurants and fast food places use few local or organic ingredients. Those that do use such ingredients are upscale and expensive.

Restaurant workers are often low paid. The minimum wage for wait staff is $2.50/hour, which is why tipping is essential and part of your bill, even if it is not figured by the restaurant. When I eat out, I tip, even if the service was bad. In the United States, a tip is not "something extra To Insure Promptness." It is most of the wait staff's salary.

When I do eat out, whether it be by necessity or choice. I never eat at large national chain restaurants or fast food places unless I am a guest of someone else or there is no other option. Even when on the road, I look for locally owned places to eat. Since every dollar I spend is a vote, I support the local food economy, not the globalized economy, by eating at locally owned restaurants.

When I travel, I support the local economies of the areas through which I journey by spending money at locally owned businesses. I refuse to voluntarily open my veins and bleed off my money to the support the economic aristocrats at the big fast food corporations national headquarters. National enterprises siphon resources from local areas to support large bureaucracies that contribute nothing to the local economy. National corporations limit diversity. I always encourage people to vote for their local economy to strengthen your own city and region.

They are an integral aspect of the design process that centralizes wealth.

Since the modern lifestyle has us on the go all the time and few of us can go home for lunch as my grandfathers always did, portable foods become an important aspect of your lifestyle's food systems. Nothing works as well to drive a person (literally) into a restaurant or fast food place at lunch than an insipid, boring sack lunch.

Containers are critical. As with all our other food decisions, the choices we make regarding portable food containers have impacts, for good or for ill, on down the line. I try to avoid plastic as much as possible. I use a lot of jars (which is one reason to save and repurpose glass jars, especially any that you get that have wide mouths). Asian markets have round metal lunch containers referred to as tiffin carriers or tiffin boxes or just tiffins. They come as doubles or triples, with two or three separate container layers for foods.

The Japanese culinary tradition gives us bento boxes, which are small boxes with compartments for food. Many styles are made with bamboo, a very sustainable wood product.

Disposables are not on the menu. Use cloth napkins, a cloth bag or metal lunch box, and reusable serving ware. Tupperware is *the* traditional portable container. However, it is a plastic-based product, and all plastic products cause environmental problems. I like to use glass jars to take my lunch to work, which is often leftover food from the previous day's dinner, or soup, for which glass jars are great. They work for sandwich meat and cheese although I have not found a glass sandwich container yet. Those round metal "Danish Butter Cookie" metal tins are great for sandwiches and other lunch foods. The tin holds two sandwiches quite nicely.

This is one of those good, better, best decision situations. Taking your lunch to work in a reusable plastic container is better than going to McDonalds. Glass and metal are preferable to plastic or McDonalds. If you need to start with a good decision, rather than better or best, that is just fine. One intriguing idea I just ran across is to use a small muffin pan and put several different foods in the muffin cups, wrap with aluminum foil, and put into the lunch box.

In any event, I think it is better to accumulate an array of containers re-purposed as portable food containers. If buying some brand new items helps boost nutrition and save money by bringing lunch or dinner to work or school, it is certainly worth the investment.

Explore new ideas for sandwiches. For years, I bought sliced bread in a plastic bag from the grocery store simply to make sandwiches to take to work. Now however, I make sandwiches using homemade buns or flat breads and wonder why I ever paid money for sliced bread in a plastic bag. I especially like the flatbread sandwiches, which are almost more like a taco, in that each 'sandwich' uses one piece of flatbread. I layer the ingredients, then I fold the flat bread in half when eating it. I pack them flat, and fold it when I pick it up to eat. I wrap sandwiches in cloth napkins.

Leftovers. I often plan ahead and cook extra so that I have enough for lunch the next day or two. Ditto for breads or flatbreads. When I make the breakfast flat bread in the morning, I make extras for lunch.

Simplicity. Peanut butter sandwiches and a carrot salad (made with yogurt, raisins, and pecans) is a fine, tasty, filling, and long-lasting lunch.

Variety is fun too. Notice that the variety of taste, texture, mouth feel, and aroma of the food compliments the simplicity of my peanut butter sandwich with a side of carrot salad. There's chewiness in the bread, smoothness in the peanut butter, crunchiness in the carrot salad with its pecans, and aromas all over the place. There is sweetness in the carrots, raisins and banana, saltiness in the peanut butter, a bit of sour in the yogurt, and the solid flavors of the bread are hard to classify. My flatbreads, for example, have a hint of smokiness in them from the cast iron griddle on which they are stove-top baked. They have protein, vitamins, minerals, fiber, and no huge amounts of fat. The carbohydrates are complex. The foods are all nutrient dense – organic carrots, organic flour, organic banana.

If you're making lunch for someone else, involve them in the process, not only when planning the menu, but also while putting it together.

If packing a lunch for a child or teenager, look at products in your local supermarket that appeal to children and teenagers. Then, prepare healthy and frugal alternatives to pack for the young folks. As with lunches for adults, involve your children in the development of the menu and the preparation of the food.

Pack hot foods like soups or chili in a thermos bottle. Heat the food hot before

filling the thermos. Preheat the thermos by filling it with hot water and letting it sit for about five minutes before putting the hot food in it. Get a good quality metal thermos bottle. That allows you to avoid the microwave oven at work.

"Pockets" are always a popular item for lunch. They are expensive when bought at the supermarket and they feature questionable nutrition and odd chemicals as ingredients. It is easy and cheap to make your own pockets. You can freeze them and zap them at lunch in the microwave. Just about anything you cook can be wrapped in dough and made into a pocket. Make some extra when you're cooking something savory and wrap it in dough for your pocket lunches! Bake and freeze for tasty eating later! To make a pocket – Pinch off pieces of dough about the size of a golf ball and roll them out into circles. Brush the dough with olive oil. Place two or three tablespoons of filling in the middle and spread it out. Moisten the edge of the dough all around the circle with water. Fold it in half and pinch the seam together all around the half circle you just made. Bake until the dough is golden brown.

Fermented foods are great for lunch. Pickles, pickled vegetables, Vietnamese daikon and carrot pickles, etc., all add great nutrition, interest, and taste to portable meals.

Try **bean spreads** for sandwiches. Mash leftover beans, add Greek yogurt (typically thicker than regular yogurt), mayonnaise, mustard, some finely chopped pickle and onion, some additional heat (crushed red pepper, powdered dried habaneros, etc.) and voila, deviled bean sandwiches. This is about as frugal as a sandwich gets, other than the traditional "Slap Sandwich" (take two pieces of bread, slap them together and eat them like a sandwich).

Portable foods often open opportunities to talk to others about food sustainability, especially if you have nice lunches attractively presented. People are curious about food. People with jaded appetites dulled by conventional food always look for something new and tasty.

Food is a great way to tempt people into taking their first tiny baby steps toward a more sustainable way of live. (How's that for stacking functions?) Your portable foods on display at your work or school are a living testimony to the advantages of sustainable living.

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02251 Food Safety

To speak only of food inspections: the United States currently imports 80% of its seafood, 32% of its fruits and nuts, 13% of its vegetables, and 10% of its meats. In 2007, these foods arrived in 25,000 shipments a day from about 100 countries. The FDA was able to inspect about 1% of these shipments, down from 8% in 1992. In contrast, the USDA is able to inspect 16% of the foods under its purview. By one assessment, the FDA has become so short-staffed that it would take the agency 1,900 years to inspect every foreign plant that exports food to the United States."
– *Marion Nestle, Pet Food Politics: The Chihuahua in the Coal Mine*

Food borne Bacteria

The five biggest issues with Food borne bacteria are –

– salmonella,
– listeria,
– E. Coli,
– C. Botulinim,
– campylobacter.

Unfortunately, none of these are visible with the naked eye,

Campylobacter is a particular problem with raw or undercooked poultry. Never eat poultry that has any pink on the inside. Poultry must always be 100% cooked all the way to the bone. If you eat out, always use a knife and fork to cut open pieces of chicken to ensure they have been cooked thoroughly. If not, return it to the kitchen for more cooking. If that happens on a subsequent visit, find another restaurant to eat at since this one obviously doesn't understand the importance of food safety.

C. Botulinim may be found in improperly canned low-acid items like vegetables or meats. If you do home canning, always follow science-based requirements to the letter for canning low-acid foods and avoid damaged commercial canned goods, such as those found in publications of the United States Extension system, the Blue Ball Canning Book, or Putting Food By. Find the National Center for Home Food Preservation online at http://nchfp.uga.edu/.

E. Coli is primarily a problem with meat that has been contaminated with feces and with untreated water. Ground meats should therefore always be cooked well done and be careful where you buy your ground meat. The best source for ground meat is a local farmer, as a pound of supermarket hamburger might have meat from dozens of different animals in several different states and even a foreign country or two. Many grocery stores sell meats that have been mixed with "pink slime," a meat food additive drenched with ammonia to kill bacteria. Up to 15% of a ground meat product can be composed of pink slime (a/k/a lean finely textured beef) without being listed as an ingredient. As of mid 2012, 40% of ground beef sold in supermarkets included pink slime as an ingredient.

Listeria can be found in uncooked meats, vegetables, cold cuts, and soft cheeses. Cold cuts like sandwich meats are a bad idea when bought from the commercial supermarket system. They contain nitrites, which are not good for you, and they may contain mechanically separated meats like the infamous "pink slime."

That's why they are cheap.

Salmonella can be found in meat, poultry, and eggs that have been contaminated with feces. Salmonella infects the ovaries of the chickens and contaminates the eggs before the shell forms. "Over-easy eggs" can be a health hazard. Always cook eggs all the way and never eat or drink raw eggs.

While not a complete guarantee, one safety factor is to buy food directly from farmers and to avoid products from Concentrated Animal Feeding Operations. Nearly all meats and eggs in regular supermarkets come from CAFOs and they are at extra risk for contamination by deadly bacteria.

Food preparation surfaces should be kept clean. Use different cutting boards for vegetables and meat/poultry/fish. Cutting boards should always be sanitized after use. Wash with hot soapy water and rinse, use one of these methods to sanitize them:

(1) Pour boiling water over the cutting board for 20 seconds, or

(2) Rinse with a solution of one teaspoon unscented chlorine bleach in one quart of water.

(3) Soak for 10 minutes in hot vinegar.

All vegetables should be carefully washed. If you peel the vegetable or fruit, wash it first, peel, and wash again. Always wash precut and bagged produce, even if it says "pre-washed."

Here is a recipe for an all-natural rinse for vegetables:

1 tablespoon lemon juice

2 tablespoons vinegar

1 cup of water

Mix well, spray on vegetables and let it sit for a couple of minutes, then rinse with water.

Highly contaminated vegetables, such as greens, may need to soak in a produce wash. For this kind of situation, prepare a solution that is half water and half vinegar, soak the greens for five minutes, then rinse.

Always refrigerate cooked items within two hours of preparation.

Store your vegetables and meats in your refrigerator carefully. Always place meats and poultry in a dish or pan so that juices from the packages do not contaminate other foods in the refrigerator.

There are food safety issues that are under your control and food safety issues that are not under your control. Some of those may be so out-of-control that nobody knows what's going on.

Regarding the food safety issues where you have some measure of control. . . The most basic rules of food safety are:

Keep hot foods hot – above 140 degrees F.

Keep cold foods cold – below 40 degrees F. Refrigerate leftovers within two hours of the meal. Don't thaw or marinade foods outside of the refrigerator. When you thaw meats, poultry, or fish in the refrigerator, put them in containers to catch any leaks from the packaging.

Keep food preparation and serving areas clean. Download document 02251.1 for a government publication on kitchen sanitation at www.ipermie.net that discusses using natural products like vinegar to clean and sanitize your kitchen.

Clean your refrigerator and freezer regularly.

Always **date food** that goes into the freezer or refrigerator.

Wash your hands often during food preparation. Always wash your hands immediately after handling raw meats or eggs. Always wash your hands after you finish food preparation and before serving or eating.

Don't cross contaminate. Keep meat, poultry, fish, and eggs separate from all other foods in your grocery basket and in

your refrigerator. Use separate cutting boards for meats/poultry/fish and vegetables.

Wash dishes promptly after meals. Stacks of dirty damp dishes in sinks are breeding grounds for germs.

Disinfect your sponges before use each time (without exception) or use a clean wash cloth each time you wash dishes. An easy and quick way to disinfect your sponge is to put it in the microwave for one minute. Alternatively, rinse and squeeze the water out of the sponge and soak it in hot vinegar for one minute or hot undiluted hydrogen peroxide for one minute.

The government website, http://www.foodsafety.gov has a wealth of information on food safety topics, organized for easy access.

Food Safety Issues Beyond Your Control

Regarding food safety issues beyond the control of your household kitchen, your best bet is to eat as low on the industrial food chain as possible and to eat as much from your local food system as you are able to access and afford. It is not prudent to trust the government food safety protection system because it is highly politicized, it is under-funded, and it promises much more than it can deliver.

When you buy whole foods and basic ingredients (like vegetables and meats) instead of prepared foods, you eliminate an entire category of possible food safety issues – the commercial food processing system. There are a lot of food safety issues in the commercial food processing system. The more of it you can avoid, the safer you will be.

Paying attention to pesticide/herbicide residues by consulting lists compiled by groups like the Environmental Working Group is another important food safety strategy.

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02261 Meats

Giant livestock farms, which can house hundreds of thousands of pigs, chickens, or cows, produce vast amounts of waste. In fact, in the United States, these "factory farms" generate more than 130 times the amount of waste that people do.
—Natural Resources Defense Council

It takes the equivalent of a gallon of gasoline to produce a pound of grain-fed beef in the United States. Some of the energy was used in the feedlot, or in transportation and cold storage, but most of it went to fertilizing the feed grain used to grow the modern steer or cow…. To provide the yearly average beef consumption of an American family of four requires over 260 gallons of fossil fuel. *—Meat Equals War, web-site of Earth Save, Humboldt, California*

The goal of kitchen permaculture is to support a food system that is just, humane, and more sustainable, where the permaculture ethics of caring for people, caring for the planet, and caring for the future are primary values.

When it comes to meat and poultry, that calls for an end to the Concentrated Animal Feeding Operation system and the development of more integrated, holistic, humane, and sustainable systems of animal husbandry. For a good example of how this works in practice, see Polyface Farm and the work of Joel Salatin http://www.polyfacefarms.com/.

If we want a more sustainable, just, and humane system of agriculture, there must be a market for the products of more sustainable, just, and humane farms. That means people must be willing to pay the price.

Meats from sustainable and humane farming operations always cost more than the supermarket meats. This is, however, a case of getting what you pay for.

Unjust, inhumane, and unsustainable systems of agriculture produce the meats found at your local supermarket's meat counter. One study found DNA from more than 100 different animals in a five pound chunk of supermarket hamburger. Every year we hear of recalls of hamburger due to food safety issues. With the consolidation of the wholesale meat industries, problems in one area may have national consequences.

Many supermarkets adulterate their beef with "lean finely textured beef," also known as "pink slime." Producers manufacture this food item by mechanically separating tiny bits of beef from beef trimmings and gristle. They disinfect the product with ammonia. As much as 15% of ground beef in a supermarket may be pink slime and the retailer does not have to declare the product on the ingredient list. Indeed, they sell meat plus pink slime simply as "hamburger" or "ground beef." Originally this was used only for pet foods but it was approved for human consumption with 2001. In early 2012, researchers estimated that about 70% of ground beef sold in supermarket contained pink slime. Following widespread news reports, some grocers discontinued adulterating their ground beef with pink slime, but others continue to use the additive.

You get what you pay for and grocers sell what you are willing to pay for. Farmers produce what you want to buy. Every time you buy supermarket meats you send a message – "I want more injustice, more ecological devastation, and more unsustainable agriculture and I will pay you for what I want." The only way to send a different message is to spend your money differently.

There are two issues for most of us: price and access. While the situation is much better than it used to be for access to local sustainably produced meats, it is not as good everywhere as should be the case. You will likely have to look. Start at your local farmers' markets and go from there. Other possible places to find farmers selling meats directly to the public include:

-- county and state fairs,

-- local meat processing businesses (look for signs offering custom processing for deer and other wild meats).

-- Local Slow Food conviviums

-- Your nearest Sierra Club chapter

-- Food cooperatives

-- County extension offices

-- Word of mouth – ask around, even in cities, people may have connections with folks in rural areas who sell meats directly to the public.

There are also online national directory listings which may have farms listed for your area:

-- http://www.eatwild.com/|
-- http://grassfedbeefsuppliers.com/
-- http://www.localharvest.org/
-- http://www.eatwellguide.org/i.php?pd=Home
-- http://www.naturallygrown.org/
-- http://www.animalwelfareapproved.org/

The Price Issue

Any way you look at it, humanely raised meats will cost more. The large corporations providing supermarket meats are able to externalize many of their costs. The farmers and ranchers selling into local markets can't do this. So the price people pay for local meats is a more just price that doesn't involve evading some of the important costs involved with producing the product.

There are two ways to finesse this problem:

Eat less meat.
If you are more traditional, have a Meatless Friday. If you are more modern, go for a Meatless Monday – http://www.meatlessmonday.com/ .

Eat less expensive cuts of meat.
We mostly eat ground meats (sausage, ground beef, ground pork), bacon, and locally-made sandwich meats. When using ground meats, I plan to feed four people most days of the week with one pound of meat per meal (about two ounces per person.) I make 8 patties per pound by dividing the meat into 8 portions. I put each ball of hamburger in the middle of a flat surface and then I press a sauce down on top of it so the bottom of the saucer flattens the meat. I then scoop the patty up with a spatula and plop it goes into the cast iron skillet.

Another possibility with ground meats is to extend them by adding in some bread crumbs or rolled oats. You can increase the volume by about 1/3 with this method without anyone really noticing. Add an egg when you do this.

Less frequently we have ham, roasts, brisket, or tenderized round steaks.

By "less frequently" I mean once a week we have something other than a ground meat in our meal. One week we might have ham, the next week a pork or beef roast, the third week brisket, and the fourth week tenderized round steaks. We also buy soup bones, which are large bones with chunks of meat attached, which are very inexpensive even when

bought directly from farmers. We make stock for soup, sauces, and gravies, and use the meat in casseroles and we make a sandwich spread from them.

How to buy meat directly from a farmer.

If you can't find a farmer, food cooperative, or other retail store that sells packages of grass fed meat from local farms, you can buy meat "by the steer" from a farmer. A thousand pound steer will yield 350 to 400 pounds of meat, which is a year's worth of beef for the average American family (average annual consumption per person is about 67 pounds). A whole pig will yield you about 150 pounds of meat.

Most families can't buy a whole year's worth of beef at once. They would have a double problem of money and storage. I suggest recruiting some friends or family and split a beef up to 8 ways. Most butchers will be familiar with this kind of deal and will cut the meat and pack it according to your specifications. You can specify how you want the beef cut (thickness of steaks and roasts, size of frozen packages, how much roasts compared to how much ground beef, etc.) You can also have the bones packaged for soup stock.

Some of the butchers sell beef by the half, quarter, or eighth beef, so you may be able to get less than a whole beef directly from the butcher, or the producer may have other customers who want to split one with you.

There are different methods of pricing beef (or pork).

Sometimes the price is quoted "live weight" – this is the weight of the live animal. The second type of price is "hanging weight" – this is the weight after the animal has been butchered, skinned, and the internal organs removed. It is about 2/3rds of the weight of the live animal. The third type of price is "dressed weight" – this is the weight of the actual "meat in your freezer". It is about one third to 40% of the weight of the live animal.

Besides the purchase of the animal, you will pay processing charges to the butcher. This might be around forty to fifty cents per pound. Be sure to inquire whether that is based on the live, hanging, or dressed weight. Curing meats carries an additional charge per pound for the cured meats (hams, bacon, sausage, etc.) It usually pays to shop around when it comes to processing charges.

After you buy it, the producer takes the animal to the custom butcher, and then later you pick up the meat from the butcher, frozen and wrapped in good quality butcher paper or a heat sealed plastic film.

How do you find a custom butcher? Look in the classified ad section, in the Yellow Pages under "Butchers" or "Custom Butchers", "Wild Game Processing". Watch for roadside signs, especially during hunting season. Ask around. A good custom butcher can help you develop your family's food security.

Seitan

Here's how to make a pretty tasty meat substitute. It's called "Seitan."

Seitan is a Japanese word for what we might call "gluten meat". You start with flour. I recommend using organic whole wheat flour.

Mix the flour with water to the consistency of bread dough.

Soak in a bowl of water for about one hour.

Wash it under running water so that the bran and the starch wash out, leaving behind only the wheat gluten. To do this, you need a bamboo steamer, which is a round circle with screen, and a colander. I put a pot in the sink (so I didn't have to bend over), the bamboo steamer on top of the pot, and a colander on top of that. I put the dough in the colander and start the water running.

Hold the lump of dough under the water, and break it into ever smaller lumps, and the bran and starch wash away. The bran collects on the bamboo steamer screen, and the while milky-looking starch water collects in the pot. After about ten minutes, the dough seems to be on the verge of disintegrating completely, but then it begins to stick together. When no more bran and starch is washing out and the lump of raw seitan holds together nicely, form it into loaves. Steam it for about 45 minutes.

Prepare in any way that you like to eat seitan. You could cut it into to cutlets and fry with onions, garlic, and peppers. You could cut it into cubes and add to tomato sauce and serve it over spaghetti. You could smother it with a vegetarian gravy.

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02271 Designing your kitchen record-keeping system

History doesn't repeat itself, but it does rhyme. – *Mark Twain*

Most people will find these records useful for planning and developing their personal food systems.

– What food did you buy from what source and how much did it cost?

– If you produced food – how much food did you produce or process, and when?

– Food storage (when you acquired the item)

– Menus and shopping lists

Since record-keeping is a task that involves time, most of us avoid it. Our records, however, can tell us over time what happens with our household food economy. This helps you to make budgets and to understand how you can decrease your outgoing money paid for food. Maybe you could do some food processing or increase your home food production. If you keep records for as long as a year, of all your grocery purchases, and arrange them by your local/regional food shed and the international food system, you will have valuable data that you can use to discern ways to reduce your dependence upon the international food system, increase your participation in local food systems, and grow your domestic production.

Observe.

What records do you need to keep? Make a list of the information items you need for each list you feel you need. Make a list of any material items needed. File folders? Notebook? Computer database? Etc.

At minimum, I think records of food acquisition and production, menus, and food storage are the basics.

Do you want to record time? Involvement of other members of the household? Decide at the beginning what you need and want to track in your record-keeping system.

What are your usual habits and procedures when you source food? Are there "contemporary records" produced when you shop for food (e.g., receipts)?

Where do you keep the receipts and are they accessible? Stop throwing away receipts and enter their info into a spreadsheet.

What other sources provide information you need to "remember?"

What existing records, if any, do you keep about your kitchen work?

Study and Evaluate.

What platform will you use for your records? Spreadsheet, word processing, 3-ring binder, notebook?

What equipment do you need? (Box for receipts, computer, pencils, file folders, scale to weigh garden produce, etc.)

How will keeping these records fit into your present kitchen routine?

Do you have the right equipment?

Who will do this work? Do you (or he or she) have the necessary skills?

Do others need to learn these skills?

Do you have enough space? Need more?

What kind of back-up do you need in case of catastrophic loss?

Do you need a records-keeping station in or near your kitchen?

How can you make this easy? Any additional functions that can be stacked on this activity? Any beneficial connections with other activities in the kitchen and elsewhere in your life?

Design.

Make your design recommendations based on your observation and evaluation. For practice, use at least three of the methods identified in 00381 to do this small design.

Stage your decisions.

What comes first? Middle? Last? Never mind the fact that this is a small design, put first things first and second things second and third things third, so you get a feeling of what it is like to organize a set of tasks such as this.

Budget.

If any of this will cost money, get some estimates and develop a budget. Decide on a source of funds.

Write the report.

Write the report and add it to your lifestyle design.

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02281 Food Preservation

To 'put by' is an early nineteenth century way of saying to "save something you don't have to use now, against the time when you'll need it.' You still hear it today from old-time country people, and applied to food it is prudence and involvement and a return to the old simplicities.
Putting food by is the antidote for running scared. *Janet Greene*

The primary methods of food preservation accessible for most households are:

– Canning, boiling water and pressure methods.

– Sugaring

– Freezing

– Dehydrating

– Fermenting

– Pickling

– Curing and Smoking

This chapter gives a brief overview of each method and points you to sources of additional information.

Food preservation takes time, effort, and space. It requires some knowledge and attention to detail. Some equipment makes it easier and more efficient. Having said that, food preservation is not rocket science. It is easy to do. It is especially fun when done with others. It provides a LOT of value for the work and resources invested in it.

As a hedge against hard times, it is particularly important for city folk interested in making their urban areas more resilient.

If you are only going to buy and read one book on home food preservation, you should get *Putting Food By*, by Ruth Hertzberg, Beatrice Vaughan, and Janet Greene. It is now in its fifth edition and is available new and used from major (and minor) booksellers and libraries "everywhere." It's even available in a Kindle edition. If your local library doesn't have it, you can certainly get it via an inter-library loan.

The National Center for Home Food Preservation, online at http://nchfp.uga.edu/ is another good source for accurate, science-based information on many kinds of home food preservation.

In the United States, your local County Extension office is a reliable source of accurate information on boiling water and pressure canning.

Pressure and Boiling Water Canning

Boiling water canning is for higher acid foods like fruits (including tomatoes, which botanically are a fruit) and anything incorporating vinegar such as pickles. Pressure canning is for low acid foods – anything with meat or vegetables. Vinegared pickles are an exception for vegetables, but there are no exceptions from pressure canning for meats.

Boiling water canning involves submerging the sealed jars into rapidly boiling water. It must be deep enough so that there are 2 inches of boiling water on top of the jars. One popular market item is the graniteware boiling water canner, which is a large kettle with a removable rack that holds the canning jars upright in the boiling water.

Every vegetable (except tomatoes and pickled vegetables), every meat, and every seafood must be canned in a pressure canner. It's the only way to **destroy the botulinum bacteria** which can grow in jars of low-acid food. That's because they must be heated to temperatures greater than 212 degrees (typically 240 degrees Fahrenheit or 116 degrees Centigrade). To do this you need a specially designed pressure canner. An ordinary pressure cooker is not quite as good for this purpose, if only because they are much smaller.

Ignore any claims along the lines that "My great-grandmother never used a pressure canner and she never killed anyone." Time distorts memories of what people actually did in the old days.

For boiling water and pressure canning, you need jars manufactured for the purpose of canning.

In the United States, canning jars come in ½ pint, 1 pint, 1-1/2 pint, 1 quart, and ½ gallon sizes. Most folks do not use ½ gallon canning jars because they have to be processed for such long times it tends to impact the texture of the food. Half gallon jars however are great for fermenting, about which more will be said in a moment. Don't use repurposed mayonnaise and commercial pickle jars for home canning although they would be fine for fermenting.

You need the two piece screw band metal lid OR reusable canning lids.

See http://www.reusablecanninglids.com/ for info about the Tattler brand, which is the one commercially available. On one hand, they have no BPA. On the other hand, they are made of food safe plastic. On the gripping hand, they last a long time. On the fourth hand, they are small investments in plastic and there are much bigger problems in the plastics industry than the making of reusable canning lids.

The more traditional metal two-piece canning lid is readily available through commercial sources. They consist of a lid and a round ring that holds it in place. The ring can be reused endlessly. The lid, once used for canning, is a one-time resource expense.

Two more items of equipment are necessary:

Jar lifter, to put the jars into the boiling water and remove them.

Jar funnel, to make it easy to fill jars.

Besides Putting Food By, the Ball Blue Canning Book is a great source of reliable science-based information on boiling water and pressure canning. It includes many recipes. It is readily available at libraries and booksellers, new and used.

Sugaring

This is the process of preserving food with sugar. We know it best as making jam and jellies from fruit. Jam includes the fruit. It has a different texture from jelly made from fruit juices. Besides sugar, jams and jellies often require the addition of pectin so that they "jell" or a high pectin fruit like apples or quince.

A sub-category is fruit butter, like apple butter, where you cook a fruit for a long time to reduce its quantity to half or less the original amount.

Sugar syrup can be used to preserve fruits, often in conjunction with alcohol. Brandied peaches are a popular holiday presentation. The Putting Food By book has recipes for jams and jellies and illustrated instructions on making them.

Freezing

Freezing is a common way of preserving fruit, vegetables, and prepared foods. Many cooked items can be frozen for eating later. People use their freezers as convenience stores, since it is often just as easy to make several food items as it is one. The extras can be frozen for eating later.

One of the most important requirements for freezing food is to label the container. A frozen item covered with ice crystals is not easy to identify without a label. Most uncooked vegetables and fruits to be

blanched before freezing. This involves plunging the cut up food item into boiling water for a short time, then into cold water to halt the cooking process. Putting Food By has a considerable amount of information on this subject.

Dehydrating

This is one of the oldest methods of food preservation. Many appliance stores have small home food dehydrators, with 4 to 6 trays, that work well. They are low power consumers, which is good since during the season you may be operating it 24 hours/day seven days a week.

It is a great way to make portable snack foods, like dehydrated apple chips, which are quite expensive when bought in stores. Plus in the store they come packaged in extra cellophane and plastic which is not very green.

You can find plans for various kinds of solar food dehydrators at http://www.builditsolar.com/Projects/Cooking/cooking.htm#Drying .

Mother Earth News has plans at: http://www.motherearthnews.com/Do-It-Yourself/2006-08-01/Build-a-Solar-Food-Dehydrator.aspx

You could put a tray of food to be dehydrated on the dash of a car. Park it pointed south into the sun, and leave it there all day with the windows rolled up.

Fermenting

Fermenting is easy. It is so easy it wins the prize for convenience. You chop the vegetables and combine with whatever seasonings you want and pack them into jars. You add pure salt (not iodized) and some whey and top off with water. Put a couple of cabbage leafs on top and a small clean stone to keep everything under the brine. Screw the lid on tight, let sit for four days or so, and voila, fermented vegetables. Keep in a cool dark place (root cellar temps) or in your refrigerator. The best book to read is Nourishing Traditions by Sally Fallon and the next best book is Wild Fermentation by Sandor Katz. http://www.wildfermentation.com/ Both are available at libraries and at booksellers everywhere.

Where would you get whey you ask? You would NOT get it from that powdered stuff sold to body builders. If you aren't part of a food coop with local foods, you could just get some yogurt, preferably real yogurt without gross additives, put it in some cheese cloth. Set it up so its over a bowl. The whey will slowly drip out of the yogurt. You will end up with Greek yogurt (which is thicker than regular yogurt because some of the whey has been removed) and whey. The book Nourishing Traditions describes this process in much greater detail.

Pickling

Pickling is not quite the same as fermentation. You can use fermentation to make pickles, or you can make a pickling solution out of vinegar and make pickles. Besides whole pickles, you can make relishes (which involve shredding or cutting up the vegetables. Jars of pickles may or may not be processed in boiling water. If not, they must be refrigerated. Putting Food By and the Ball Blue Canning Book have lots of information on this kind of food preservation.

Curing and Smoking

Curing and Smoking are, for most people, more advanced home preservation arts. Curing of meats requires the ability to hold the products between 36 and 38 degrees. As with canning, curing and smoking meats lends itself to community endeavors. Putting Food By has a lengthy section on this subject.

Other Methods

This is where we put things like making your own ketchup, mustard, and other condiments. I think this is one of the more important areas of home food preservation, since commercial condiments contain ingredients that are impossible to pronounce, which is never a comfortable situation. As with any of the other food preservation arts, there is a short learning curve but it is easy to get up to speed. Home made condiments are

often much less expensive than their store-bought versions.

Condiment Recipes

http://www.thekitchn.com/all-the-fixins-make-your-own-condiments-172567

http://www.saveur.com/gallery/Homemade-Condiments/

http://www.budget101.com/frugal/condiments-recipes-179/

A great book on the subject is Better Than Store-Bought, by Helen Witty. It covers much more than condiments.

The Importance of Home Food Preservation

Why should city people be interested in this? At first glance, home food preservation seems at once rural and antique. That's yesterday's thought. Here are seven good reasons for home food preservation in urban areas:

1. Quality of food. When you do home food preservation, you control the ingredients and the process. You know exactly what goes into the process. You don't have to guess or hope. You taste the quality with every bite.

2. You customize the process to your own tastes. Whatever tastes you prefer in condiments and pickles and etc., you can do it with home food preservation. You don't have to accept the dumbed down tastes of commercial foods.

3. Supports local food systems. Most commercial food preservation is national-scale. It doesn't support local food systems. Home food preservation supports local food systems when households produce food or buy from local farmers and preserve it for eating later.

4. Makes cities more resilient. Household food preservation shortens the supply chains that supports cities. It makes urban food systems more redundant.

5. Home food preservation is cost-effective. While it may not be less expensive than canned foods produced by national corporations and sold in national stores, it is a cost-effective method of preserving locally produced foods for eating later. Depending on the cost of the produce, home food preservation may be less expensive than commercial foods. The cost of canned goods continues to increase. Sometimes the increase is obvious – the price goes up. Other times the increase is indirect – the price remains the same, but the content decreases. The 16 ounce can has pretty much been replaced by 14.5 and 15 ounce cans. If you open a can of corn, half of the contents will be liquid. A home-canned pint is 16 ounces and it will be mostly food, not water.

6. Home food preservation can support community organizing efforts. Most home food preservation activities are more fun in a group, whether it be of your own family or household or your neighborhood. It provides a reason for people to come together and work on a common project that provides great value to the neighborhood.

7. Home food preservation cares for the earth and cares for people. It is a more sustainable activity than the national food processing system.

Our testing question is simple: How can we make home food preservation easier to access for urban folks?

You can readily see the advantage of doing food preservation in a group in a larger kitchen. Religious organizations, schools, and other institutions with larger kitchens can provide a great public service by investing in some large sizes of canning equipment and making their facilities and resources available for community use. A group of households in a particular geography could invest in one set of equipment. This portable canning infrastructure could either be passed around from kitchen to kitchen in season, or a larger kitchen at a religious

organization or school could be borrowed during the big canning season and the group could work together to process a large amount of produce.

This kind of group activity works even better when partnered with one or more farms or food coops who would supply sufficient supplies of food to be processed.

Another structure that could support this kind of urban activity is the neighborhood service center. Such places could be equipped with larger kitchens and food preservation equipment for use by patrons.

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02291 Home Food Storage

It wasn't raining when Noah built the Ark.

Food storage is an important **persistence** (ability to resist damage) and **resilience** (ability to recover after damage) issue for urban food systems. The modern commercial food system is strictly a just-in-time operation. If something stops the incoming deliveries, the grocery stores empty out fast. The general consensus seems to be that big cities have about a week's worth of food in their stores and maybe a month if there are regional food warehouses in the area. Other than that, it's what's in people's homes and could be brought in from the city's nearby foodshed.

The brittleness of commercial food systems is one of the reasons why there are three essential urban food system adaptions that constitute a "food security triangle:

1. Growing food in cities, in both gardens and using edible landscape techniques.

2. Encouraging food production in the city's nearby foodshed by buying foods from local farmers.

3. The third leg of that urban food security pyramid is home food storage.

The basic rule of food storage is simple: Store what you eat and eat what you store.

If you wander around the internet, and look at commercial food storage sites, you will see a lot of stuff about storage beans and rice and wheat. This is fine advice, as long as you use beans and rice and wheat in your daily diet. If you don't use these foods, don't store them. An emergency is not a time to start a new diet. You want to store familiar, comfortable foods that you understand how to prepare and that your family and household like to eat.

If you eat a steady diet of fast food, we obviously have a problem, since it isn't likely that you will be able to store adequate amounts of commercial fast food. There are interesting urban legends, however, about various national fast food burgers which seem to resist decay. I wouldn't bet on that for my food storage. Besides, do you really want to eat something like that? So fast-food-aholics need to work on their diet and adapt a food storage program to their new and improved eating plan.

If you know how much food you eat in a month, that gives you some clue as to how much food you want to keep on hand.

The Latter-day Saints practice food storage as a religious discipline. They say to store a year's worth of food. Many of us would be hard-pressed to do this in one big shopping spree. That's where clever design comes in. In other words, don't go out and buy everything all at once. Instead, build up your household inventory gradually.

Think of this as keeping some of your household's savings in the form of food.

The list of issues with home food storage includes:

– Storage,
– Storage,
– Storage.

Given the smaller sizes of urban apartments and houses, the "where" of storage is always an issue. Here is where it pays to be clever.

Repurpose food storage as furniture. Boxes of food storage, draped with attractive fabrics, can be serve as coffee tables, end tables, and ottomans.

Many of us use space in closets poorly. Invest a bit of time and effort in **reorganizing your closets** in order to free up space that can be used for food storage. Shelves in closets are great places to store food.

Look for wasted spaces, such as underneath beds. You can elevate a bed and create even more room underneath it. There are lots of storage solutions for putting things under beds, starting with the simple and ecologically-not-bad-choice of bottles in corrugated cardboard.

Make a **wall of shelves** and hang curtains in front of it.

Here is an interesting video about a **sofa that conceals a food storage** area capable of holding 500 cans. http://www.youtube.com/watch?v=FCnXfO7YMfk

Make some **seating cubes**. These are 18" cubes with hinged lids. Put casters on the bottom, padded seating on top. This will hold about 4 cases of commercial cans, or a similar amount of home canned jars.

See what you can do with five shelves at http://www.youtube.com/watch?v=Lv1uDkLQCIM&feature=relmfu.

Use a **neighborhood service center** as a place to store food. It would be located convenient for access by a neighborhood. It provides services to the area. These could include a processing kitchen for food preservation projects, freezer space, food storage space, and clothes washers.

Label everything you bring in or produce at home for food storage. You need to rotate your food supplies and to do that you need dates on everything.

Keep an **inventory with storage locations** so you know where things are.

One fun site for food storage beginners is Food Storage Made Easy – http://foodstoragemadeeasy.net/ – run by two young moms who can help you get up to speed with this important aspect of urban sustainability.

Don't be intimidated by the thought of storing food, especially if you have a small apartment. You can do what you can within your present resources, which include storage.

Food storage provides an important short-term hedge against both systemic issues and personal crises. There were times in my life, when I would not have had food to eat if I had not had some food storage. While food storage is important and has several functions stacked on it, it's not possible to store our way through the future. Everyone needs to be involved with creating sustainable urban food distribution systems.

One Month of Food in a Computer Box.

One 20 quart size powdered milk (4 pounds)

One 10 lb bag rice

Two 4 lb bags beans

Two 3 lb bags of macaroni

Three 13 ounce quick oats

Two 5 lb bags flour

One 8 ounce baking cocoa

One 4 lb bag of sugar

One 10 oz baking powder

One 8 oz baking soda

One 4 lb jar of peanut butter

One 1 qt bottle of syrup

30 miscellaneous cans (soups, vegetables, chili, etc.)

One bottle hot sauce

One bottle soy sauce

9 miscellaneous spice bottles

2 vitamin bottles

One 4 ounce bottle of vanilla extract

One 4 ounce bottle of yeast

One 16 oz bottle of jalapeno peppers

I found a 23 inches by 21 inches by 10 inches computer box, and all of above food fit into the box, with the lid folding flat and would fit underneath a bed or table. . The above would provide the following daily servings for one person:

-- 2-1/2 cups milk
-- 1-1/2 cups cooked rice
-- 1-1/2 cups cooked beans
-- 1-1/2 cups cooked macaroni
-- 1 cup cooked oats
-- 1 cup flour
-- 4 Tbs. peanut butter
-- a quarter of a miscellaneous can of food
-- Plus daily sugar and spice

Depending on the assortment of cans, a variety of stuff can be made from these ingredients, including cinnamon rolls, oatmeal cookies, peanut butter cookies, tuna casserole, etc. This box fits underneath my bed.

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02301 Design a fermentation station for your kitchen

The process of fermentation offers other benefits beyond preservation. Fermented foods are easier to digest, have natural preservation properties and more available vitamins and minerals. The foods still contain live cultures that offer a boost to both the digestive tract and the immune system. – *Sarah Flessner, BS, dietetic student and Mark Kestin, PhD, MP, dean of the School of Nutrition and Exercise Science Bastyr University Natural Medicine, Fermented Food for Health*

Fermentation is an ancient method of food preservation that remains important in our present era.

Fermented foods are great tasting table pleasers. They provide taste and nutrition.

Fermenting is one of the easiest methods of food preparation and preservation that can be done in the home. You can make as little, or as much, as you want. In other words, make one pint or a half dozen gallons, whatever scale is appropriate to your situation.

The purpose of this assignment is to design a fermentation station for your kitchen. If you don't have a kitchen, use this assignment to work on your general design skills. If you think you would never ever try fermenting foods, then design something else useful for your home food system.

The book Nourishing Traditions by Sally Fallon is one of the best introductions and recipe collections for fermented foods.

To learn more about fermenting foods, consult these websites.

http://www.nourishingdays.com/2009/07/the-benefits-of-fermented-food-lacto-fermented-vegetables/

http://nourishedkitchen.com/recipe-index/ferments-cultured-food/

Fermentation Wiki
http://en.wikibooks.org/wiki/Cookbook:Fermentation

http://sustainjefferson.org/files/Shivani%20Arjuna%20Fermentation%20Class.pdf

http://www.wildfermentation.com/

Observe.

What are your goals concerning this project? What do you want – and need – to accomplish? What priorities do you discern among your goals? If you have never done fermentation, one of your first steps must be to start fermenting foods. That way you get a feel for what to do, how to do it, and the stuff you need.

What do you need to do fermentation in your kitchen? That list includes ingredients, cooking equipment, pans, measuring cups and spoons, maybe a food processor or stand mixer. Make a list, including the most common ingredients, and include it as part of your report.

What do you do when you ferment foods? What are the motions, tasks, and etc. that baking involves? Do any of these motions or tasks fall into reasonably discrete categories? (Hint: don't forget "Clean up when finished.")

Who does this work? One person by himself or herself? The whole family? Rotating jobs?

What energy does fermenting require? Where do you get your ingredients and supplies?

If you already make fermented foods, where do you do this at present? How much space do you need? How often do you ferment foods?

Where are fermented foods stored? If you expand your production, do you have enough storage space?

Is this primarily a seasonal activity, or does it go on all year?

Study and Evaluate.

Do you have the right equipment?

Do you have the necessary skills?

Do others need to learn these skills?

Do you have enough space? Need more?

How often do you ferment foods? Do you want to do this more often?

What do you like the most about this kitchen task? What do you like the least?

Are your ingredient sources primarily world food shed or local/regional? What about supplies and equipment? (Jars, lids, crocks, pickling salt, spices, etc.)

Can you do this with less fossil energy?

What connections does fermenting have with other elements of your site? What functions are/can be stacked on this activity? Does fermenting serve more than one function in your design?

Design.

Make your design decisions based on your observation and evaluation. During this design work, use three of the methods identified in 00381 that you haven't used in any of the previous design challenges. If you have already used them all, pick three at random and work with them.

Will you design a temporary station, to be set up for each fermentation session and then take it down after clean up? Or will it be a permanent place in your kitchen?

Where? When? What? How?

Any changes you want to make to the sources of your ingredients? Anything you can move down the Local Food Pyramid? What connections does the fermentation station have with other elements of your design?

Stage your decisions.

What comes first? Middle? Last? Never mind the fact that this is a small design, put first things first and second things second and third things third, so you get a feeling of what it is like to organize a set of tasks such as this.

Budget.

If any of this will cost money, get some estimates and develop a budget. Decide on a source of funds.

Write the report.

Write the report and add it your lifestyle design.

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02311 Nutrition Readings

"About eighty percent of the food on shelves of supermarkets today didn't exist 100 years ago." – *Larry McCleary, Feed Your Brain, Lose Your Belly*

There are different philosophies of nutrition and discussions of nutrition can get as heated as a religious or political discussion. I am not in the business of prescribing any particular philosophy of nutrition. Instead, I believe you should read widely and make your own decisions.

Here are some online readings that represent four of the primary schools in food nutrition.

The first is about the USDA Food Pyramid. It can be fairly said that that describes the position of mainstream nutritionists.

The second is the Weston Price Foundation philosophy, which emphasizes whole and organic foods, fermentation, and many traditional food practices.

The third is lacto-ovo vegetarianism, which is a vegetarian diet that includes eggs and dairy.

The fourth is veganism, which uses no animal products whatsoever.

USDA Daily Food Plan

http://osufacts.okstate.edu/docushare/dsweb/Get/Document-3019/T-3172web.pdf

Weston Price Foundation on healthy eating

http://www.westonaprice.org/basics/principles-of-healthy-diets

Oldways: The (Lacto-Ovo) Vegetarian Diet and Pyramid

http://www.oldwayspt.org/resources/heritage-pyramids/vegetarian-diet-pyramid

Speak for Animals: Vegan Diet

http://www.speakforanimals.info/vegan

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02321 Edible Landscaping

Plant your own garden and decorate your soul, instead of waiting for someone to bring you flowers. – *Veronica A. Shoffstall*

When people think about growing food in urban areas, their first idea is to hide a vegetable garden somewhere in the backyard. All too often that means "out of sight, out of mind."

In reality, the possibilities for food growing in urban areas are much more imaginative and extensive than the traditional backyard garden.

Since growing space in cities must compete for space with all other urban functions, it is important to stack the function of food production with other important urban functions.

One such urban design element that can serve several functions is landscaping. Let us count the functions of urban landscaping:

1. Shade

2. Beauty

3. Cleansing the air

4. Sequestering carbon and giving off oxygen (via photosynthesis)

5. Wildlife refuge and food (animals, birds, insects)

6. Adds value to properties

7. Annual leaf litter fall feeds soil as it decomposes (composts)

8. Delineates boundaries

9. Moderates the urban heat island effect.

10. Produces high quality nutritious food at low cost

Food production is the proverbial cherry on top of that ice cream sundae.

Let's think about a forest for a moment. We can easily find seven different layers of vegetation:

(1) mature canopy trees,

(2) under story trees,

(3) shrubs and bushes,

(4) herbs

(5) ground covers,

(6) climbing vines,

(7) roots.

We find micro flora and fauna, as well as insects, worms, and other wildlife. All contribute to the greater whole around them.

On private property, the job of incorporating edible plants with landscaping is fairly straightforward if the property owner agrees. Public, institutional, or commercial properties will be somewhat more involved, due to the additional stakeholders..

Our collective iPermie goal is to get as much edible landscaping in place in urban areas as possible. We need more fruits and nuts in urban areas!

In all your urban designs, do your bests to fill all seven layers of a forest, as identified above, don't solely restrict yourself to fruit and nut trees.

How?

Keeping in mind Section 1's lessons on invisible structures, we can sketch some ideas as follows.

Sell the benefits, not the ideology. Don't talk about global warming or peak oil or brittle food systems. Instead, go on – at length – about the benefits of edible landscaping.

Start with religious institutions and schools, including universities and colleges. Both educate young people and have concerns about meeting the needs of low income people. Point out how expensive fruits and nuts are, and how useful it would be to have additional local production of fruits and nuts. Point out the advantages of fruit and nut trees for teaching biology and botany. When approaching a particular religious institution, it is always helpful to have someone on board who is a member at that location. The same is true of schools. Getting parents and teachers involved early on helps build for success.

Listen to what the group is interested in. If you want to install forest gardens at local schools, spend time talking with the stakeholders at each school so you can respond to their actual needs and desires.

Offer all of the information they will need to make an informed decision. Establishing urban edible landscape plantings can be work intensive, and you will have more success in encouraging people to do this work, and pay for the expenses if they start with a complete written presentation, including cost and time estimates. Be prepared to produce such a design for the group, with their assistance. Work with your local county extension office to compile lists of recommended varieties of edible landscaping plants for your area.

Promote an Economy of Abundance. One comment you will hear is "all the fruit will be grabbed by a few." Counter such concerns with discussions of the advantages of an economy of abundance and suggestions to plant more trees and design a system for sharing the fruit.

Let's review some permaculture principles and strategies as applied to designing urban edible landscaping.

1.Observation.

"Gardener, know thy land," would be the gardening equivalent of "Physician, heal thyself." You can learn a lot by simply looking at the land that is the object of your design, whether it is great or small. Consider my little 1/7th of an acre. You wouldn't think a little patch like that would have microclimates but it does. I have cold spots and warm spots, some places are dry and others wet. My learning processes and impacts on this land are works in progress, so the need for observation never ends. If I plant a tree, it will change that place. Before you start, spend time simply observing the land. Some things, like trees, can't be moved once they get established. Think hard about where you put your trees.

Observation includes you as the garden designer and the other stakeholders in the community. All of this impacts your design. If you think about the whole field of landscape design, it's easy to see there are many schools and many possible ideas for design principles. For example, a formal garden would be absolutely symmetrical, balanced, lots of straight edges and if there are curves, they are perfect. A more natural garden would not be so symmetrical, there wouldn't be many straight edges and curves might take many shapes. Between these two poles there are many options. Spend time observing yourself and your community.

2.Multiple uses.

Edible flowers –

(1) are beautiful,

(2) are tasty to eat, and

(3) attract bees and beneficial insects.

Logs used as landscape elements provide –

(1) habitat and food for worms and other little critters,

(2) places for humans to sit,

(3) cat petting perches,

(4) are aesthetically pleasing to look at, and

(5) potentially could grow mushrooms.

Not a bad deal for something that a lot of people would just throw away.

The vines on a trellis –

(1) yield grapes (wine & jam),

(2) leaves (mulch and stuffed grape leaves),

(3) provide shade.

(4) Provide food and shelter for wildlife including birds and bees.

Mulch –

(1) moderates the temperatures of the ground,

(2) helps control weeds,

(3) encourages earthworms, and

(4) composts in place, thus feeding soil flora and fauna and the plants.

Not bad for something that people put in plastic bags and bury in holes in the ground. There's lots that has to be done even in a small garden ecosystem, and it's better for the plants to do their job than for the gardener to rush around doing backbreaking labor and spending piles of cash to make up for the lack of a functioning ecosystem in the garden.

3.Relative location.

Everything in the garden connects to everything else. If you ignore the way plants interact with each other and the environment, you're just making extra work for yourself. If you look at nature, nothing grows in isolation, and also not in monocultures. Rather, plants exist in communities. You have mature trees, under story trees, climbing vines, herbs, and etc. all growing together, mutually supporting each other.

Permaculturists talk about plant guilds in the same way that vegetable gardeners talk about companion planting. For example, a plant guild centered on a fruit tree would want plants that are nutrient accumulators, nitrogen fixers, mulch producers, bee plants, pest repellants and ground covers, while at the same time producing useful products. Everything has places in the garden where it will do well, and where it will do not so well. The trick is to find good places for everything so they can do their work as plants, thus taking a load off the gardener's back.

4. Many elements support each important function.

Multiple elements supporting critical functions is vital for resilience. Consider what happened in Ireland due to the potato blight. How many millions starved or immigrated because one plant failed? Natural systems incorporate a diversity of species of flora and fauna, and so must the edible landscape. If you come to my house for a salad in summer, it will have maybe 15 different items. Imagine what an upscale restaurant would charge for such a plate. I think that ultimately we will have more than 200 different varieties of useful or edible plants growing on our little land. It will take a few more years to get there.

5. Design for energy efficiency

Edible landscaping must be designed for energy efficiency. Energy refers to fossil fuels. It also is about human effort. High maintenance designs will not be popular with the urban institutions you want as edible landscape cooperators.

Thus, it is better to front-load some work at the beginning, as you set things up, so there is less to do later. The best kind of front-loaded work of course is intelligent design so you don't waste time, money,

effort, or resources, while at the same time achieving a sustainable yield that can be harvested for the benefit of the community.

Edible landscaping moderates the urban heat island effect and reduces the need for air conditioning in buildings shaded by trees, shrubs, and vines.

Once you plant an apple tree, you don't have to plant it again next year. This is one of the real advantages of perennial edible landscaping plants.

6. Use biological resources, minimize inputs.

It's always tempting to spend money for quick fixes, but biological resources are better – and they cost less money. Play the frugality card early and often when pitching urban edible landscaping designs. Chemical fertilizers, herbicides, and pesticides add to the expense of urban landscapes and they carry hidden externalized costs that are often not talked about.

There is no necessity that requires the use of pesticides, herbicides, and chemical fertilizers. Pesticides, herbicides, and chemical fertilizers come into play when humans have destroyed an ecosystem or when we fail to create or properly manage an effectively working ecosystem. It makes no sense to destroy the soil that should nourish plants. The point of the careful design work that needs to go into urban edible landscape design is to create systems that have no need for chemical fertilizers or herbicides/pesticides.

7. Energy/resource cycling.

Due to poor design, energy sinks proliferate our present system. We spend piles of money to heat water and then throw all that heat away by draining the hot water into a cold sewer in the ground, without even trying to at least recover the useful heat, not to mention reuse the water. Many such examples of flagrant waste and energy gluttony could be cited. We should remember what our grandparents told us: WASTE NOT, WANT NOT.

One way to waste not want not in gardening is to recycle organic materials to make compost. Turn food scraps, garden waste, newspaper and etc. into useful compost via natural processes. If not composted, we throw them in the trash and bury them in a landfill or wash them down a sewer via a "disposal." Kitchen disposal's should be renamed as "money shredders" or "wealth wasters" because that's what they are.

Natural forests and prairies do not waste energy in this matter. Everything cycles and recycles. The more your community does this, the less work you have to do, the healthier the garden will be, and the more bountiful will be the harvest.

8. Work with natural forces, not against them

In nature, if a piece of earth becomes bare, plants rush in to heal the breach. First come plants that we call weeds, then bushes and later the trees. This is the principle of natural succession. In an edible gardening landscape, you help this process along by substituting useful or edible plants for volunteers.

Much gardening and landscaping these days is a matter of working against, not with, nature. From this attitude of opposition and dominance comes our heavy reliance on commercial fertilizers, pesticides, and herbicides. We kill the natural fertility with poisons and chemicals, and then we try to grow plants in a dead growing medium by substituting artificial fertilizers for the complex natural system that has worked pretty well for several hundred million years.

But even if we avoid chemical traps, there are still plenty of ways we work against, rather than with nature.

People often come by my house and they want to help. Generally, the first thing they do is to reach down and pluck up a dandelion (dandelions grow in just about every part of my property). This is such a

problem I want to put up small signs here and there – "Please don't pluck the dandelions." Dandelions are incredibly useful. Their long taproot brings up trace nutrients from down deep, they contribute to mulch, and all parts of them are edible. Not to mention how pretty their yellow blossoms look. Pulling them works against nature. It is better to let them alone, and enjoy their beauty and usefulness, and let them do their job, thus working with nature. Planting and encouraging nutrient accumulator plants is a way to use biological resources. If you pluck a dandelion, you should eat it or make wine from the flowers.

Another biological tactic is to create polycultures of annual and perennial plants. Nature abhors monocultures, and insect pests love monocultures. Planting polycultures (many species of plants gathered together in a location) minimizes the pest problem and is more beautiful than monocultures.

Perhaps the most important thing is to pay attention to the soil. Much of what we do in landscaping, such as tilling, and using pesticides, herbicides, and chemical fertilizers, harms the long term health of the soil. Herbicides and pesticides destroy the micro flora and fauna that are essential to healthy soil. With lots of earth worms, you won't need to till. It is better to let the worms do their job rather than task a human with backbreaking labor to do the worms' job.

"Do no harm" is another biological strategy we all need to practice so we can get good at it.

9. Optimize edge.

In ecology, it is evident that such "edges" between ecosystems are more productive and diverse than the either of the neighboring systems. Edges are good, and that is true of both the garden as a whole and its various parts. One advantage of a curved line over a straight line in a garden is that more plants can grow along curve than a straight line.

10. Use natural patterns.

Nature doesn't have a lot of straight lines and square edges, and neither does my garden. One thing that makes vegetable gardens not front yard material is that many people do straight rows. There is no biological reason for planting vegetables in a monoculture straight line. Cabbages and broccoli can grow just fine in curved rows and circles, scattered among flowers.

11. Appropriate Scale. Permaculturists speak of small systems, and that is the scale that most gardeners work at.

Always start small. Don't immediately dive in and try to come up with a plan for a 160-acre urban park. Start with a few small designs for fruit tree guilds at schools and religious institutions in your neighborhood.

Appropriate size is a consideration when you put things together in the garden. There are always lots of details to consider

That's one reason we do written plans.

12. Use succession. Don't dig up some turf, fill it with tree-sized hole, and plant a bunch of trees. First things first. In this case, we want to invest in the fertility of the soil. That calls for building up from the ground. So we mulch and plant nitrogen fixing and nutrient accumulating plants. Once these plants have had a chance to prepare the ground to receive them, then you can plant the trees.

13. Use color and texture effectively. Edible landscaping in an urban area has many functions stacked on it. One of those is beauty, so it's important to use color and textures effectively. Useful and edible plants are colorful and have varied textures and the colors and textures can be combined effectively to create incredible displays. The first year that I used crimson clover as a cover crop brought a nice surprise. In early spring, beautiful crimson flowers covered my yard and garden beds. People driving by would stop and ask, "What is that growing there

on your yard?" Many plants considered to be ornamentals are edible, this is especially true of flowers. Every part of the day lily plant is edible - flowers, roots, and leaves. Rose petals are edible as are the hips (which are a major source of vitamin C), as are Rose of Sharon flowers and red bud flowers (the red bud seeds may be ground for flower). Rye can be as beautiful as ornamental grasses. Purple coneflowers besides being beautiful are an important medicine plant.

Winter color can be found among the hardy edibles such as purple, pink, and green kale. Arugula (a self seeding annual salad crop) is green in the winter, as is salad burnet and French sorrel, and of course the sage. Oregon grapes, besides producing an edible berry, have glorious copper colored foliage. Rue is a nice silver green that is still bright in the winter. For Thanksgiving I made a table decoration with branches of tarragon, rue, Oregon grape, horehound, and arugula, and sprinkled bright red rose hips around it. And of course, the vetch and clovers grow all winter long. The lemon and chocolate mints are still green and thriving, even after snow. Swiss chard is a colorful plant that survives into winter and as an edible it is a "cut and come again" staple.

Fall and spring color are found among the edibles. In spring there are blossoms on the fruit trees and berry plants, and I highly recommend the sand plums for beautiful orange and red fall foliage, as well as the interesting shapes in which they grow

Many wildflowers are edible or medicinal or produce dyes, and many of them that are suitable for this area are local natives. Another show stopper is the Maximilian sunflower, which produces multi-branched plants covered with yellow blossoms.

Final Thoughts.

The best time to plant an edible forest was twenty years ago. The next best time is today. Invest in the fertility of the soil for at least a year before planting trees and larger shrubs and you will see a benefit in the growth and establishment of your trees and shrubs.

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02331 Useful Kitchen Equipment for the Permacultured Kitchen

Good food and a warm kitchen are what makes a house a home. I always tried to make my home like my mother's, because Mom was magnificent at stretching a buck when it came to decorating and food. Like a true Italian, she valued beautification in every area of her life, and I try to do the same. – *Rachael Ray*

This list is ***not*** a suggestion to go out and buy all of this stuff. You could share some of this equipment with others. You may never do some of these things so you won't need that equipment.

Equipment for a Minimal Kitchen without a Stove (like a dorm room or tiny apartment)

+ Crockpot

+ Electric skillet

+ Hot plate

Three more items that are useful in minimal kitchens

+ A tabletop oven (roaster oven, toaster oven, convection oven, etc.)

+ Blender or food processor.

+ A microwave (depending on how you feel about microwaves)

Food Preservation

+ Boiling water canner. This is a large pot at least 13 inches deep, for processing jars of high acid food items like fruit, pickles, and fermented foods.

+ Canning jars in a variety of sizes

+ Freezer, manual defrost

+ Pressure canner. For processing vegetables and meats.

+ Dehydrator. Plans are readily available for solar food dehydrators.

+ Food grade storage containers, variety of sizes

+ Jar lifter, funnels, colander, strainer, sifter, measuring cups and spoons

+ Crocks for fermenting/storage (or use canning jars)

+ Roaster oven (can be used with smaller jars for boiling water canning, holds more jars than a typical canning kettle and they come equipped with racks to hold the jars.

Food Processing

+ Food processor/blender

+ Grain and meat grinders.

+ Strainers

+ Jelly funnels

+ Knives

+ Apple corer, cherry pitter

Brewing and Wine/Cider Making

+ Glass carboy

+ Airlock stopper

+ Racking equipment (tubing)

+ Bottle capper

+ Hydrometer

Food Preparation

+ Outdoor cooking equipment

+ Crockpot.

+ Oven-ware – casserole pans, loaf pans, baking pans.

+ Solar oven/cooker

+ Measuring cups and spoons

+ Cutting board

+ Kitchen knives

+ Kitchen scissors

+ Pastry cutter

+ Peeler

+ Pressure cooker

+ Crockpot cooker

+ Retained heat cooker

+ Solar oven

Food Production

+ Sprouting container(s)

+ Mushroom growing containers/media

Other

+ Kitchen scale

+ Food grade storage containers

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02341 Design a storage solution for your household food system.

First comes thought; then organization of that thought, into ideas and plans; after this we transform those plans into reality. The beginning, as you will observe, is in your imagination. – *Napoleon Hill*

Permaculturing your kitchen involves a certain amount of stuff. Stuff can be useful or it can be a dispiriting collection of useless junk. The difference between the two is organization. Most of us have limited space. We need to look carefully at our patterns of work and equipment use and design creative solutions to our own personal "Dilemmas of Stuff." In this particular case, I want you to think about storage solutions for your lifestyle's food system.

Your lifestyle food system may be small. You may live in a dorm room. In that case, you might have a microwave, a crockpot, and a hot plate and a box of food.

Or you may live in a full size house, with a good sized kitchen and lots of kitchen stuff and a year's worth of food stored for your family in case of a systemic crash.

Most of us are somewhere in-between these two extremes. I've lived with a lot of small kitchens in tiny apartments in my days. Sometimes I think I had more fun, and was more creative, with the small kitchens.

Observe.

As always in permaculture, we start with observation. Long and slow observation, over time. There is no point being in a hurry. We don't have time to be in a hurry. We are in trouble because we've done way too much hurrying, and thus we cut corners, make mistakes, go down dead ends, and reinvent way too many flat tires.

We remember that if "you always do what you always do, you will always get what you always get. We observe our individual food experiences in the context of our collective experience as humans. Those who don't look before they leap may jump right out of the frying pan into the fire. That is not a good place to be.

Are you satisfied with your present method/structures for kitchen storage? If it isn't broken, don't try to fix it. Observe your situation to make sure you are set up in a way that meets your household needs efficiently.

What are your goals for your kitchen storage? What are your needs? How do these rank in priorities?

Start with the list you developed of all your kitchen stuff and the inventory of your food storage. Take the list and go and look at each item on the list. Where is it now? Is it rationally placed in proportion to its use? How often do you use it? Can you find it quickly? Is your storage "zoned" so that items used frequently are close at hand? Do you have a bunch of stuff that you don't need and never use?

Who does this work of getting things out for use and putting them back afterwards? One person by himself or herself? The whole family? Rotating jobs? Does everyone in the household pretty much know where everything is or do folks do a lot of hunting and searching?

Study and Evaluate.

For example, suppose you only use the food processor once or twice a month. Yet, it sits on the counter close to the food prep area, where it takes up space and gets in the way of the kitchen's daily work. Is this the best storage choice for this small appliance?

Take your list and sort it based on how often you use each item. Daily (or near daily), weekly, monthly, seasonally, and annually would probably be enough categories for most people. Some examples might be –

Daily – coffee grinder, coffee or tea pot, general cooking pots, knives, dishes, serving ware, kitchen towels and cloths, napkins.

Weekly – baking station, blender,

Monthly – fermentation station,

Seasonal – canning station

Annual – dishes for special festive occasions, turkey roaster

Are you anticipating acquiring additional kitchen equipment that will need storage?

Do you have the storage equipment/structures you need? If not, what needs to be built or bought?

Do you have the necessary skills?

Do others need to learn these skills?

Do you have enough space? Do you need more? On what schedule do you need more? Daily? Or do you need a "space surge" when you process garden produce in the fall for winter eating?

Design.

Make your design choices based on your observation and evaluation.

How many functions can be stacked on the various elements of this kitchen equipment storage system?

How many beneficial connections between your kitchen storage systems and the rest of your life can you establish?

How will this result in less work?

How will this make food preparation and storage easier and less work?

How will this help you use less fossil fuels?

Where? When? What? How? How much?

Stage your decisions.

What comes first? Middle? Last? Never mind the fact that this is a small design, put first things first and second things second and third things third, so you get a feeling of what it is like to organize a set of tasks such as this.

Budget.

If any of this will cost money, get some estimates and develop a budget. Decide on a source of funds.

Write the report.

Add it to your developing lifestyle design plan.

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02351 Useful Kitchen Permaculture Skills

When I cook with my son, I might chop vegetables and have fun with different shapes. Cooking is a way to teach kids about other things, like reading or math with all of the weights and measures. There are so many things that are part of cooking that are also very educational. – *Emeril Lagasse*

Skills are important to the lifestyles we create via permaculture design. They are portable – you take them with you wherever you go. Of course, no one needs to master all of these skills, but everybody can master some of them. Make acquiring new skills a major aspect of your permaculture lifestyle design plan. Education is one thing that can never be taken away from you. When you leave, you don't have to pack your education. It goes with you automatically.

+ Bread baking

+ Brewing (beers, soda pops, wines)

+ Energy management

+ Fermentation

+ Food shopping

+ Food safety

+ Gardening and food production

+ Juicing

+ Knife skills

+ Meat cutting

+ Menu planning

+ Recycling, composting and waste management

+ Sauce and gravy making

+ Solar cooking

+ Stock making

+ boiling water and pressure canning

+ brining/salting

+ cheese making

+ curing meats/hams

+ dehydrating

+ jam and jelly making

+ sausage making (charcuterie)

+ smoking

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02361 Compost: Because a rind is a terrible thing to waste.

The ground's generosity takes in our compost and grows beauty! Try to be more like the ground. – *Rumi*

If you want to grow your own food, or to help others to grow food for you, the place to start is to make compost.

The first question is – indoor or outdoor composting? If you live in an apartment, chances are your only choice is indoor unless you know someone with an outdoor compost pile that would like to have your compostables. A second possibility is to compost on a veranda, porch, or balcony. Given the circumstances, that will be more like indoor composting since you will certainly compost in a container.

If you live in a dormitory, get busy organizing a compost program for your dorm. You'll have to get permission from your administration. If you combine this with something fun like a competition to reduce the energy and water use of dormitory buildings, your administration will sign up for the deal. After all, they have to pay someone to haul away trash and pay someone else to buy fertilizer for the grounds. If they have less stuff to haul away and less fertilizer to buy as a result of a campus composting program, then the school saves money. Composting the waste from school cafeterias would reduce maintenance expense for the school's landscaping (no fertilizer to buy) and lower the disposal costs for their cafeteria food service. They get bragging rights about their campus-wide composting program. What is not to like about that?

Alternatively, is there a community garden in your area? Can you start a new community garden and compost pile if there isn't one in your area?

For indoor composting, the there are three primary choices:

– indoor compost bin,

– vermicomposting,

– bokashi.

You can buy a compost bin, but it is hardly any trouble to make a compost bin. For an apartment dweller with no outside garden or yard that generates lawn waste that needs to be composted, a galvanized metal garbage can will do just fine. You could use a plastic garbage can, or plastic buckets. That involves petrochemicals which are at best nasty and at worst toxic and cancer-causing. If that's all you've got handy, especially if you acquire them used, go for it. One useful possibility for apartment dwellers are the 5 gallon food grade plastic buckets that restaurants and bakeries use. They are often free for the asking, or at most can be bought for $1 or $2. It's better to use a food grade plastic bucket than to not compost.

Get two, because when one is full, you'll have the second one to take your current compostables.

While we always start where we can and need to start, we remain aware of the need to climb up the **good-better-best decision hierarchy** and reach for the best decision we can make that is practical for our circumstances. Don't let the perfect

become the enemy of the good. Don't let procrastination freeze you into inactivity either.

Drill a dozen holes in the bottom of whatever container you end up with using a 3/8th inch drill bit, find a tray to stand it in, and place it on a couple of half-inch slats in the tray so it stands above the tray instead of flat on it.

You could make a 15" x 15" x 15" box from untreated half inch plywood to use as an indoor composter. Drill holes in the bottom, put slats in a tray, and sit it on the slats in the tray. If using wood, treat it inside and out with vegetable oil. It needs a lid.

Composting involves a mixture of **brown and dry** and **wet and green** materials. With indoor composting, your wet and green will be household food waste together with the occasional trimming from household container plants. You want about twice as much brown and dry as you have wet and green materials in your compost bin.

Brown and dry can be shredded paper (white paper or newsprint), shredded brown paper sacks, shredded corrugated cardboard, shredded dried leaves, dried grass, or sawdust. All the ingredients should be shredded – don't just lay a stack of newsprint on top of your compostables. Just shred it by hand, no need for a mechanical shredder. You can pulse food scraps a couple of times in a blender. Most food scraps will already be in small bits and pieces.

Cover the base of your container with a few inches of brown and dry materials. Add your daily compostables, wet and green, and cover them with more brown and dry materials. Avoid colored inks and glossy papers, as they may have petrochemical additives that you will not want in your compost. Yes I know, many printer s are using soy-based inks At the beginning, middle, and end of filling the container, add a small amount of soil, a couple or cups, if you have access to some soil. The best additive would be some soil from underneath an outdoor compost pile. If you come across some moldy leaves in your travels out and about, bring them home and put them in the bin. This adds additional beneficial microbes to your mix. Mix the contents thoroughly every week. If it gets dry, moisten it. You don't want it sopping wet. You don't want it to dry out either.

If it starts to drip water into the tray, add more brown and dry materials.

If it starts to smell, add more brown and dry and mix well. Composting is an aerobic process and there should never be any disagreeable odors. If it gets too wet and compacted, anaerobic digestion sets in and that does give off disagreeable odors. Trust your nose. If it smells bad, you have a problem. Fortunately, it is an easily solved problem. Simply add more mixing of brown and dry into the compost and mix well.

It is fine to add fats, oils, and dairy to indoor composting bins. Just make sure you add sufficient brown and dry material so you don't develop odors. Meats not-so-much with an indoor bin like this. I compost meats in my outdoor compost piles. They are considerably larger than a bucket or home-made inside composting bin.

When the container is full, start the second container. The time it takes for your bin to compost depends on what's in the container and many other factors. It's done when –

– the material has a fluffy appearance,

– all the structures and form of items placed in the compost are gone (in other words, you can't tell what the ingredients were)

– it has the odor of fresh forest earth.

What would you do with compost, as a dweller in an apartment? Here are three great ideas:

You can use compost as an ingredient in your own potting soil mixes and you can **fertilize your container plants** with it.

Give it to someone who has a garden and make a deal to get back fresh vegetables in return during the growing season.

You could be a **GUERILLA FERTILIZER**! Spread your beneficial organic fertilizing material surreptitiously in public landscaping. Don't get caught! God only knows what the penalty is for fertilizing without a license ;).

Two other methods are sometimes used with indoor composting: vermicomposting and bokashi composting.

Here is a good overview on **vermicomposting**:

http://www.organicconsumers.org/organic/compost.cfm

The standard text on the subject is Worms Eat My Garbage by Mary Appelhoff.

Worm composting is fun and easy and people enjoy the relationship they develop with their worms as they consume their garbage. Yes, some come to think of the worms as just another household pet, only more useful and you don't have to entertain them, take them to the vet, and their poop is immediately useful as fertilizer.

Bokashi composting uses beneficial microbes which must be added to the container for the process to work.

Wikipedia on Bokashi: http://en.wikipedia.org/wiki/Compost#Bokashi_composting

The Compost Guy's Bokashi page – http://www.compostguy.com/bokashi-resource-page/

Here is a commercial site (I have no financial interest in the site) which does a good job of explaining what it is – http://www.bokashicomposting.com/ .

Outdoor Composting

If you have room for an outdoor composting pile, here is my **Easy Very Basic Outdoor Compost** recipe.

Select a place for a compost pile, and dig the ground up a bit. Put down a layer of twigs and small branches, and make alternating layers of "brown and dry" materials and "green and wet" materials. The layers should be about the same thickness. Brown and dry can include leaves, shredded tree limbs and bark, newspapers (no shiny slick papers or colored inks), brown cardboard, dried grass clippings. Green and wet includes kitchen scraps, green lawn trimmings, green leaves, flowers, weeds, plants, etc. Some people say "don't put meats or fats" in compost, presumably because they might attract small animals. I have put them in my compost for years without a problem. You want about two parts brown and dry for each one part wet and green.

Wet each layer thoroughly, and toss a shovel of soil on each layer and a couple of small branches. The point of the branches is to keep it loose. The soil inoculates the pile with composting micro organisms. If you have a friend with some compost, maybe get a little compost to sprinkle on the layers instead of the soil.

Pile it up at least 3 feet high and 3 feet wide, & leave it alone for a year. If it's a dry summer, water it so it stays damp inside (like a wrung out sponge). After about a year, rake away the leaves still on top, and inside will be a nice, rich, dark loamy compost that smells like forest dirt when you sniff it.

If you can't wait a whole year, you can make compost faster by fussing with it a bit. Every week or so go out and "turn it." Use a pitchfork and move the compost to a different spot. Save your energy and don't move it far. Make the new pile right next to the original pile. What was "outside" on the pile is now inside, and what was inside is now on the outside.

If the compost pile starts to smell bad, something's wrong. You probably have too much "wet and green" and/or it has

somehow gotten so compacted that air can't get in.

For the problem of too much wet and green, add more brown and dry.

If the pile has become compacted, stir it up a bit and add some small branches (the purpose of the branches is to keep the pile from compacting and to help air circulate).

If you dig into the pile, you will find lots of little creatures at work, rolly polies, worms, etc. That's good, because that's what's supposed to happen.

Another method of composting, which saves even more work, is to **compost in place** where you grow vegetables or trees or other fruit bushes. With this method, simply put down a thick layer of mulch (4-6 inches) and put your "wet and green" compost materials under/in the mulch as you produce them. I start at one end of a bed and work my way down to the other end with my kitchen scraps and etc.

There are two advantages of this method:

The gardener does not have to make a pile in one place and then move the finished compost to the place where it can be used. Instead, the compost is made in the place where you want to use it.

As a compost pile develops more nutrients – becomes more "tasty" – some nutrients wash out of the pile with rain. If you have carefully chosen the place for your compost pile, to take advantage of this fact, then that's less of an issue. When you compost in place, all of the nutrients are available to the growing plants in your garden bed.

I'm using a combination of vermiculture with container gardening this year as an experiment. I live in a house and have quite a bit of container garden plants on the back patio. When repotting a couple of plants this year, I noticed that worms had moved in. I checked other pots and found worms. I began spreading compost materials on top of the soil, beneath the layer of mulch I always put on top of the potting mix. This is my best container garden season ever.

If you need a specific amount of compost – say eight cubic feet – to fill a series of square foot garden beds, start with three times that amount – 24 cubic feet. The rule of thumb is that finished compost equals about 1/3 of the original volume of compost materials. If you want 8 inches of growing soil in your Square Foot Garden beds, pile 24 up inches of compost materials and it will decompose down to about 8 inches.

If you want a nice garden, **start with building your soil.** The common practice of wrapping valuable organic materials in black plastic and burying them in landfills is a bizarre ecological and political insanity!

No chemical fertilizer has the advantages of home made compost. Compost has the added benefit of recycling your food waste, lawn & garden trimmings on site, rather than sending them off to be buried wastefully in a landfill. Composting is the beginning of a beautiful home garden.

Start your compost pile or bin this week. **A rind is a terrible thing to waste!**

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02371 How to grow some of your food in the city.

The single greatest lesson the garden teaches is that our relationship to the planet need not be zero-sum, and that as long as the sun still shines and people still can plan and plant, think and do, we can, if we bother to try, find ways to provide for ourselves without diminishing the world. – *Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals*

Gardening is like growing money! The best eating vegetables are those grown close to home.

People say it costs more than the vegetables are worth to do home gardening. That just isn't true for most of us! Sure, you can spend big piles of money if that's what you want to do. It's not necessary though.

Many of us in urban areas don't have land or can only access small amounts of land! We live in apartments or dormitories. Even so, there are opportunities to raise food indoors. We can look at gardening outside and gardening inside and talk about how to raise veggies on concrete.

Gardening is less work than most people think. This is true for indoor and outdoor gardening – as long as smart design goes into the set-up. Spend time and brain power early in your design process to save work and effort and money in maintenance later.

Fertility

All food growing is rooted (literally) in fertility. That's why the discussion of making compost came before this discussion of growing food. First things first! Before you can garden, you must acquire fertility to grow the vegetables.

There is no such thing as a free carrot. Nor a free tomato, cabbage, or turnip. Beautiful plants yielding bountiful harvests do so because they grow in abundant fertility and have their other needs met. Your goal in designing a growing food system is something that works for your own unique and particular situation. Begin with fertility and that means compost. This helps take care of another problem, food scraps and lawn trimmings/waste (if you have a lawn) and dead leaves (if you have one or more trees). This is true whether you garden in the ground, on concrete, or in a container.

Water

The second necessity for growing food is water. Water issues are as dominant as fertility in developing your growing food lifestyle plan. How much rain does your area receive? You need a minimum of 10 years of monthly climate records that show the minimum and maximum temperatures for each month and the amount and type of precipitation. Going back further is better. Indeed, you should be able to find some kind of a 100-year rain and drought record if you dig around at the climate and weather departments of your state colleges. How long is the longest dry period? The amount and sources of water you have available will determine the place and form of your growing food plans.

Place

Gardening is a territorial thing. It happens in real space.

Outside, the space may be the ground – a prepared garden bed. Or it can be a series of containers on pavement.

Any surface that gets six hours or so of sun every day can become a garden. You can grow all of the common garden vegetables in six to eight inches of potting soil and six hours of light. With a little preparation, concrete is a great place to grow vegetables.

Inside, the space is any container that holds fertility and the area that container occupies. Or "containers," as the case may be.

How much place do you need? If you are new to gardening, it is always best to start small. We start small, or we don't start at all. By small I mean as small as nine or sixteen square feet. Nine square feet fits into a 3' x 3' miniature garden bed. Sixteen square feet is a 4' x 4 bed.

For an indoor, sidewalk, or balcony garden, you could think about nine pots to get you started.

Master the concepts with a small patch. Learn the skills. Do well with your first attempt and you will come back for more and better next year. Each year add something and over time, you create a bountiful and productive growing system that is appropriate to the place where you live and the scope of your lifestyle.

You may only have room for one 9-feet square patch. That's fine. You can grow an amazing amount of veggies in only nine square feet. Do what you can, with what you have, where you are, and always be on the lookout for ways to do better.

Where should this be? In a city, your choices may be limited. You don't want your garden in an out-of-the-way place where you never go. The ideal place is just outside of the door to your house that is closest to your kitchen. It should be a place where you regularly go anyway. That way you will not ignore your garden but will be engaged by it because you will walk through it several times a day going and coming from your dwelling.

If you live in a building with no land for gardening, besides the usual container garden windows and balconies and sidewalks, you could look for a place in a community garden. The best location for the community garden would be somewhere along a route that you already travel most days. Give bonus points for the design if the community garden is within easy walking distance of your dwelling.

Form

A place for gardening has form.

For outside gardening, I recommend the Square Foot Gardening method. This is raised bed gardening, which means that the form of the garden is a bed of growing soil raised six to eight inches above the surrounding level. Raised beds warm up faster in the spring and drain better after rains. They can be built on top of poor soil and the soil doesn't get compacted.

Generally, SFG uses forms that are 4 ft on each side. They could be 3 feet by 3 feet, or 2 feet by 2 feet, or 2 feet by 8 feet, or any size that fits whatever room you got. There is no law that says that it has to be a square form. It could be round, a triangle, or a long rectangle, whatever fits the place and the gardener's purposes.

For balcony, indoor, patio, sidewalk, and driveway gardens, the form of a Square Foot Garden could be a series of pots. Look for pots that are about one foot in diameter to match the Square Foot Garden plant spacing information. You could use larger tubs or make growing boxes out of untreated plywood coated with vegetable oil. Put the larger containers on wheels or casters so they can be moved around. Square containers have the advantage of fitting together without any wasted space. Make something similar to the compost box described in the previous chapter on Composting, except it only needs to be eight inches deep, and should be in multiples of 12 inches long and wide in order to accommodate the spacing guidelines of the Square Foot Gardening

movement. You could make a 3' x 3' or 4' x 4' plywood box and put it on concrete.

However, here is an important caveat about raised bed gardens. They are appropriate as long as the climate is such that rain is reasonably plentiful. Arid areas with limited rainfall, or during times of drought in other areas may require a different form for the garden, if you garden in the ground.

If you garden on concrete or some other form of container gardening, your form is the same whether you are in dry lands or more temperate climates..

The indigenous peoples of arid dryland areas almost always grew their food in various kinds of pit gardens – the reverse of the raised bed garden. The purpose of a pit garden is to conserve water. If there isn't much rain, soggy garden areas will not be a big worry. The greater concern is to have enough water to grow anything in the first place.

Gardening is always, in every situation, without any exception, site-specific. In permaculture, context is everything!

If you grow outdoors, you survey your situation, observe your climate, and develop your garden forms appropriately. If you are a dryland gardener in an arid area, go with one of the variations of pit gardening. You can do a pit garden just like a raised bed garden except that first you have to excavate the pit and then you add the fertile soil mixture as described in the Square Foot Gardening info.

You use the excavated soil to build berms to help contain and harvest rainwater and direct it to where you want to go so you hang onto as much of it as possible when it does rain.

When growing indoors (or on a balcony, sidewalk, patio, or driveway) . . . you can grow in any container that will hold soil and has some holes in the bottom for drainage. You can use commercial growing containers or you can just adapt other items you may have around, such as buckets, bottles, sinks, whatever you got.

Vertical gardening is an important urban growing option. It increase yields of small spaces. Your goal here is to create a place for gardening that occupies space vertically. So think of things that will hold potting soil but that can also be hung or somehow fixed to something in a vertical position.

While I am not fond of plastic, there is a lot of it around. You could repurpose a 2 liter soda bottle as a garden container. Cut off the bottom and make some holes in the lid for drainage. Nail them to a fence. If you do use plastic, use the food safe plastics – the ones labeled 1 (PET, clear soda bottles), 2 (HDPE, opaque tubs, milk jugs), 4 (LDPE grocery bags and squeeze bottles), and 5 (polypropylene, white wide mouth containers like yogurt cups). Avoid all of the rest, including PVC pipe which periodically shows up as a material on online do-it-yourself garden projects. An alternative to plastic for urban gardening are cans of various sizes. You could nail gallon-size (#10) cans to a fence post, poke holes in the bottom for drainage, fill with potting soil, and plant greens.

People place rows of gutters along fences, fill them with potting soil, and grow lettuces, flowers, herbs, any kind of shallow-rooted items.

You can build a growing column of chicken wire and cardboard that will give you 12 square feet of growing space that occupies only 2.25 square feet. You can garden your windows using traditional containers or you can do a window garden that uses vertical growing techniques.

There are lots of imaginative ideas floating around out there amongst urban gardeners.

Here are some ideas for vertical gardens:

http://www.instructables.com/id/Vertical-Garden-1/
http://www.motherearthnews.com/organic-gardening/vertical-gardening-zm0z10zhun.aspx
http://lifeonthebalcony.com/how-to-turn-

a-pallet-into-a-garden/
http://www.instructables.com/id/VERTICAL-VEGETABLES-quotGrow-upquot-in-a-smal/

Sprouting and micro-greens qualify as indoor gardening too.

Do what you can, with what you have, where you are. Creativity is always helpful. As you develop more "permaculture eyes," you will begin to see design opportunities in places you had never actually noticed before. What's happening is that as you pack your brain with the concepts and knowledge of permaculture, and begin to develop skills by doing small design projects, you brain learns new ways to process information. At levels below conscious thought, design may happen. It's not a fast process. It is certain to happen if you work at learning the concepts by practicing them with real life design challenges.

Soil

The form of your garden contains soil. There is an infinite amount of wisdom that can be written and taught about soil. One of the most important things to notice is that entropy will always attempt to dissipate your soil with distressing regularity. This is erosion and the moment one even thinks about "plowing" or "tilling," erosion begins. One of the more important truths about urban agriculture is **Do Not Till.**

All tilling damages your soil. It mixes up soil layers. It hurts the micro flora and fauna that live in the soil and chops earthworms into pieces. That kills the worms. Each piece does not grow into a new worm.

Take care of your soil. Don't till. Design your outdoor garden space to contain and direct water flows so they gently infiltrate and don't erode. Slow it down and spread it out are the primary design principles when it comes to managing rainwater runoff and your soil.

In the beginning. . . remove the turf (if there is grass) and build your soil up from there, using mulch and materials as suggested in the Square Foot Garden method.

Potting Soil for Containers

Container gardens require a lighter soil mixture than common garden soil. Ordinary garden soil, by itself, not amended with anything, will compact in a container and will not keep a proper balance between moisture and air. Commercial potting soils are a relatively recent development. Historically, gardeners made their own potting mixes.

The problem with buying potting mixes is that they are nearly always made with exotic ingredients – vermiculite, perlite, and peat moss in particular.

Peat moss is not a sustainable material. Local and more sustainable substitutes are leaf mold, rotted sawdust, and compost. Leaf mold is simply leaves that have begun to compost. Dig under a pile of leaves and you will find some. Make a special compost pile or bucket that consists of nothing put shredded leaves. Keep it moist and mix it every week. Your plants will love you.

Vermiculite is industrially mined from a single source in South Carolina. Unless you live in South Carolina, it's imported. Mining it is an industrial activity. Not much sustainability here.

Perlite comes from the U.S. Southwest. Its job is to lighten the mix and promote drainage. It comes to us courtesy of industrial processes.

Ordinary builder's sand works just as well as vermiculite and perlite. This is a more coarse sand, the kind that people mix with cement to make concrete. Avoid fine sands.

To make your own potting mix, take some ordinary fertile garden soil and mix it with compost and rotted leaf mold with a light dusting of wood ashes for your container plants. If the soil is high in clay content, add sand to lighten the mixture.

Natural fertilizers like blood meal can be added to boost fertility. See the ATTRA document included with this iPermie on potting mix for much greater detail on this subject.

A typical homemade potting soil mixture would be:

– 1/3 garden soil

– 1/3 sand

– 1/3 compost and leaf mold

Another recipe:

– 1 part builders' sand

– 2 parts garden soil

– 1 part leaf mold or compost

– 1/2 part dried cow manure

– 1 5-inch flower pot full of bone meal to each bushel of the mixture (a bushel equals about 1.25 cubic feet)

Mother Earth News Recipe

– 1 part garden soil

– 1 part compost

Leaf mold is simply compost made with only leaves. Because dead leaves are all carbon, this can take as long as a year. You can speed the process by shredding the leaves finely. One way to do this is to run a lawnmower over a pile of leaves a few times. Or put the leaves in a garbage can and insert a weed whacker/trimmer and run that a few times. They can be left in a pile on the ground in a shady spot if you have a yard, or placed in a container for indoor composting. To speed the process along, stir the leaves, mixing them well, every week. Unlike regular compost, which boosts fertility, leaf mold, composed of only one item – leaves – is primarily a soil conditioner, which is its contribution to potting mix. It supports water retention and provides habitat for beneficial soil micro flora and fauna.

More information on making your own potting soil can be found at

http://www.motherearthnews.com/Organic-Gardening/How-To-Make-Your-Own-Potting-Soil.aspx

Seeds

Fertility, water, place and form bring us to seeds. Permaculture favors use of open pollinated heritage varieties of plants. "Open pollinated" means that their seed breeds true. If you save seed from the plant, you will get a plant just like the parent in the succeeding generations, barring the occasional random mutation. "Heritage" means that it is an older species, developed in day of yore when taste was important.

However . . . It is not evil to grow a hybrid plant. Hybridization is a natural method of developing new varieties of plants. Seed companies offer many hybrid varieties. They won't breed true. You will need to buy new seed each year. If you want to save seed, as part of your growing food lifestyle plan, go with the heritage open pollinated varieties. If don't mind buying seed every year, hybrid will be fine. If possible, buy your seed from a local business. If this isn't possible, look for independently owned sources online. Start with places like –

Southern Exposure Seed Exchange
http://www.southernexposure.com/

Seed Savers Exchange
http://www.seedsavers.org/

Fedco Cooperative
http://www.fedcoseeds.com/

Vegetable varieties can be found that are appropriate for various kinds of climates, soils, and the length of your growing season. Some varieties have a natural resistance to plant diseases and some insects. For container gardeners, finding seeds for plants that grow well in smaller areas will be useful.

Light.

The rule of thumb is six hours of full sunlight for food production. Like any rule of thumb, that is a general statement and there is a fudge factor. There are varieties of food producing plants that do better in shade or partial shade. If you live in a particularly hot area, during parts of your summers your plants may prefer dappled shade to full sun. You will learn this by observation and discussion with other gardeners in your area.

Indoor growers can supplement natural light with indoor lighting. The light that plants need is not the light that we get from our standard incandescent and florescent bulbs. You need "grow lights," which give light in the right colors for growing plants. They are readily available in stores and on the internet, in a number of different forms, including the super-efficient LED lights. When supplementing with artificial light, use mirrors and reflective foil to direct light onto the plants.

The pioneers of indoor growing under lights are the marijuana growers. Law enforcement authorities have found entire houses converted into indoor greenhouses growing hundreds and even thousands of plants. More small scale operations dedicate one room or even a single closet for the purpose of growing marijuana. I'm not recommending marijuana cultivation, only to note that what works for pot works just as easily for tomatoes, salad greens, herbs, and cabbages.

Putting it all together.

There's a lot to think about when it comes to growing some of your own food. It's true of the whole permaculture project. That's why we do this one little item at a time while always keeping our eyes on the big picture. We learn design by doing design. At every point we ask questions like –

(1) How many beneficial functions can be stacked into this element, activity, or functions?

(2) How many functions can support a particular need or function or element?

(3) How many beneficial connections can we make, so that the wastes of elements are food/energy for other elements, always keeping in mind the model of the forest or prairie that works without a gardener or farmer?

(4) Can we do this with no energy? Can we do this with less energy?

(5) Does this reduce or increase work? If it increases work, why do it? Is the work an investment to set something up?

Growing Food Notes

The Square Foot Gardening Method is one of the best choices for gardeners in urban areas with restricted areas outdoors for growing food. It is truly an easy and less work method. Remember the caveats at the beginning about discerning whether you should use a raised bed or a pit bed format. The form does not have to be square, it can be adapted to any shape.

For more information, see **The Ten Basics of Square Foot Gardening** by Mel Bartholomew, at http://www.squarefootgardening.org/whatissfg#!__get-started/vstc61=page-1/vstc30=10-basics

Vertical and container growing.

Some plants can be grown vertically in square foot gardening beds. Grow vine tomatoes 1 plant per square foot, and plant four of them in a row along one side of a bed. Make a trellis by putting 6' fence posts at either end, and put a 1 X 2" or other pole across the top. Use welded wire or a net and train the tomatoes as they grow to go up the trellis. Bush type tomatoes don't use a trellis, and can be planted 1/sq ft. Zucchini and yellow squash can be grown on a trellis. Plant beans/peas with corn or sunflowers so they grow up the stalks.

Typical Plant Spacings

16 per square foot: radishes, onions (for green onions), carrots

9 per square foot: bush beans, spinach, garlic

8 per square foot: pole beans and peas climbing poles or a trellis, bulb onions

4 per square foot: celery, chard, corn, garlic, lettuce, mustard

2 per square foot: cucumbers (in a row of 4 squares, vertically on a trellis)

1 per square foot: cauliflower, broccoli, cabbage, peppers, potatoes, eggplant, okra, summer squash (grow summer squash vertically)., tomatoes (in a row of 4 squares, vertically on a trellis)

1 per 2 square feet: winter squash, or 1 per square if grown vertically on a trellis

Fall is a Great Time to Start Your Spring Garden

If you reading this during the fall, now is a great time to get ready for your spring garden. Build your beds, and fill them either with Mel's Mix or Bob's Cheap as Dirt Mix. If you don't have compost ready, fill them with soil and compost materials & let them turn into compost in place over the winter. You will need about 18 inches of compost materials mixed with some soil on top of each bed to create a 6" deep planting medium of soil and finished compost. (Finished compost equals about 1/3 of the original volume of materials.)

Bob Waldrop's Notes on Square Foot Gardening:

We start small or we don't start at all. Don't plow up your entire back yard for your first year's garden. In fact, you won't need to plow or till, ever. Build your soil up rather than dig down. It is much less work. Let the worms till your soil.

If the area has turf grass like Bermuda, remove the sod first. Then lay down two layers of cardboard, and build the garden bed on top of that. Bigger cardboard is better than smaller, e.g. if you can get some large appliance boxes, they are great for making garden beds.

You could build plywood boxes and use them as Square Foot Gardens. Drill some holes in the bottom for drainage. One of my neighbors has several such boxes sitting on her driveway. She elevates them up a bit with a plywood stand beneath the growing box.

The grid that Mel talks about below may seem odd at first. It is really helpful as a way to visualize 16 square foot planting areas in each 4' X 4' bed. While I don't leave mine on all the time, every time I plant I use a grid.

If you put 6 inches of "Mel's Mix" in each 4' x 4' planting bed, you will need 8 cubic feet of the mix. (Multiply length TIMES width TIMES depth to determine cubic feet.) Generally, if you buy compost, the bags will say how many cubic feet they contain. Hopefully you will have your own compost.

To save money, use Bob's Cheap as Dirt Mix instead of Mel's Mix. Combine 1/3 soil, 1/3 straw (or shredded leaves or leaf mold), 1/3 compost. If the soil is particularly heavy, add some sand. We have not bought any vermiculite or peat moss and have had great success with this mix. Renew your beds each planting cycle with compost and mulch.

The 4' x 4' box is a convenient size. You can make them as long as you want. They can be less than 4' wide. Keep to multiples of one foot (or the equivalent in a metric measurement) to make it easy to figure your 1' x 1' “squares” for planting your seeds and plants. You could have a 2' x 8' bed, if that’s what fits the space. You don’t want them any wider than 4', however, assuming you can access both sides, because you should never walk on the planting surface. Thus, you have to be able to reach to the middle from at least one of the sides.

They don't have to be square either, so long as you can figure out how to do your one-foot-square planting units. I recently

rearranged much of my garden into a series of curved beds designed to catch and hold water. I can plant them using Square Foot Garden principles just as easily as I could the square and rectangular beds they replaced.

As your seeds and plants get started, put 4-6 inches of mulch around them to conserve moisture and to slowly compost in place.

If you want to grow a lot of a particular crop, and harvest it all at once for canning or dehydrating, instead of planting different crops in each square, you can devote all or half of a square to a specific plant.

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02381 Avoiding Food Pollution

Organic is something we can all partake of and benefit from. When we demand organic, we are demanding poison-free food. We are demanding clean air. We are demanding pure, fresh water. We are demanding soil that is free to do its job and seeds that are free of toxins. We are demanding that our children be protected from harm. We all need to bite the bullet and do what needs to be done—buy organic whenever we can, insist on organic, fight for organic and work to make it the norm. We must make organic the conventional choice and not the exception available only to the rich and educated. – *Maria Royale, Organic Manifesto: How Organic Farming Can Heal Our Planet, Feed the World, and Keep Us Safe*

There are three primary issues with food pollution:

(1) Pollution involving pesticide/herbicide residues on foods, and

(2) Pollution involving contamination with food-borne disease germs. This is discussed in 02251.

(3) Plastic contamination of seafood and toxin contamination of freshwater fish.

When it comes to pesticide/herbicide residues on foods, the best solution is to eat organically grown vegetables. The problem with the "buy organic vegetables" advice, however, is that access to organic vegetables is not universal. People often cite price as a factor too, but even people using food stamps to purchase food can afford organic vegetables if they do not buy prepared foods and make meals from basic ingredients using a carefully planned menu.

OK, not everybody has the skills to do that either.

And equally OK, people can learn to do better and develop the skills to do this.

So as with most things, there are good, better, and best choices. The best choice is to buy certified organic vegetables or to grow your own. If that best choice is not possible, avoid the so-called "Dirty 20" (as identified by the Environmental Working Group) and always buy them certified organic (or grow your own if you have access to some land):

The Dirty Twenty
(worst are listed first)

Apples
Celery
Strawberries
Peaches (and stone fruit in general)
Spinach
Nectarines
Imported grapes
Bell peppers
Potatoes
Domestic blueberries
Lettuce
Kale/collard greens
Cilantro
Cucumbers
Grapes – domestic
Cherries
Pears
Domestic nectarines
Hot peppers
Green beans

In this list, the EWG ranks foods in order from highest to lowest levels of pesticide residues. The ones listed on the "low" levels or the chart have high enough

pesticide residues that organic will be better.

These fruits and vegetables grown with non-organic production practices are drenched with pesticides and herbicide residues. Peaches and apples run a race for worst of the worst, with testing showing combinations of as many as 57 pesticides on peaches and 56 on apples. Strawberries and domestic grapes tested positive for 14 different pesticides. 96% of celery samples tested positive for pesticide residue – and 91% of potatoes were pesticide positive. Hot peppers had been treated by as many as 97 (!!!) different pesticides and greens with 66.

Besides fruits and vegetables, Team Planet Green (affiliated with The Learning Channel) warns against non-organic rice, since there are 40 different pesticides used in its production.

Non-organic baby food is a big issue, since babies are much more sensitive to food pollution than adults (given the small size of their bodies and the immaturity of their immune systems). The best solution with baby food is certainly to make your own from organic ingredients.

The Environmental Working Group has identified a “Clean 15", where pesticide contamination is zero or minimal. The first on the list is the cleanest:

The Clean 15

Onions
Sweet corn
Pineapples
Avocado
Asparagus
Sweet peas
Mangos
Eggplant
Domestic cantaloupe
Kiwi
Cabbage
Watermelon
Sweet potatoes
Grapefruit
Mushrooms

The third list is the “In-Between.” From highest to least, that list (which starts with #21 on the Environmental Working Group’s list), is as follows:

The In-Betweens

Carrots
Imported plums
Imported blueberries
Raspberries
Imported green beans
Summer squash
Oranges
Broccoli
Green onions
Bananas
Cantaloupe imported
Honeydew melon
Cauliflower
Tomatoes
Papaya
Cranberries
Domestic plums
Winter squash

Following this list come the Clean 15.

Contamination of Seafood and Fowl

The world's oceans are downstream from everywhere on the planet. As a result, the trash of the world is accumulating in our oceans. Plastics are everywhere and the scientific evidence is mounting of contamination of the entire ocean food chain with microplastics, tiny bits of plastic too small to see. They are bits and pieces of larger plastic items that degrade and break up in the ocean waters to smaller sizes.

When you eat ocean fish, you are likely consuming some of that microplastic, together with the toxic substances that such plastics are made from.

Pollution from sewer systems, storm water systems, power generation plants, chemical manufacturing companies, and other industrial processes pours into our domestic waters. Mercury, arsenic, and selenium are commonly found in the fresh waters of the United States and other countries and are taken up by the fish and concentrated in their flesh.

By best advice is to avoid all seafood from the ocean. Not only are there problems with contamination, we are over-fishing the oceans and endangering the survival of many species of fish.

Always check with local health authorities before eating any freshwater fish caught in your local waters.

Make your eating decisions prudently.

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02391 How to start a local food cooperative.

It has been said that cooperativism is an economic movement that uses the methods of education. This definition can also be modified to affirm that cooperativism is an educational movement that uses the methods of economics. – *Fr. José María Arizmendiarrieta Madariaga*

A "local food cooperative" is a food cooperative that only sells, or mostly sells, locally produced food and non-food items. This should be distinguished from other kinds of food cooperatives, which sell the same kinds of foods and items sold in big box grocery stores.

A local food cooperative is an excellent structure to increase household and community food security. The Oklahoma Food Cooperative, for example, provides excellent customer access through 45 pickup sites, to local food production. Many of the major food categories are covered by multiple producers. This system offers both a variety of choice and the security of redundant supplies, so that if in a given month, a particular producer does not have hamburger, others will.

The same access customers have is mirrored by the experience of the producers. Even a very small producer will be able to meet the Coop's standards and then be able to supply the coop's marketplace. This contributes to three important principles: (1) variety of products available to members, (2) redundancy in supplies, and (3) social justice in terms of offering people the ability to make a living by growing or making something for sale to the members.

Local food cooperatives are not capital intensive enterprises. The Oklahoma Food Cooperative got started with a website, volunteers, borrowed ice chests, and borrowed work space. They provide ways for members, both producers and customers, to invest and leverage sweat equity in the future of their local food system.

This document derives from the experience of the Oklahoma Food Cooperative, which was the first food cooperative in the United States to only sell locally produced food and non-food items. That experience has been replicated in the organization of 19 other food cooperatives following the "Oklahoma Plan," as this is sometimes called, in the United States, Canada, and Australia.

Getting Started.

A local food system starts in local kitchens, as individuals decide to take personal responsibility for the food they eat.

Kitchens formed by permaculture design are helpful if you want to jump start the foundation of a local food system.

If we want a more sustainable and just food production system, there must be a market for the products of sustainable and just food production systems.

Personal and household choices about where and how we spend our kitchen money and time are critical to the permaculture design of the kitchen.

This design process begins with observation of your present situation and an inventory of what you have and do,

what you need, and the challenges of getting from here to there.

A local food system is about distributing basic foods; it does not look like a big box store. Don't expect all the ersatz "convenience" offered by manufactured foods. The good news is that while the process is not always easy, the change that permaculture design brings to your kitchen is uniformly positive. The food will be more nutritious, it will taste better, and you will feel better about your work in the kitchen.

The First Organizers

The best local food cooperative organizers are people who have advanced through the beginnings of this "kitchen permaculture design" process and who are already buy and eat local foods. In the case of the Oklahoma Food Cooperative, during the year prior to the actual organizing campaign, key organizers had begun to look for sources for local foods and to incorporate local foods in their diets.

Getting Online

Get online early and often! As you collect information, tell everybody! The Oklahoma organizers started a website to share the information they found about local food producers. Today, besides a website, you'd want a Facebook page and Twitter, maybe also Pinterest, Tumblr and other online platforms. The more the merrier!

The Oklahoma organization got started with a "call to organize a local food cooperative" that was posted in several email discussion groups serving the Oklahoma area. As a result of that email posting, the group started a Yahoo group. The initial discussions and planning took place at that Yahoo group. The archive of okfoodret@yahoogroups.com contains a complete written record of the development of the cooperative from the first announcement of the idea to the present time.

Public Meetings.

Besides internet discussion, the Oklahoma organizers held a dozen meetings, in different parts of the state. The primary publicity was through free notices published in local newspapers. The meetings were in churches and libraries. The best attendance at any of these meetings was 12. The people attending each meeting elected one person to serve as a member of the "Oklahoma Food Cooperative Organizing Committee."

The Organizing Committee.

The organizing committee initially incorporated as an Oklahoma Non-Profit Organization (we reincorporated as a cooperative when we started selling membership shares), and began holding monthly meetings. At each meeting, we had a potluck lunch. The organizers believe that this regular "table fellowship" was critical to the group's success.

The benefits of church involvement.

Recruit members of church staffs "early and often." Churches directly supported the organizing campaign for the Oklahoma Food Cooperative. Epiphany Catholic Church let us use their facilities free of charge for 3+ years until we outgrew their building. Other churches lend their facilities for use as pickup sites.

Where to look for local food producers.

Directories. Some state departments of agriculture maintain directories of local food producers.

Certified organic producers. Certification organizations can provide lists of certified organic producers by geographic areas.

Farmers' markets. The Oklahoma organizers handed out flyers to all the producers at farmers' markets.

County extension agents. In the United States, every county in all 50 states has an "extension office" which works with

farm, garden, and domestic issues. They will often know who is producing for direct sale to the public.

Custom butchers. They will know what farmers and ranchers are selling steers to their neighbors.

Other. Look at classified ads in newspapers for people advertising food, and run classified ads to find farmers. And word of mouth is one of the best ways to find people.

Where to find the first customers

– Local and state chapters of environmental organizations, in particular, look for Sierra Club chapters.

– Homeschoolers

– Weston A. Price Foundation local chapters

– Churches

– Local and regional internet discussion groups.

– Food editors

– Restaurant owners

– Slow Food conviviums/contacts

– Peak oil discussion groups

– Transition Town organizations

– Doctors and medical professionals

– Support groups for people with allergies

– Gardening organizations,

– Environmental groups.

Everyone has a right to eat local food.

Cast a wide net when you look for people. Everybody has a right to eat and to access local foods -- not just the people who agree with you on politics, religion, or culture. The Oklahoma Food Cooperative is diverse -- we have conservative evangelical Republicans, gays and lesbians, Catholics, Methodists, Presbyterians, Southern Baptists, Muslims, Buddhists, pagans, Democrats, anarchists, socialists, atheists, and all points in between. There is **no political, ideological, religious, or cultural litmus test to join and participate** in the Oklahoma Food Cooperative.

Many of our members would not normally even be in the same room as others, much less working with them across barriers of religion, politics, and culture, on a common endeavor. We find this to be a hopeful sign. We don't lack for reasons to divide us. It is nice to find that a diverse group of people can come together and work with each other on a common cause.

We don't make some kind of commitment to faux diversity where we pretend things don't matter. No one has to deny any deeply held belief. We just realize that some things are relevant to food, and other things in our lives aren't relevant to coming together at a table of local food fellowship. The Oklahoma Food Coop does not get involved with politics, except for issues that directly relate to food. This includes a ban on distributing partisan political literature at our pick-up sites during election campaigns.

In other words, **there is no religious, political, or cultural "test" in order to access local foods.** People from all aspects of the political spectrum have been shocked to find that this is true and the food cooperative is not a vehicle for them to pursue other interests, political campaigns, or ideologies. The shock wears off quickly however, and we haven't had any problems with people coming to an understanding of the need for this kind of cultural, political, and religious neutrality.

The local food contribution to economic development.

The fastest way to create jobs in rural areas is to help farmers sell food directly to local residents. Rural areas are well stocked with the most important capital good relating to food production – which is land. Given the resources local

communities sometimes spend to attract industries to rural areas, it is ironic that these rural development organizations often ignore the one industry already present in rural areas and the opportunities it offers for new markets that will reduce capital outflows from the rural community and create new capital inflows as rural producers market their goods in regional cities.

For example, if people in rural areas simply started buying their beef from the neighbors who are cattle ranchers, the economic impact to a rural county would be about $2.6 million per 10,000 residents, if the residents eat the U.S. average amount of beef. Since rural folks are likely to eat more beef, that figure may be low.

If each of those dollars only circulates once in the community, the economic impact doubles to $5.2 million. Run it around a third time, and the impact multiplies to $7.8 million.

These are real, not imaginary dollars. Making this shift in most rural areas would require zero capital investment, since the necessaries – cattle production, processing facilities, and relationships between cattle producers and customers – already exist. What it requires is a structure to facilitate and organize that potential marketplace.

Features of the Oklahoma Food Cooperative Order Delivery System.

Core Values. The Core Values of the Oklahoma Food Cooperative are social justice, economic viability, and environmental sustainability. Our food has a story, and this is what we are about. If people want miscellaneous anonymous food, they can go to a supermarket. They come to a local food cooperative because they want something more. Telling the coop's story is important, and it is equally important for each producer to tell his or her own story.

Membership. Both producers and customers are members. Everybody pays the same amount to join, and has the same rights. Producers can buy, and customers can sell. One member, one vote, one class of membership stock. Each member receives a unique membership number.

It is important to **not limit the number of producers** in the coop. Early in the Oklahoma Food Cooperative's history, there was a proposal to limit the number of producers that could sell in any given product category. This kind of restriction is common in farmers' markets in some areas. The founders of the Oklahoma Food Cooperative rejected this, however, and time has proven the wisdom of this strategy.

– *The cooperative constantly grows.* We need new producers to help meet the growing demand.

– *Producers drop out,* often without any warning or notice to the Coop. They go bankrupt, retire, get divorced and have to sell, they change their production focus, and they die. A multiplicity of producers helps insulate the cooperative from this kind of event. We had one producer who was selling $8,000/month with us – a wide variety of products, beef, pork, eggs, prepared foods. Then, one day his wife said "I want a divorce." They had to sell the farm and one month he was there and the next month he was gone. The coop didn't miss a beat because there were more than a dozen other producers selling beef and pork and eggs and prepared foods.

– The *market should choose*, not the cooperative's leadership. The only rational way to pick winners and losers is to let the customers choose who they do business with.

– A *limitation on producer access to the cooperative marketplace violates core values* of social justice and economic viability.

– Multiple producers *(variety) attracts* customers.

Product Standards. You need product standards. The question "what is a local food?" is deceptively simple. With some things – such as vegetables, meats, eggs – the answer is fairly clear. What about prepared foods? Can they use ingredients purchased from the wholesale trade? If not, you will have no jams and jellies. Will you require any local product in prepared foods? Or is the labor of the producer preparing the ingredients sufficient to make it a local food product? What about co-packed products? Your group will need to decide its standards for product sales.

To become a producer, **members must apply and be approved.** The coop's administration screens the applications to make sure they meet our standards. We ask for a copy of any relevant licenses or certifications (kitchen inspections, organic, etc.). We have an orientation process producer applicants must complete before approval. We visit their farm or kitchen to ensure that they produce what they say they produce. The final step is a vote by the Board to approve them. We have different applications for various categories of producers (food, non-food, processed food, etc.), since the questions asked vary based on what will be sold. The Oklahoma Food Cooperative has these categories of producers: Food, Non-Food, Prepared Food, Processed Food, Co-packed Prepared Foods, Co-packed Processed Foods. Producers who want to sell in different categories must apply for and be approved in each category in which they want to sell.

An Agency Relationship. The relationship between the cooperative and its producer and customer members is an *agency* relationship. We act as agents of the producers in listing their products, collecting the customer orders, arranging for delivery, collecting from the customers and paying the producer. We act as agents of the customers in finding producers with products to sell, providing an order system, collecting their payments, and delivering their groceries. In our sorting operation, we are a cross-docking operation. The cooperative never holds title to any of the products. The products are always owned by either the producer or the customer. This is important for regulatory reasons.

Order system: Local food cooperatives use an online ordering system coupled with a semi-volunteer distribution system.

The Oklahoma Food Cooperative designed its own online order system, the **Local Food Cooperative Management System,** which is available free of charge to others via the General Public License System. It is not "download, plug, and play." You need someone who understands PHP and MySQL to set it up and maintain it. Contact roy@designinsight.net for more information on how to download and use the system.

Delivery Schedule. Each local food cooperative adopts a delivery schedule, from once a month to once a week. The Oklahoma Food Cooperative operates on a monthly schedule. The order opens on the first day of the month. Customers order by browsing the product lists and clicking to add items to their shopping cart. When a customer orders, the system creates two invoices: one for the customer, and one for the producer informing him or her what people have ordered. After the order closes, producers can then log in and click a link to access their orders, in two formats, sorted by customer, and sorted by product.

Delivery Day is when customers get their food. Each local food cooperative finds places for pickup sites at churches, businesses, homes, and sometimes parking lots.

Financing. The Oklahoma Food Cooperative has been almost totally self-financed by the sale of membership shares, sweat equity volunteer workers, and in-kind donations. In our organizing campaign we received a few hundred dollars in donations (from the Sierra Club and the Oscar Romero Catholic Worker House), in-kind donations from Epiphany

Church in the form of free use of church space for meetings, delivery day, and banquets, and we received one small grant, some of which we were unable to use because we had requested the grant when our goal was to open a store and not all of the money could be re-programmed to fit our order delivery service.

Pricing. Producers set their own prices. The Coop has nothing to do with what producers charge.

No limits on the producers. The cooperative does not limit the number of producers who can sell a particular product. We think this is important to maintain the vitality of the cooperative and make it an interesting place for customers to shop. If the cooperative limited producers in product categories, this would totally change the relationship between the cooperative organization and its producer and customer members. The cooperative would find itself in the business of picking winners and losers and second-guessing customer tastes and choices, as well as requiring us to forecast expected demand in order to make sure we had enough producers.

Producer brands. Each producer effectively is their own brand within the Coop. All the producers have a page at our website to tell their story. Producers decide the categories to display their products. Producers enter and edit their own information and products on the website. Producers must be able to access the internet to participate in the coop. Each product receives a unique number, automatically assigned by the software when the producer sets up the product. Producers can specify inventory amounts in their product descriptions. As customers order products, the inventory declines. If somebody cancels an order, the inventory increases.

When customers order, they order from specific producers. If I want five pounds of ground beef, I order that from a specific producer. The coop does not buy wholesale and then sell retail.

Only Sales of Production. We have strict standards about what can be sold through the cooperative. We allow no distributorships. Anything sold must be produced by the producer. Producers can buy raw materials, but the producer must add value. "Repackaging" is not added value. No confined animal feeding operation products may be sold through the cooperative nor may they be used as ingredients in processed/prepared foods. Ingredients for prepared and processed foods may be bought from the regular food system, except that any meats or eggs must come from Oklahoma farmers. Meats, dairy, and eggs must come from free-ranging flocks and herds. We don't allow animal products or antibiotics in feeds nor do we permit the use of bovine growth hormones. Products do not have to be organic or all natural. Producers must declare their production practices at the cooperative's website.

User Ids. The system assigns new customers and producers a user ID. This tells our system what level of access to allow the member.

Producer prepping of delivered products. Producers must get their goods to the delivery location. We have several producers who pick up items from other producers; those producers help pay for the gas for the driver.

Each product coming in to our operations center must be labeled with the name of the producer, the name of the customer, the customer's delivery code, and what the product is. The cooperative's website produces labels in two formats which the producer can automatically download at any time after the order closes. All he or she has to do is cut them apart and staple, tape, or otherwise stick the label onto the package.

Product packaging has been an issue. The flimsy plastic grocery bags are not that suitable for our system, since items have to be sorted and moved, and packages inside them can easily fall out. Attaching labels to such bags is next to impossible (well, you can attach them, they don't always stay). For frozen items,

the best packaging is zip lock bag, with the label inside the zip lock bag.

Delivery codes. Each customer has a unique delivery code based on how they choose to get their food (pickup at one of several locations or home delivery):

Ice chests. We use ice chests of varying sizes, for moving frozen and refrigerated items. For frozen items, we use food grade dry ice which we buy directly from a distributor, not from a retail store. We use frozen bottles of water for refrigerated items. We number the ice chests. Keeping track of those ice chests and ensuring that they come back to each delivery day is always a challenge. (These are former soda and juice bottles repurposed as frozen water bottles to keep refrigerated foods cold.) We tried using those frozen "blue blocks" but we had problems getting those back too. We switched to the frozen bottles of water.

Pick-up site management. Each route and pick-up site has a volunteer in charge of it. This volunteer has an administrative access that allows them to see the customers on their route. They email or phone them before delivery day to verify that the customer selected the right delivery method and remind them of the pickup times. Each pickup site has a volunteer in charge of that. Sometimes one person is the volunteer in charge of the route, the pickup site, and the driver for the route (smaller routes, like Midwest City).

Coop operating revenues. The cooperative presently charges the producers 11.25% to sell and the customers pay 11.25% to buy, this provides the operating revenues of the cooperative.

Payments: The cooperative takes payments in checks and via the PayPal system, thus allowing us to take credit cards. We originally offered a cash discount, for customers paying with cash or check. The accounting of that was always a problem, so we no longer offer a cash discount. We originally took cash, but with our widely distributed pick-up site system, cash turned out to be a problem. Few checks written to us bounce.

All orders must be paid for by the customer before leaving with the groceries.

Our primary method of **communication with customers is the internet**. We do not do regular postal mailings to members, although we did in the early stages. We do not have a printed customer handbook. We tried to do this early on and quickly discovered that even with donated copying, we could go broke just mailing out updates. At one point we had a subscription to a monthly mailing. Since only one or two people took advantage of that, we discontinued it. Now a printed price list for all of our 4500+ products would be more than 100 pages long!

We sell about $850,000 in local food and non-food products each year.

Sorting:

On Delivery day, producers deliver their products to our operations center. We have five areas in our operations center where we sort products to customer orders: Dry/non-refrigerated, produce, eggs, refrigerated, frozen. Ice chests for each pickup site are co-located in the sorting area, so the ice chests for frozen, refrigerated, refrigerated produce, and eggs for each pickup site are together. Larger pickup sites (with 50+ members picking up) may have 20-30 ice chests on delivery day.

We presently work with a staff of 3-3/4 full time employees and about 60 delivery day and pickup site volunteers.

The Oklahoma Food Cooperative welcomes visits groups interested in starting a coop in their area. You will learn the most by planning to participate in one of our delivery days, which are always the third Thursday of the month.

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02401 Meeting the Food Stamp Challenge with Local Foods: Slow Food for Low and Moderate Income People

In a country well governed, poverty is something to be ashamed of.
In a country badly governed, wealth is something to be ashamed of. – *Confucius*

This chapter is an essay I wrote in 2004. Prices are 2004 vintage.

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In November Sharon Gordon posted a "food stamp challenge" in the Community Food Security listserv: eat for a week on a food stamp budget. We decided to do this using as much food as we could from local farmers. We expanded the challenge to show how the combination of (1) frugal supermarket shopping, (2) preparing meals from basic ingredients, (3) buying local foods, (4) gardening, (5) food storage, and (6) home preservation of food could add up to a healthy, affordable, practical, and environmentally sustainable meal plan, even though the local meats, eggs, and dairy products are more expensive than typical supermarket fare. And the food had to be satisfying and taste good too, otherwise, what's the point? Call this the Slow Food for the Poor Challenge.

We succeeded on all accounts. Here's the summary of our results:

Total spent on food for week – $60.43

Food stamp allowance, 2 people 1 week – $61.87

Amount under budget – $1.44

Food cost average amount per day – $8.63

Amount bought from farmers – $44.18

Amount from supermarket – $16.80

Percent of local foods – 73%

Percent of supermarket foods – 28%

Besides coming in under budget, we ended with at least 2 more meals of leftovers in the fridge and apple pie filling in the freezer for later. The detailed table, showing the meals, ingredients, and prices, is document 31001 in this week's readings.

The meats we ate during the week were buffalo, 100% grass-fed beef, and pork. Yes, we ate a lot of ground meat (sausage, beef, and buffalo). We also had a great pot roast for a festive weekend meal. The meats ranged in price from $2.95/lb (ground buffalo wrapped in butcher paper) to $4.50/lb for the buffalo round roast.

We ate ground meat nearly every day, and some might ask, "Wasn't that boring?" No, because we fixed it different ways. We had Redneck Salisbury Steaks (ground buffalo patties browned in a skillet, and cooked in gravy in the oven), homemade spaghetti sauce with ground buffalo and pasta, rice pilaf with ground buffalo, and beef stew made with hamburger.

Ground meat can take on different flavors, depending on the herbs used with it, and we made liberal use of our garden-grown dried herbs this week. If we had tried to eat unseasoned hamburger patties
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for a week, that would have gotten boring fast. Instead one day we were south of the border, and the next we ate in Italy and the day after in southwest Oklahoma. We were liberal with our use of herbs, onions, garlic, hot red peppers, habanero pepper salsa, and chipotle peppers, all from our garden with us-ens doing the processing (smoking for the chipotles, boiling water canning for the habanero pepper salsa, dehydrating for the peppers, curing for the onions and garlic). We did all of that work, in the summer and fall. Now we get to eat these items all year thanks to a couple of hours of work in the summer or fall.

Our eggs were from certified organic, free-ranging hens, bought directly from a farmer through the Oklahoma Food Cooperative, costing $3/dozen. As the week went on, I slowly scaled back the number of eggs we ate for two reasons. One was to stay in the budget, the second was we were running out of farmer eggs and the Oklahoma Food Cooperative monthly delivery was more than a week away. On Sunday, Sean and I were a bit dubious about 1 scrambled egg each. It turned out fine. The sausage we scrambled with it added to the bulk, and the homemade hashbrowns made with leftover baked potatoes further filled out the meal, and the apple cobbler for breakfast dessert was a true treat.

Every day we had home baked rolls or biscuits made with 100% certified organic stone ground flour, made with Oklahoma wheat. I used the opportunity to try a couple of different recipes and we decided that the most recent version was undoubtedly "our best 100% whole wheat rolls ever". (Recipe is included below, of course.)

We baked biscuits or rolls every day, even though I only made dough twice during the week. Each time I made enough dough for several bakings, and kept the unused dough in the refrigerator.

We made intelligent use of leftovers, by design. Sunday's supper was a delicious hearty winter soup. It had leftover cabbage and the broth from cooking the cabbage, leftover beans and bean soup, some of the rice pilaf, and the gravy from the pot roast, simmered for a couple of hours, and served with fresh baked whole wheat rolls.

There's enough of that soup left for today, and we're glad about that because it was good, rich and complex flavors.

We would not have had such nice treats (apple pie and apple cobbler) if we had not preserved apples given to us by a friend during the summer. She had picked and preserved so many for her family she was out of room in her freezer. We sliced, dipped, and froze several bags of apples and each month we have apple treats.

We did not cut any corners on quality. We used olive oil and butter, not shortening and margarine. We buy olive oil at a locally owned supermarket for $10/gallon. They don't have it at that price all the time, so when it is cheap we buy several, and then we don't have to buy it for quite a while.

Our garden and home preservation skills made a major contribution to our diet. Home grown and/or preserved items we used during the week included spaghetti sauce, corn on the cob (bought from a farmer in the summer and frozen), green beans, peach and plum jam, chipotle peppers, habanero salsa, dried herbs, cured onions and garlic. We had fresh greens (chard) from the garden. Food processing techniques that contributed to our menu this month included jam making, boiling water canning, dehydrating, freezing, smoking peppers, and curing of alliums. .

We bought our meats through the Oklahoma Food Cooperative, pork from a family in Okemah and buffalo from the Stepp family of Hinton and Dennis Garret of Eufaula. I think it is likely that folks in other areas would have a hard time finding locally produced meats at these prices. That of course was one of the reasons I started the organizing process to

form the Cooperative. Oklahoma needed a way to conveniently buy food from farmers, and voila, the Oklahoma Food Cooperative was born. Our meat and egg prices are higher than supermarket fare. They are lower than what is found in health food stores and natural groceries.

Supermarket items included pasta, white flour (for thickening gravies and sauces), sugar, salt, rice, cabbage, carrots, potatoes, celery, dried beans, canned tomato sauce (we used the last of our frozen sauce this week, sigh), butter, and milk. We hope to add carrots to our list of "we grow all we eat" items next year. In the meantime we buy them at the supermarket.

Food storage proved its utility, in that I didn't have to buy anything except cabbage, carrots, potatoes, and celery, everything else was on hand. I did make an extra trip to the grocery store to check some prices, however, as I "charged myself" for the supermarket items I had on hand based on the price this week at Buy for Less at NW 23rd and Penn in Oklahoma City for the items.

PREPARATION TIME

Someone sent me a private email suggesting that I keep track of food preparation time. Not including cooking time, these meals averaged 15 minutes preparation time. The pot roast extravaganza was the most involved menu. The dough making took about 20 minutes for each batch, including the kneading time. The pie was 20 minutes prep time, the cobbler was about 10 minutes. The first time I made dough of course it took a lot longer than 20 minutes. Now I have been making bread for going on 20 years so unless it is something new I don't have to study the recipe. I don't have to look for stuff when I want to bake because I have everything I need for baking organized in one place. During this week cooking took a little longer because I measured everything with spoons and cups that I usually "measure by sight" so I could fairly account for the price of the ingredients.

It should be noted that this is not an exceptional menu for us, it is the same kind of food we eat every month, so these recipes were not new recipes to me, I have prepared them many times.

One of the real time saving techniques was the creative use of leftovers. The most complicated meal was the pot roast. It gave us a second meal that evening from the leftovers, and the rest of the roast and the gravy went into the Sunday night soup. We had more than one meal of burger helper. The subsequent meals simply required warming it up. My busiest day was Wednesday, I was at church from the morning until late at night, so I prepared all three meals at breakfast, and then packed my lunch and dinner. Remembering the descriptions in Laurel's Kitchen cookbook about how she prepared her husband's lunches to take to work, I got out a picnic basket and filled it up, the rest of the staff at work thought it was a great touch, and it was. A re-usable picnic basket is much better than a disposable sack.

CONCLUSIONS

My conclusion is that depending on the access to local foods, feeding your family a high quality diet using local ingredients is absolutely do-able. This experiment integrated frugal supermarket shopping, use of local foods, preparing meals from basic ingredients, food storage, gardening, and home preservation of foods. Each of these six areas was essential to our ability to stay within the food stamp budget.

RECOMMENDATIONS:

Based on this experiment, increasing community food security infrastructure and capacities, together with encouraging and helping low and moderate income people in these areas seems to me to be most promising of success. I think people should start with their situation as it is, and over time add basic areas of food security until they all work together. People will be better able to take advantage of local foods, for example, if

they have already learned to prepare meals from basic ingredients.

Skills. While our grandparents knew how to do all this stuff, there has been a tragic collapse in the transmission of heritage food information across generations in the United States. Classes are needed to help people learn how to plan menus, garden, preserve foods, cook meals from basic ingredients. And people need to talk to elders while they remain with us and conserve as much information as they can. Oral histories are a great way to do this.

Equipment. Help people acquire home food preservation equipment, including freezers, canning jars, dehydrators. For about $200 (internet catalog prices), a basic set of new equipment could be bought including a boiling water canner, dehydrator, grain grinder, pressure canner. For about $1500, larger equipment could be bought (including a pasta maker and oat roller) that could be loaned for use by individuals or groups or maintained at (for example) a church kitchen and made available for use by people wanting to do home preservation of foods who don't have the equipment.

Improving access to local foods. If I did not have access to the Oklahoma Food Cooperative, it would have been much more difficult to meet this challenge. Low income people in cities are not going to have the time or resources to be running around in a hundred mile radius stopping at farms along the way to get their groceries. Structures need to be established to efficiently and conveniently link urban consumers with rural producers. It is my opinion that those structures should be organized and controlled by those who use them - the producers and the customers.

Frugal supermarket shopping. The easiest of the five areas to start with is frugal supermarket shopping, preparing meals from basic ingredients, and home food storage. That was where I started. Low and moderate income families should be encouraged to keep some of their household savings in the form of food. It takes a while to build up supplies, of course. If built up over time, food storage helps low income households manage their food budgets. Supermarket prices often have violent "mood swings". If meat is cheap, canned goods are expensive. A family with food storage can buy what is cheap, and avoid what is expensive.

Gardening. Gardening is another area to "start working on early", and helping people learn how to garden is essential for food security -- also helping them to find the resources they need, including seeds, bare root plants, tools, and land.

RECIPES. The recipes used during the week can be found at http://www.bettertimesinfo.org/2004index.htm , the 5th edition of the Better Times Almanac.

02411 is an Open Document Spreadsheet of information regarding our Slow Food Challenge participation. Download it at www.ipermie.net.

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02421 Design a college food system

Much of our food system depends on our not knowing much about it, beyond the price disclosed by the checkout scanner; cheapness and ignorance are mutually reinforcing. And it's a short way from not knowing who's at the other end of your food chain to not caring–to the carelessness of both producers and consumers that characterizes our economy today. Of course, the global economy couldn't very well function without this wall of ignorance and the indifference it breeds. This is why the American food industry and its international counterparts fight to keep their products from telling even the simplest stories–"dolphin safe," "humanely slaughtered," etc.–about how they were produced. The more knowledge people have about the way their food is produced, the more likely it is that their values–and not just "value"–will inform their purchasing decisions. – *Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals*

In 02091, we visioned a bit in order to describe a permacultured college food system. How does this compare to your specific situation in school? You should do this assignment, even if you live off campus, because you need design practice. Sure, you are only a beginning permaculture designer, does that mean you can't look at your situation and see how it can be different?

It will be best if you do this with some permie friends. If you don't have any permie friends -- find some. If necessary, run an ad in Craig's List.

The situation described in 02091 is different from the food systems of most college cafeterias. A common model is to contract with a national food delivery corporation to operate the campus dining facilities. Many college cafeterias feed their students the same junk food crap that stocks our supermarkets.

But even in the absence of a permacultured food system on campus, there is much that college students can do to promote college food security.

Organize for better food.

Better food security for your college begins with **careful observation** of your situation. There is a lot to take in. You should probably begin by starting an on-campus permaculture organization that can advocate with your college administration for better food security for the campus.

Network with and involve off-campus local and regional food security organizations. Your campus organization can amplify its impact as you build relationships with off-campus organizations to create a better food system with invisible structures that support a more just, sustainable, and resilient food system for your area. In turn, off-campus organizations can help you get a better food system on campus. Don't forget alumni groups!

Find sympathetic faculty members. You'll need a campus sponsor and the more faculty you can get on your side, the more effective your discussions with your campus administration will be.

What your group's goals and aspirations for your college food system?

How many students does your campus feed every day? How many places does it

feed them? Are these all controlled by one food service organization? Is food service a campus project? Are food services contracted to outside corporations? Who owns the food service equipment and other campus food service infrastructure? Is there any organic or locally produced food served?

What is the status of local food production? What products do farmers produce in your area? In what quantities?

Does your school own land other than its immediate campus? Does it own farms and pastures? Schools often have inventories of assets like farms and ranches that are left to them by donors in wills. They simply rent them out and spend their rent money on school activities. Such lands could be used to grow food for on-campus consumption.

Study and Evaluate. After a thorough observation, study and evaluate your observations. Your group could issue a "grade" for your campus food system and this could be an opportunity for more work with your campus administration. Don't hesitate to flunk your campus food system if they do nothing for community food security. Make this a public event.

How much food does your campus need each year to operate? How does this compare with local food production?

What are the easy aspects of transitioning to a permacultured college food system?

Design. As you begin your design work, incorporate permaculture principles such as succession, and "slow and small solutions."

If you start small, what is the first thing you would do to move your campus food system in the direction of a whole systems plan? If that were successful, what would be the next thing to do? The third?

Start with things that students can do on their own, without any need for permission or resources from the school.

Eat with the season. Eating with the season is a food security principle that applies in campus dining halls just like anyplace else. Skip the salad bar and its imported greens during the winter – unless your school is raising its own salad greens in solar heated greenhouses fertilized with compost from the cafeteria kitchens.

Go local! When you eat out – and college students eat out and buy take out all the time – support locally owned restaurants and fast food locations! Stay away from the franchised national brands. This will get you allies in the local business community and that's good. One of your first campaigns should be "Support your local café."

Buy some food from local farmers. College students living in dorms buy food all the time even if they have meal cards to eat at on-campus cafeterias. Find out where your local farmers' markets are and buy some local food. Chances are good you will find people selling locally made cookies, granolas, breads, and other fun and tasty foods to bring home to stock your dorm room snack bin.

Store some food. You are probably not going to get your school to go all-in for food storage (unless perhaps you are a student at Brigham Young University . . . which probably already has food storage). You could keep some extra shelf-stable food in your dorm room, both for late night snacking and for emergency use if the system gets suddenly stressed. Food storage items for college students could be jerky, meat sticks, nuts, dried fruit, granola, Ramen noodle packages. See the list at the end of chapter 02291 "One Month of Food in a Computer Box."

Once you have picked all the low-hanging fruit, move on to more difficult challenges. One of the most important aspects of college food security is for your **campus food system to build relationships with local producers.**

Start with ground beef. While it's important for institutions to source food from the local area, the reality in many areas is that your school may not be able

to find enough local production to feed its students. The one locally produced food item that is likely to be available in large enough quantities to feed a campus in most areas is ground beef. If not immediately available, production of locally grown ground beef can be ramped up quickly. A focus on ground meat is one of the more important things we can do for the food system. Locally grown ground meats, sourced from free ranging herds of cattle, do not produce the extensive climate-forcing emissions that are a problem with feedlot (confined animal feeding operation) cattle. You should inquire about your school's existing choices for ground beef, since many institutions buy ground meat that includes the infamous "pink slime" ingredient – so-called lean finely textured beef, made from bits of gristle and sinew and other mechanically separated beef parts, and then drenched with ammonia to kill bacteria. By law, it can be as much as 15% of ground beef and the manufacturer does not have to disclose its presence in the product.

Food Service Composting. As part of your dialogue with the school, get your campus food service on board with composting. At Saginaw Valley State University, their campus environmental organization, with the assistance of sympathetic faculty members, started a project growing salad greens. Food waste from the cafeteria was sent to the greenhouses, where it was fed to worms. The worm tea and castings grew salad greens for eating in the cafeteria. It wasn't a completely closed system. It was a great first effort. The greenhouses produced greens in the middle of the Michigan winter.

Research projects. Connect your efforts with the research projects of campus faculty or propose new research projects to faculty that your organization can help with. Professors often must do research as part of their job. To find a bunch of enthusiastic students proposing to help with interesting and useful research will be welcome. It stacks another function on your projects and the more beneficial functions stacked on these kinds of efforts, the more likely it will be that the administration will sign off on the deal.

Grow some food on campus. Persons living in dormitories can start permaculture clubs that could get permission to start demonstration gardens on campus. Schools could be encouraged to raise some or all of the food they serve in their cafeterias. A college food system that sourced most of its food supply from its own farms would be enormously popular with students and parents and could give that school a competitive edge in the race to attract more students. In the meantime, if you have a sunny window, practice by growing a tomato plant, or some other vegetable or herb plant that you like, in a container. Maybe there could be a contest among the campus fraternities and sororities for the best edible landscaping projects.

Bottom Line Deal: Make your food preferences loudly and unambiguously and persistently known to your campus administration. Do not be shy about making your food preferences known to the cafeteria management and to responsible school officials. Always make such requests in writing and ask for an in-person meeting. A certain amount of publicity will benefit this process.

A permacultured food system does not spring into being overnight. It comes about one step at a time as students, faculty, alumni, and other community stakeholders establish goals and work through the processes necessary to achieve those goals. The result is tasty and nutritious food that cares for people, cares for the planet, and has a care for the future.

A plan like this will be a lot of work, so you need friends. **Start your campus permaculture organization** and then run with the food system design plan project. You could maybe have a weekend workshop, and invite local permaculture designers to do a design solution on the issue with you.

Always think big, but not grandiose. In other words, permaculturing a college food system is a big plan. You may not complete it during your time at that school. If you do a good job with your organization, it will continue on and persistently work on the design. **Always design for small incremental steps. Be on the lookout for the big scores too.**

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02431 Design a personal food system.

If you do just one thing—make one conscious choice—that can change the world, go organic. Buy organic food. Stop using chemicals and start supporting organic farmers. No other single choice you can make to improve the health of your family and the planet will have greater positive repercussions for our future. – *Maria Royale, Organic Manifesto: How Organic Farming Can Heal Our Planet, Feed the World, and Keep Us Safe*

This is different from 02421. That was about designing a big system involving invisible structures impacting potentially thousands of people.

This is a micro design problem that relates to your own life and household. If you live in an urban area, your personal food system explores how you will find and prepare the foods you need for sustenance for yourself and your household.

This is one of the more important iPermie design challenges. Your food choices have major impacts on the planet and on your own life and health and the lives and health of those in your household. This is an area that, because of its importance, demands careful attention to design details and the whole system orientation of permaculture.

This is about designing something that works for you and your urban lifestyle that is consistent with the ethics of permaculture.

If you live on campus, and eat at a college cafeteria, that will be a major part of your personal food system. Even so, you don't eat all the time at the school cafeteria and what you eat away from your primary household food system is as important as anything else you do with this design. You won't live in a college dormitory forever. How will your personal food system transition as you leave school?

Observe. If there are 30 days in the month, and three meals and two snacks in every day, that's **90 meals and 60 snacks.** Where are you eating those meals and snacks? What are you eating? "Where" as in "where is the food prepared," as you may be doing take out and fast food for some of those meals. Where and what do you eat when you are away from campus or your home? When traveling? Do you pack portable foods to take with you?

When you eat away from home, how is the food packaged? When you buy food to prepare at home, what is the package burden? How much plastic? Foam? Paper? Save all the packaging from the food you eat for a month and see what it looks like. (Scrape off any food waste, preferably into a compost container, to avoid undesirable odors.) If you separate it into plastic and paper/cardboard, what does each weigh?

What about water? Do you buy bottled water? If so, please stop. Bottle your own and carry it with you in a permanent non-plastic water bottle. If you don't like the taste of your local water, buy and use a water purifier.

Do you like the way you do food now? If not, or if you think your present system is "OK" but you want to do better – what do you want out of your personal food

system? Can you set goals for three months, six months, a year, five years? How will you bring your personal food system into cooperation with the ethics of permaculture?

Make some lists. *Goals* – and the functions and systems and elements needed for them; *Functions* – and the systems and elements they require. Drill down into your lists to achieve greater detail and clarity about goals and functions and their necessaries.

Study and Evaluation. Where in your personal food system do you have the most control? What changes can you make there? Recalling the good –better – best strategy of decisions, if you can't always do the best, can you do the better? And if not the better, can you do the good? You will need to decide what the good, better, and best decisions are for your personal food system. Make a list of those decisions and what each decision needs and yields.

Design. How does your personal food system interact with the rest of your life? What are the beneficial connections between the various aspects of the food system in your design? How will your life and food system evolve after you leave school?

What **invisible structures** do you need that will help you make good, better, and best choices for your personal food system? Do these exist? Or do you need to take a leadership role in getting them started? If not you, who do you think should or will do that organizing work?

Implementation. Once you get a plan, how do you implement it? Do you pile on and do everything at once? Or do you take a first things first, second things second strategy? (That is the general recommendation of permaculture.) If your plan costs money, do you have that money on hand? If not, where will you get it?

Whole Systems Thinking

The leg bone connected to the knee bone, the knee bone connected to the thigh bone, and etc. How does your personal food system fit in with the rest of the world in its totality and your specific lifestyle?

What issues do you resolve by applying permaculture design to your personal food system?

What beneficial connections are there between your personal food system and the rest of your life?

What additional functions (besides nutrition and health) can you stack on your personal food system?

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02441 Natural Lawn Care that Cares for People and Cares for the Neighborhood

Landscapes have a language of their own, expressing the soul of the things, lofty or humble,
which constitute them, from the mighty peaks to the smallest of the tiny flowers
hidden in the meadow's grass. *Alexandra David-Neel*

If you are in doubt about the dangers of conventional lawn chemicals, see the factsheets at www.beyondpesticides.org and www.pesticide.org.

This chapter offers positive suggestions for alternative lawn care methods that do not poison people, pets, wildlife, birds, or the bees.

Improve your soil. Taking care of your soil is the most important thing about natural lawn care. You can get a soil test done at your local county extension office. They will tell you how to collect a sample of the soil for testing. If it is too acidic, add lime. If it is not acidic enough, add sulfur. Weeds are an indicator of your lawns nutritional needs. If you have lots of dandelions, it is likely that your soil pH is above 7.5. Broadcast sulfur to lower the lawn pH. If you have too much clover, your lawn likely needs more nitrogen. Spread compost or a compost tea. It is always best to fertilize your lawn with compost or compost tea.

Don't cut the grass too short. Most turf grasses achieve best health at 2.5 to 3.5 inches. Wait until the grass is at least 3.5 inches tall and then set your mower to cut 1 inch. Giving your lawn a short hair cut damages the grass and creates an unhealthy environment. Make sure your lawn mower blades are sharp. The one exception is the last mowing of the fall. Cut the grass "that time only" to about 2 inches.

Do leave the grass clippings on the yard. These naturally decompose and help the lawn remain healthy. Clippings do not contribute to thatch. They give your soil nitrogen and phosphorus which it needs to remain healthy. They will quickly disappear from view.

Water carefully. Lawns benefit by deep watering. The lawn should dry out between waterings -- this does not mean "turns brown", but the color will be a bit dull and footprints will stay compressed for more than a few seconds. Give the lawn ½ inch of water. Put a tuna can in the watering area. When it is half full, the lawn has received one-half inch. Wait an hour or so and give the lawn another half inch. The tuna can will then be full. Water early in the morning to avoid evaporation problems. Frequent watering causes shallow roots and that's bad. Deep watering infrequently encourages deep roots and that is important to drought proof your lawn.

Lawns need fertilizer only once a year. If you have cool season grasses (like fescue), fertilize in the fall. Warm season grasses (Bermuda) need feeding in the spring. Use compost or compost tea for the most healthy impact for your lawn. If you must buy and use a commercial fertilizer, get an organic fertilizer or buy compost.

Use corn gluten to control spring weeds – if you feel like you must control weeds. An increasing number of people are opting for more diverse lawns than a

Bermuda grass or fescue monoculture. But if you must . . . Research indicates a 60% success rate for corn gluten in the first year of use that quickly climbs to 90% effective in a few years. It inhibits root formation at the time the seed germinates but it doesn't poison the environment and put you, your family, your pets, and the neighborhood at increased risks of negative health outcomes. See http://eartheasy.com/article_corn_gluten.htm for more info.

Don't use pesticides and herbicides on your lawn. Every application of these harsh and toxic chemicals attacks the natural ecology of your lawn. This creates a vicious cycle calling for ever more toxic doses of chemicals to resolve the problems caused by the initial use of toxic chemicals on your lawn's ecology.

Use vinegar to spot treat weed problems. Mix 5 parts white vinegar, 2 parts water, 1 part dish soap and apply with a hand pump sprayer. Only spray the weeds. Don't broadcast it over the lawn.

Lawn grubs? Use milky spore powder. It only impacts the grubs. It leaves beneficial organisms alone. Ask for it at your local lawn care center.

Don't send your dried leaves to the dump! Yard waste is an increasing problem at landfills. Shred your dried leaves in the fall. Use them for mulch in flower or vegetable gardens or around trees. Add them to compost piles. Make a special compost pile of only shredded leaves and next year mix it with your potting soil and your container plants will really love you. It is best to get a little aerobic exercise and hand rake your leaves. To shred, put them in a trash can and use a lawn trimmer to shred them (these are sometimes known as "string trimmers").

Control thatch buildup. The thatch layer (next to the soil) should be about a half inch. This is composed of the above-ground runners of the warm season grasses like Bermuda. If it gets much more than that, aerate the lawn. Rent a core aerator from a local business and run it over the yard once. See http://www.diynetwork.com/how-to/how-to-aerate-a-lawn/index.html for more info.

More natural lawn care info:

Primer for Fall Natural Garden Tasks: http://www.safelawns.org/blog/index.php/2012/09/fall-lawn-tasks-heres-the-primer/

http://www.richsoil.com/lawn-care.jsp

http://www.safelawns.org/

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02451 Food design challenges

Being able to take ideas and transform them into something tangible is life-affirming. — *Melinda Santillian*

In permaculture, we learn design by actually doing design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has some small projects that you can work that will help you to develop design skills. Never forget that none of these challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

This section offers you six design challenges. Here they are, with the documents that reference them. Your goal in these challenges is to develop food design skills that will help you to compile a permaculture design for your life.

As you work through these design challenges, make a list of the beneficial connections between these design projects and the rest of your life.

02141Make a baking station

02271Designing your kitchen record-keeping system

02301Design a fermentation station for your kitchen.

02341Design a storage solution for your lifestyle’s food systems.

02421Design a permacultured college food system

02431Design a personal food system

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02461Additional resources for food and permaculture

Observe Nature thoroughly rather than labor thoughtlessly.
Masanobu Fukuoka 'One Straw Revolution'

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Section 3: Energy

The word "energy" incidentally equates with the Greek word for "challenge." I think there is much to learn in thinking of our federal energy problem in that light. Further, it is important for us to think of energy in terms of a gift of life. – *Thomas Carr*

I urge individuals around the world to stand up, and ask local leaders, if they haven't already, to pledge to purchase cleaner cars, build green facilities, and buy green power like wind or solar energy. Our actions may determine if we become a casualty in the war for a habitable planet for generations to come. – *Leonardo DiCaprio*

"I'd put my money on the sun and solar energy. What a source of power! I hope we don't have to wait 'til oil and coal run out before we tackle that." – *Thomas Edison*

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03011 Energy Definitions

Coal, oil and gas are called fossil fuels, because they derive from fossil remains of beings from long ago. The chemical energy within them is a kind of stored sunlight originally accumulated by ancient plants. Our civilization runs by burning the remains of humble creatures who inhabited the Earth hundreds of millions of years before the first humans came on the scene. Like some ghastly cannibal cult, we subsist on the dead bodies of our ancestors and distant relatives.

– *Dr. Carl Sagan, Billions and Billions*

iPermie is not a detailed scientific treatise on energy. It discusses energy from the viewpoint of a lay person hacking a permaculture design for his or her life. In that context, here are some basic energy definitions which will be useful for your understanding of the documents and concepts in this section.

AC
Short for alternating current, the kind of electricity you use when you plug something into a wall outlet that draws power from a generator or the electrical grid.

Amp
Short for "ampere," it measures the volume of electrical current flowing through an electrical circuit.

Barrel
When applied to oil, a barrel equals 42 gallons. Outside of the United States, the unit of measure for oil is cubic meters or metric tonnes.

BOE
Abbreviation for "Barrel of Oil Equivalent". It measures the amount of energy contained in one barrel of oil. The actual energy content of a BOE depends on the kind of oil it contains, as different grades of crude oil yield different amounts of energy. The common average reported and often used in general calculations is 1 BOE = 1.7 megawatts of electricity = 6,000 cubic feet of natural gas = 6 gigajoules.

BPD
Barrels per day, a common method of reporting oil production by well, field, province, world.

BTU
British Thermal Unit. The amount of energy needed to raise the temperature of one pound of water one degree (specifically, from 39 degrees to 40 degrees Fahrenheit.)

Carrying Capacity
The amount of life that a given territory can support. Fossil fuels can be used to artificially increase the carrying capacity of territory.

DC
Short for Direct Current, the type of electricity you get from a battery.

Depletion Rate

The rate at which oil production in a well, province, country or other area of measurement declines after production has peaked. This is sometimes referred to as the "decline rate". "Depletion" refers to the problem of declines in oil production.

Energy storages
A term used in permaculture to describe any stockpiles of energy at a given site. This refers more to storages of resources in general than it does to gasoline or diesel. This is because permaculture views material resources as embodied energy, held in a pattern that is useful to the residents of a site.

EROEI
Acronym for Energy Returned on Energy Investment. Because of the Laws of Thermodynamics, when analyzed on a full life cycle basis, this is always a negative number, that is, we always get less energy out of a system than we have to put into it to generate the energy because all energy transactions, without exception, lose energy. Oil works so well for us, in making an apparent energy profit, because the original energy investment was millions of years ago in the form of ancient sunlight.

Gigajoules
1 billion joules.

Gigawatt
One billion watts, or one thousand megawatts.

Horsepower
1 horsepower equals 746 watts.

Hubbert Theory
A theory regarding oil production, developed by Dr. M. King Hubbert of the Colorado School of Mines, which postulates that oil production follows a bell shaped curve. It rises to a peak and then declines as fast as the original drive towards the peak.

Joule
Scientific unit that has mostly replaced the BTU for scientific calculations. It equals one watt second.

Kilowatt
1000 watts. It is about equal to 1.34 horsepower. It equals 3.6 megajoules.

Kwh
Abbreviation for kilowatt hour, or the consumption of electricity involved with the expenditure of 1,000 watts for one hour. It equals 3,412 BTUs.

Life Cycle Analysis
A method of analysis that attempts to quantify the total energy and materials embodied in the production of any given product or the workings of any system.

MBTU
1,000 BTUs. It equals 293.07 watts.

Megawatt
One million watts, or 1,000 kilowatts.

MmBD
Abbreviation for Million Barrels/Day, a measure of oil production.

Peak Oil
Common name of the theory, first articulated by Dr. Hubbert, that world oil production would peak and then enter a terminal decline.

R-value
A measure of thermal resistance. Materials with a high R-value slow the transfer of heat energy. Increasing the thickness of the insulating material slows the transfer of heat energy.

TANSTATEF
Acronym for the phrase – "There ain't no such thing as the energy fairy." In other words, there is no miracle waiting in the wings to save us from our energy follies.

Terawatt
One trillion watts, or one thousand gigawatts. The total power used by humans worldwide in a year is estimated at 16 terawatts.

Volt
Volt is a measure of electromotive force. If we compare electricity to water in a hose, volt is a measure of the water pressure.

Watt
Amps times Volts equal Watts. This is a measure of the work that electricity can do. There are 3.414 BTUs per watt.

The Three Methods of Heat Movement:

Radiation
Transferal of heat energy through electro-magnetic waves. Sunlight is an example of heat transferal by radiation. It always moves from hot to cold.

Conduction
Transferal of heat energy through a solid material. The direction of transfer is

always heat to cold. That is, heat will always move towards cold.

Convection
Transferal of heat energy by the motion of fluids (which includes air and wind), heat always moving towards cold.

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03021 Laws of Thermodynamics

There ain't no such thing as a free lunch. – *Robert A. Heinlein, The Moon is a Harsh Mistress*

This is a lay person's general summary of the topic from the viewpoint of someone working on a permaculture design for his or her life.

Thermodynamics is about **heat, energy, and work.**

The laws of thermodynamics are observations of concrete and unavoidable limitations on human action. Thermodynamics studies the effects of work, heat, and energy on a system.

They apply to everybody and everything, without any exceptions. They are indifferent to social and economic status, location, ethnicity, culture, religion, politics, or nationality. Political and economic theories are irrelevant when it comes to thermodynamics.

In the Permaculture Design Manual, Mollison quotes Kenneth Watt –

> All energy entering an organism, population, or ecosystem can be accounted for as energy which is stored or leaves. Energy can be transferred from one form to another, but it cannot disappear, or be destroyed, or created. No energy conversion system is ever completely efficient. *Principles of Environmental Science*

Here is an easier to understand summary –

1. You can't win (because energy cannot be created or destroyed).

2. You can't break even (because entropy always increases and you never return to your original state), therefore all energy transactions cost energy. In other words -- you get less energy out than you put into the deal. Well, if it was a very cold day – with a temperature of absolute zero – you could break even.

3. You can't get out of the game (because absolute zero is not attainable). In other words, it doesn't get that cold.

While energy can be transformed, all such transformations are inefficient – they lose energy.

"Transformation" means I can pour gasoline into an automobile and convert the gasoline into work (moving the vehicle down the road) and heat which fritters away into the atmosphere, lost to us forever. Maybe I get a little use out of some of it via the car's heater during the winter. The rest of it goes away.

Or I could plug in a mixer and convert the electricity into motion (the whirling of the beaters) to mix a batter. Some of the energy converts into waste heat that dribbles off into the surrounding materials/atmosphere and does nothing further for us. In both situations, we got less work out of the deal than we invested as energy.

That is the pattern for energy – each and every energy transformation without exception from the human viewpoint yields work plus waste. We always get less energy out of an energy process than goes into it in the first place.

Because energy transformations always lose energy, if you want 1000 BTUs of

work, you need more than 1000 BTUs of energy to do that much work.

This leads us to what Mollison calls the "Law of Return":

> Whatever we take, we must return, or "nature demands a return for every gift received," or "the user must pay."
> *Permaculture Design Manual*

The "on the street" version of this law is – "There ain't no such thing as a free lunch," the acronym for which is TANSTAAFL.

We ignore these scientific realities to our mortal peril. Understanding the laws of thermodynamics should lend an urgency to our work. It illustrates (among many examples that could be cited) the inherent limitations of alternative energy sources such as wind and solar, when compared with the power of fossil fuels.

Let's belabor these realities a bit –

When it comes to energy –

– You can't win.

– You can't break even.

– You can't get out of the system.

Why? Because energy transformations always lose energy.

What does this have to do with real life?

Fossil fuels are important precisely because of the "fossil" nature of their origin. The original energy investment was millions upon millions of years ago, in the form of solar energy converted to carbon-based plants and animals which, in time, in the depths of the Earth, changed into petroleum and natural gas.

Considered on a full life-cycle basis (that is, from its beginning millions of years ago to present-day gasoline in my tank), making gasoline from petroleum is an energy-losing activity.

But that doesn't matter in the present, because the original energy investment was millions upon millions of years ago in the form of the sun shining down upon plant and animal life. That is a done deal, a sunk investment, we don't have anything to do with that. We dig a hole, pump out the crude oil or the gas, refine it, and voila! Behold the fossil fuel era! Let's party!

The problem with the party is that fossil fuels are a finite resource. When they are gone, they are gone and then we will have to account in the present for all of our energy transactions. Another way of describing fossil fuels would be "archeological fuels."

Contrast this with the situation for alternative energy systems. Wind, solar, water, biofuels must be 100% accounted for in the present. The "energy return on energy invested" for all of the alternative fuels and gee-whiz energy gizmos on the market these daze is much less than that of petroleum.

What will happen over the next few decades is that the hard rock of fossil fuel depletion will meet the irresistible force of soaring demand.

Demand for fossil fuels soars each year. There are about 2.5 billion people in China and India and every one there wants a car and gasoline to power it. We already compete with them for energy supplies which is one of the reasons why gasoline has become expensive these past few years. We can expect their consumption to race ahead in coming decades as more of their people are able to afford and buy cars.

This will be a clash of enormous magnitude that will create a tremendous amount of danger for humanity worldwide. Historically, human societies, when faced by resource constraints of this magnitude, resort to war.

Managing the decline in fossil fuel availability, the soaring demand, and the low energy return on energy invested of renewable fuels is a major challenge for

permaculture design. No one can, at this point in time, predict how that will work itself out or whether permaculture design can be deployed extensively enough to peacefully manage that decline. Everyone can make a serious contribution to this critical need by beginning permaculture design of their own individual lives and households.

There are **three utter necessity energy realities** of the future –

– Do more with less,

– Do less with less, and

– Full stop on some activities. War would be a good activity to put first on this list, followed by genocide and ethnic cleansing.

How much fossil fuel energy does it take you to cook a roast? We'll talk later about accounting for that, but for now – in the future coming at us, and is already here for some – if you have a non-fossil fuel alternative, you will want that to cook your roast. The price of the hydrocarbons will be such that you might not be able to afford conventional energy.

You'll want something like a solar oven, or an outdoor bread oven, or a retained heat cooker, all of which can work without hydrocarbon energy, so you can have a hot meal instead of going hungry. For some of us, there won't be a choice. It's use a non-fossil fuel energy, or go without energy.

I'm not saying fossil fuel energy won't be available. While oil and gas will be pumped for a long time, they will become more expensive. We have found and exploited all of the cheap oil. The oil that remains is not cheap oil. It is expensive to produce and refine.

So as you go through your design process, your essential testing questions are –

Can I do this without any hydrocarbon energy?

If not, then -- how can I do this with less hydrocarbon energy?

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03031 Peak Oil: Concepts and Consequences

In many OECD countries....oil consumption came to a peak and it is slowing down, but the growth of the demand is coming from China, the Middle East, India. So demand will grow. The question is, whether or not we will be able to increase the production to meet that demand growth. According to our projections in the World Energy Outlook, even if we were to assume, and this is very important, even if we were to assume the next 20 years global oil demand growth was flat, no growth at all, in order to compensate the decline in the existing fields we have to increase the production about 45m bpd just to stay where we are in 20 years, which means to find and develop 4 new Saudi Arabias, and this is a major challenge. *Fatih Birol, Chief Economist of the International Energy Agency*

How long does it take the earth's population to use one billion barrels of oil? Twelve days. Half of all the oil that has been used to date has been used since 1985.

I am one of the co-moderators and registered owner of runningonempty2@yahoogroups.com. This is a conversation with more than 7000 members which has been discussing peak oil and other energy issues since 2001.

Peak oil is a theory regarding oil production, developed and publicized by the late Dr. M. King Hubbert, who was a geoscientist. He worked for years at the Shell Oil Company laboratory in Houston. After retiring from that career, he became a senior research geophysicist for the United States Geological Survey. He taught geology and geophysics at Stanford University and the University of California at Berkeley. He developed a theory regarding oil production which predicted that for any given geographical area – from an individual oil field to the entire planet – the process of oil production can be described by a bell curve.

Using the science of his theory, Dr. Hubbert correctly predicted in 1955 that United States oil production would peak in 1970/71 and decline thereafter. At the time of this prediction and for years thereafter, people ridiculed him. Yet, as he predicted, US oil production continued to increase until 1970/71, at which time it "peaked." US oil production has been generally in decline since then. US oil production in 2011 was 41% less than 1970 oil production.

You can view a chart showing US oil production from 1859 to 2011, which shows the peak and decline, at http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPUS2&f=A. It's not an even smooth curve. It has little ups and downs. The trend over time is clear.

EROEI, Thermodynamics, Alternative Fuels.

Petroleum is, without a doubt, the "Queen of Fuels."

It has been cheap, versatile, and widely available for decades. Because of its versatility and cost relative to its production expense, it is essential to human society as we know it at this stage of our technological and social development.

Petroleum has a high **energy returned on energy invested**. We refer to this as EROEI. Working with this concept requires a brief review of the laws of thermodynamics.

(1) You can't win.

(2) You can't break even.

(3) You can't get out of the game.

For our purposes, the important law is the second. Every time energy changes, you lose some of the original energy content. This is true without exception for all energy transactions. It's why we say, "You can't break even." If you want 100 BTUs of work from a hydrogen fuel, you will have to spend more than 100 BTUs of some other fuel to get that potential 100 BTUs of hydrogen work.

Since there are no exceptions to this, it is true of fossil fuels.

Why are fossil fuels so important? They work so excellently for us because the original energy investment **was ancient sunlight which millions of years ago** fueled the growth of the plants and the creatures which ended up becoming coal, natural gas, and petroleum. Fossil fuels have a high EROEI in the present, because the original energy investment – sunlight – happened millions of years ago. The end result (gasoline in your tank) has less energy than the total energy investment in the product (from ancient sunlight through to the energy involved in its production and refining). That doesn't matter because all we have to account for is the extraction and refining work on our end of the history.

Unfortunately for humanity, **all substitute fuels like hydrogen or ethanol require the expenditure of the full energy investment up front.** As that energy cycle turns, we discover that there isn't any such thing as a free lunch with energy. Our alternatives to fossil fuels, without exception, have low EROEI. That doesn't mean they don't work. It does mean that they don't do as much work for as little input as is the case with hydrocarbons.

We get less work for our effort with alternative fuels and our work costs more. That is an issue we will have to cope with during the coming decades.

A second issue is the decline of the EROEI of oil and gas production. In the early days of conventional oil production, we got 100 barrels of oil for every barrel of oil equivalent of energy invested in exploration and extraction.

As time passed, we found and began to pump all of the easy oil. In the beginning, oil actually flowed to the surface on its own. Early wells were shallow and tapped formations with so much pressure the oil blew through the drilling equipment creating "gushers."

Now we willingly pay tens of millions of dollars to drill wells in the deep ocean and millions of dollars to drill for oil on dry land.

Of every 100 barrels of oil that we pull out of the ground –

– 10% of the energy is used to extract the oil.

– 27% is used to refine the oil into usable products.

– 42.5% is used to construct and maintain the transportation infrastructure necessary to move the oil around, and to actually move the oil around to where it needs to go.

So only 20.5% of the original energy value of the 100 barrels of oil is available for use at the end consumer stage.

Most of that 20.5% of our 100 barrels of oil energy ends up as fuel, and the internal combustion engine wastes most of the energy it burns as heat. That's why your car has a radiator and a cooling system that you fill with antifreeze. According to Wikipedia, the average efficiency of internal combustion engines is 18-20%.

This means that only FOUR PERCENT of the original energy of the

100 barrels of fuel actually is used to move a vehicle. Or, for every 100 barrels of oil we pump, we get to use four for our personal use.

That's not quite true though. What does the weight of a vehicle consist of? Mostly steel, rubber, plastic, etc. and the weight of the fuel itself. Less than TEN PERCENT of the weight moved by a typical vehicle is an actual human body.

So ultimately, the way we presently do things. NINETY-NINE POINT SIX PERCENT of the original energy endowment of that 100 barrels of oil is either consumed in its production of fuel, frittered away as heat, or used to move steel, plastic, etc. down the road. **ONLY FOUR TENTHS OF ONE PERCENT moves people around.**

That's apparently the best that the world can do at this stage of its development. It's embarrassing, though, to run the numbers like this, and discover how incredibly energy inefficient our transportation system is.

Price and Demand

The issue with peak oil is not that we are in imminent danger of running out of petroleum. We don't anticipate a near-term situation where we produce no petroleum fuels because of absolute shortages of petroleum.

The problem is that demand is on track to outrun production. The market's response will be price increases so that hydrocarbon products will become much more costly over time.

In the last few years, we've seen that economies worldwide are sensitive to the price of petroleum. High petroleum prices contribute to riots, government instabilities, and the loss of millions of jobs around the world. Since the peak of US oil production in 1970, we have participated in three major wars in or near the oil producing areas of the Middle East.

Looking for a cavalry to rescue us.

Many of us visualize a high tech market driven cavalry coming to our rescue just in the nick of time. We plan to drive our hydrogen powered SUVs into the filling station of the future and gas up with hydrogen or charge our batteries with electricity. We have zero intentions to reduce the importance of the personal automobile to our lifestyles.

That may not be true of the younger generations. News seems to be bubbling up that many of today's young people don't care about owning and driving automobiles. They prefer to organize their lives so that they don't need to drive a car. That's a smart move for young people.

In 1998, two-thirds of potential drivers 19 years old and younger had driver's licenses. In 2008, less than half of potential drivers had licenses. In 1985, young people ages 21 to 34 bought 38% of new vehicles. Now, this demographic group buys only 27% of new vehicles.

The Economic Fallacy About Oil

Economists seem to think that if the money is there, there will be no energy problem. They say that if a fuel becomes more scarce, the price will increase. As a result, people will use less and the market will look for substitute fuels. True enough, as far as it goes. What happens, however, if there are no substitute fuels of equal or greater EROEI to the peaked petroleum? Markets can only "find" what is there to be found, or what is scientifically possible to discover. Money can't actually transform a sow's ear into a silk purse.

A further problem with the economic cavalry to rescue us argument is that governments worldwide finagle energy prices. Some act to increase the price of some fuels. Others act in contrary purposes, attempting to drive down the price of fuels. This government meddling prevents markets from sending accurate signals about the relative scarcity of fuels.

Bad market information results in bad market prices which cause bad energy market decisions.

Saudi Arabia, for example, subsidizes all energy expenses in its Kingdom. As a result, Saudi Arabia uses energy with extreme inefficiency, even though in less than 20 years, if their current trends continue, their domestic consumption will increase so much that it will require all of the nation's oil production leaving nothing for export.

We have a similar situation in the United States, where governments have finagled energy prices for decades. The entire 20th century construction effort created a built environment that uses energy with amazing inefficiency. The same is true of our transportation systems. We are built up and ready to go for a system based on cheap fossil fuels. Alas for us all, those days are gone.

To many economists, politicians, and the general public, the laws of thermodynamics are irrelevant before the power to the marketplace. This illustrates the serious danger of widespread scientific illiteracy.

Just the Production Facts.

Since 2005, world oil production per day has floated between 84 and 87 Million Barrels per Day (hereafter "MBD") of "petroleum" – except, as we shall see, this figure includes much more than simple crude oil production. One way that governments and industry are hiding the true facts about energy access is by finagling the statistics so the situation seems more positive than it actually is in reality.

Total World Oil Supply

2005 -- 84.424
2006 -- 84.390
2007 -- 84.262
2008 -- 85.356
2009 -- 84.318
2010 -- 86.751
2011 -- 87.093

Change in total World Oil Supply, as reported by the U.S. Department of Energy, 2005-2011: +3.2%

However, before we break out the champagne, let us examine the curious details.

Total World Oil Supply is not just actual oil. It also includes lease condensate, natural gas plant liquids, refinery processing gain, and **other liquids**. The "**other liquids" category is mostly corn ethanol.** Yes, it's true. The United States government is doctoring its reports on **World *Oil* Supply** by including corn ethanol and other non-oil products in its totals.

A second curious detail is that the natural gas plant liquids, refinery processing gain, corn ethanol, and lease condensate, do not have the energy intensity ("energy returned on energy invested") of crude oil.

Remember that the next time someone brags about world oil production keeping up with demand. If we only look at **actual crude oil production**, we see a different story.

Actual crude oil production is that good old fashioned black stuff. It came oozing up out of the ground when old Jed Clampett shot at a deer and missed and thereby laid the groundwork for the hilarious Beverly Hillbillies television series. It is what most people think of when they see the words "oil production.".

World Actual Crude Oil Production
million barrels per day, not including corn ethanol, natural gas plant liquids, refinery processing gain, or lease condensate

2005 -- 73.644
2006 -- 73.267
2007 -- 72.812
2008 -- 73.625
2009 -- 72.219

2010 -- 74.005
2011 -- 74.080

Change in actual crude oil production, 2005-2011: +.67%

That's less than two-thirds of one percent change in six years of intensive drilling worldwide.

Now let's look at that category, "Other Liquids."

How did corn ethanol production do? Between 2005 and 2011, **it zoomed up by 187%.**

That's production. Now let's look at consumption.

World Energy Consumption
(million barrels per day)

2005 -- 84.105
2006 -- 85.162
2007 -- 85.847
2008 -- 85.463
2009 -- 84.711
2010 -- 87.231
2011 -- 87.421

Years 2005-2011 that world production exceeded consumption: **1**

Years 2005-2011 that world consumption exceeded production: **6**

Change in consumption, 2005 - 2011: **+3.9%**

Change in total oil-like liquids production (including corn ethanol), 2005-2011: **+3.2%**

Change in actual crude oil production, 2005-2011: **+ .67%**

Production and consumption data reported as thousand barrels per day, from the Energy Information Agency of the US Department of Energy, at http://tinyurl.com/7u6pf83.

Oil is oil. Or is it?

Each barrel is about 44 gallons.

There are two primary kinds of conventional petroleum: Light sweet crude and Heavy sour crude. The price of oil you see on the news is the price for light sweet crude. A 44-gallon barrel of light sweet crude will yield about 22 gallons of gasoline plus assorted other refined products.

But a 44-gallon barrel of heavy sour crude will yield much less gasoline. Refineries that process light sweet crude cannot process heavy sour crude.

The situation of reporting petroleum production is about as complicated as it gets. We've already seen that "total world oil production is not just world oil production." It's also various other liquids including corn ethanol.

So when reading petroleum production statistics, consult the fine print for the definition of the resources being reported. Dr. Colin Campbell, a retired petroleum geologist who was one of the authors of the 1998 paper that reminded the world of M. King Hubbert's work and noted its implications for the present, says that there are nine different kinds of petroleum products that are sometimes lumped together into one set of production statistics, and sometimes broken out separately:

1. Regular Conventional Oil and Gas

2. Heavy Oil (<17.5 deg API - a measure of density)

3. Bitumen (defined by viscosity)

4. Oil Shale (immature source rock, from which oil can be extracted by heating)

5. Shale Oil and Gas (that can be extracted by artificially fracturing reservoirs lacking adequate natural porosity and permeability)

6. Deepwater oil and gas (>500m)

7. Polar oil and gas

8. Natural gas liquids from gas plants

9. Non-conventional gases (coalbed methane, hydrates etc.)

Add in refinery processing gain and corn ethanol and you have even more confusing statistics to ponder.

Dr. Campbell wouldn't add corn ethanol into this "total oil" mix. Doing so amounts to the politicization of oil statistics and that is worrisome since bad market information inevitably leads to bad market decisions which in turn sends bad market signals leading to even more bad market decisions. That is a vicious negative feedback loop which has already caused major problems and that will get worse going forward.

The evidence seems to be that world production of light sweet crude (the good stuff) has already peaked. The total change in actual crude oil world production is less than 1% for the past seven years.

Saudi Arabia says they can't increase production of light sweet crude, but they can ramp up their production of heavy sour crude. They claim they can get to 12 MBD. However, the US Energy Information Agency (part of the Department of Energy) has been saying that by 2020, Saudi Arabian production must be at least 22 MBD to meet the expected world demand. Saudi production in 2009 was 8.25 million BPD, so there is a large shortfall between expectations and actual reality. Now the IEA is saying that Saudi production will fall in the future.

There is another minor devil in these expectations of a growing demand for Saudi oil exports. The government of Saudi Arabia heavily subsidizes energy so there is little incentive for conservation. It is thought that these subsidies are necessary to keep the population from revolting. Changing the domestic subsidy situation is fraught with peril for the Saudi aristocracy. If current trends continue, sometime between 2020 and 2030, Saudi Arabia will become an oil importer because of increases in its own domestic demand for fuels. This is a problem, according to the US Energy Information Agency, the US must count on increased Saudi exports to satisfy world demand. Oops.

Peak oil observers have noted for a long time that most of the Saudi production comes from large mature fields and depletion is already an issue for the Kingdom.

Dr. Campbell expects the total world production of conventional oil by the year 2100 to be a cumulative total of two trillion barrels. More than half of that has already been produced:

Campbell's Estimate of Production to 2100

Production to date (2011)1115 Billion barrels (1.115 trillion)
Future production (2012 - 2100) 885 Billion barrels
Production from known fields779 Billion barrels ("reserves")
From new finds 106 Billion barrels
Total conventional oil production2000 Billion barrels (2 trillion)

Dr. Campbell writes:

> The peak of production (conventional oil) was in 2005 and the current depletion rate (annual/future) is 2.5% a year. Regular Conventional dominated past production and will likely continue to do so for many years to come. It therefore probably has a major influence on the peak of all categories, which is much more difficult to determine. My current estimate is that their peak was in 2008 at 82 Mb/d, but one cannot exclude the possibility that it might be overtaken over the next few years by a small amount. A debate rages as to the precise date, but misses the point when what matters is the vision of the long decline on the other side of it. *Email of July 3, 2012 to Association for the Study of Peak Oil USA Advisory Board, full text is at the end of this chapter, used with permission by Dr. Campbell.*

Don't forget that Dr. Campbell is talking about real oil. He doesn't include the fake oil corn ethanol statistics favored by the U.S. government and others in the energy marketplace.

The Problem of Fake Reserves

Many world oil producers do not release important data. Nobody has ever done a transparent, independent, third party audit of the claimed reserves of Middle Eastern countries. When it comes to oil statistics and the Middle East, transparency is not on anyone's agenda.

Petroleum geologist Jean Laherre and others have grave doubts about the reality of the Middle Eastern reserves. Dr. Colin Campbell says there may be 300 million barrels of spurious reserves in the Middle East. They note that when OPEC decided to base annual production quotas on the size of a nation's oil reserves, all of the Middle Eastern countries registered overnight increases in their oil reserves, amounting to increases of tens of millions of barrels of claimed reserves in some countries.

Discoveries and Reserves and Depletion.

Meanwhile, back in the American oil patch, Dr. Hubbert noted that a production peak must follow a discovery peak. US oil discoveries peaked in the 1930s. It was about 40 years later that US production peaked. On planet earth, world oil discoveries peaked in the 1960s.

But what about the increases in world oil reserves that we read about every year? Aren't we actually discovering more oil than we use? No, we aren't and we haven't been discovering more oil than we consume since the 1980s. The problem is that the way the oil companies do their bookkeeping. It creates an accounting illusion that appears to report "new oil discoveries" every year, with clockwork regularity.

Suppose an oil company discovers an oil field and it is one square mile in size. They start working one 40-acre patch. That oil company will only record the reserves of the 40-acre patch on its books. When it adds another 40 acres, it will add those reserves to its books. Voila, they have just discovered more oil! Well, no they didn't. They discovered all of the oil when they figured out they had a one square mile oil patch. They didn't count it until they started exploiting it. Nothing new has been discovered. It was there all along. This kind of claim, however, is useful to corporate hierarchies as it gives the appearance of vigorous exploration to stockholders and the more naive in the investor class.

Thus it comes to pass that discoveries of new oil did in fact peak in the 1960s. This peak must be followed by a decline, and the evidence thus far indicates there is about a 40-year lag between the two peaks. Over half of world oil production comes from 100 giant fields, and all of them date to the period 1940-1970. No one discovers such large fields these days.

The "peak" of Peak Oil is unlikely to be a sharp clean peak like, say, the Matterhorn. It may be more like Mt. Massive in Colorado, which is a large plateau with seven peaks, all about the same height. Oil production and marketplaces are chaotic human constructs and can be influenced by many factors. The early oil shocks of the 1970s, for example, which created such interest in conservation that oil use actually dropped for a while, had the effect of delaying the peak in world oil production.

Using less now means a more gentle decline after the peak. That's good.

Using more now means a steeper and faster decline thereafter. That's bad, maybe very bad.

What will the future bring?

The world needs more oil every year to handle demand growth. The growing middle classes in China and India have discovered the car and everybody there wants one at least, two if they can get them, three of course would be even

better. China licenses tens of thousands of new cars every day. This is known as the "Chindia" problem, as China and India gobble up an increasing share of the available oil exports every year.

Demand Destruction

So if we're not getting enough new production to cover demand growth and depletion, what's happening?

High prices drive demand destruction. We see evidence of this in –

-- Persistent high prices for fuel.
-- Food riots in the third world,
-- People abandoning their cars in the United States,
-- People moving closer to their work,
-- Economic crises throughout the world destroying jobs and businesses.
-- Draw-downs of petroleum stocks in storage.
-- The lack of interest of young people in automobiles.

In recent years, there have been spot "absolute" shortages of diesel and gasoline in rural areas of the upper Great Plains states during the peak driving months of the summer. The areas of shortages are literally at the ends of pipeline systems, which suggests that the national pipeline system occasionally "runs dry" at its end points. This indicates a general draw-down of inventories.

National media don't report these spot shortages in remote areas. You can find this kind of news in alternative sources like the various peak oil forums including runningonempty2@yahoogroups.com.

Contrast this fact-based look at actual production statistics with the extreme optimism prevalent in the United States news media predicting that the United States is on the verge of becoming the world's next Saudi Arabia. Whenever you watch the network news. . . Always remember that media corporations manage the mainstream news "for your benefit".

Has Fracking Killed the Peak Oil Hypothesis?

There is a full court press in progress by the oil industry on the potential of fracking to increase oil production.

In the Spring of 2012, Citigroup released a report claiming that US oil production would increase so much that we would become known as the "New Middle East."

This report is riddle with problems and data issues.

The Citigroup analysts appear to ignore the actual track record of some of the classes of oil they expect to increase and thus their projections are the "optimistic" case. We can always root for optimism. That isn't necessarily the way to lay your bets.

http://bittooth.blogspot.com/2012/03/citicorp-energy-projection-gentle-cough.html

The International Energy Agency's 2011 World Energy Outlook report says that in 2035, the world will need 47 million barrels of new oil every day, the equivalent of five Saudi Arabias, from oil fields that have yet to be found, in order to meet projected oil consumption demand extrapolated from current trends.

Germany's DeutscheBank expects a 20% shortfall in oil production compared to demand by 2015.

Is fracking the cavalry that will save us?

While it is true that US oil production has gone up slightly in recent years, we are nowhere near increasing our production to equal or exceed our 1970-71 peak in oil production. Meanwhile, depletion continues everywhere on the planet, so we end up with a not-very-impressive net increase in the world figures. Thus far, nearly all of the increase in production was in one year, 2010. 2011 did not repeat the growth rate. At the time of this writing, we don't know what the 2012 figures are.

Actual crude oil production world wide is only up by .67%, 2005 to 2011. That's less than one percent!

Gross liquid fuel supply is up 3.2% once we add in Natural Gas Plant Liquids and corn ethanol production.

Meanwhile, consumption is up 3.9%.

You don't have to be a mathematician to see the problem with the figures.

About fracking, and the claims of many in the industry that peak oil is now a "dead concept," Dr. Campbell says –

> There is nothing new about artificially fracturing reservoirs to increase production. Indeed in the early days in Texas they sometimes put nitroglycerine down a well to cause an explosion. But higher prices and the advent of horizontal drilling have increased the scope. The targets are mainly source-rock sequences where it is possible to tap interbedded siltstones and other rocks lacking adequate natural properties. In some cases, the clays or shales forming the source-rock itself contain small pockets of trapped oil and gas that can now be tapped. The wells are costly and have a short life, but the resource in the ground is enormous and at present unquantifiable. No doubt there are sweet spots that are developed first. There are obvious environmental objections.

It is probably too soon to analyse the impact of the production of oil and gas from these sources, but in general it could be argued that the First Half of the Oil Age saw the rapid growth of industry, transport, trade and agriculture, fueled largely by cheap and easy oil. It allowed the human population to rise six-fold in parallel. Logic suggests that the Second Half, which now dawns, may be marked by a corresponding contraction. During the First Half, the banks had been lending more than they had on deposit, confident that Tomorrow's Economic Expansion was collateral for To-day's Debt. But Economic Expansion relies on easy cheap energy which is not there any more, explaining why debt went bad and major banks failed. Governments, working on outdated economic principles, have reacted by printing yet more money out of thin air, hoping to restore consumerism and prosperity, but may have made a bad situation worse. The transition to the Second Half threatens to be a time of great political and social tension, as already witnessed by riots from Moscow to Wall Street and revolutions in North Africa and the Middle East.

So it goes through the present pro-oil propaganda campaign. The shrill nature of the campaign suggests that the actual controversy may be near its end and what we see right now is the last gasp of the industrial attempt to avoid the truth of the future regarding our energy supplies:

Betting the Farm on Natural Gas

The other popular fossil fuel advocacy campaign positions natural gas as the bridge fuel of the future. Various gas production companies claim that the United States has "100 years" and maybe even "200 years" of natural gas. They don't have much to say about the fine print.

The source of the claim that the US has 100 years of natural gas is the Potential Gas Committee. It is mostly composed of people from the natural gas industry. Its 2011 report identifies three kinds of natural gas resources: probable, possible, and speculative.

If you add up all three categories, you get a total of 2,170 trillion cubic feet of natural gas.

If you divide that number by the 2010 US domestic consumption of 24 trillion cubic feet, you get a potential gas supply of 90 years. This is ten years short of the 100 years claimed in their publicity. I suppose they round their numbers up although we don't know for sure because they don't "show their work."

But much of this gas will never be produced. It is too deep to be economical, or stranded in small deposits that aren't worth the drilling costs.

By their reasoning, I could claim to be a billionaire, based on my "speculative potential income" derived from writing books that I feverishly imagine could sell "tens of millions" of copies.

Someone should send a memo to Forbes to list me on their Forbes 500 List of Speculative Billionaires Who Might Get Rich Under Improbable Circumstances.

A more likely prediction of what we have on hand is their Probable category, which totals 550 trillion cubic feet. The Potential Gas Committee says that it is likely that half of this will actually be produced. We already have 273 trillion cubic feet in proven reserves (found, tapped, producing or ready to be produced).

So that suggests a natural gas supply of only 11 to 23 years, not 100, depending on what the industry is able to produce.

For a more detailed look at how much natural gas we have, see this article from Slate magazine: "What the frack?" http://www.slate.com/articles/health_and_science/future_tense/2011/12/is_there_really_100_years_worth_of_natural_gas_beneath_the_united_states_.html

For evidence that US natural gas production may be presently in decline, see http://www.smartplanet.com/blog/take/the-murky-future-of-us-shale-gas/157 .

One characteristic of shale gas production is the rapid depletion of the wells – the wells appear to be depleting at a rate of 32%, giving each well a relatively short life. This requires a robust drilling operation in order to maintain gas production levels. Because of the currently low price for natural gas, companies are shifting their exploration activities from gas to oil. At the time of this publication, natural gas was selling for $3.29 per thousand cubic feet. However, the actual break even price for natural gas from fracked wells is between $6 and $8/thousand cubic feet.

Thus, corporations are sharply curtailing their gas drilling operations.

This suggests the possibility of a coming surge in natural gas prices. Folks should perhaps beware of acquiring any new natural gas dependencies until the price and supply issues sort themselves out.

In any event, all of these rosy predictions of a century of natural gas require that current US consumption remain at the present level. If we do what natural gas producers want us to do, and convert our transportation fleet to run on natural gas, consumption will soar. More consumption means that supplies will deplete faster. Where's our 100 year supply of natural gas?

Peak Oil Impacts

The National Energy Technology Laboratory of the US Department of Energy commissioned the Hirsch Report (on peak oil). The Department never officially released it although they published it in 2005. It is available on the internet at http://www.hirschreport.com.

Dr. Robert Hirsch, primary author, had this to say in the Executive Summary of the report about the potential consequences of peak oil:

> The peaking of world oil production presents the U.S. and the world with an unprecedented risk management problem. As peaking is approached, liquid fuel prices and price volatility will increase dramatically, and, without timely mitigation, the

economic, social, and political costs will be unprecedented. Viable mitigation options exist on both the supply and demand sides, but to have substantial impact, they must be initiated more than a decade in advance of peaking.

Consider these leading edge impacts.

In 1950, the United States was the largest manufacturer of goods of all descriptions, we were the largest exporter, and the largest creditor nation.

In 2012, 41 years after the peak of our national oil supply, we are the world's largest debtor nation and the largest importer of food and manufactured goods.

The game isn't over until it's over, and it is not possible to know right now with certainty how all this turns out. There are things that could make the situation much worse, number one on that list is a world war for energy supplies. Historically, when faced with resource scarcities, human societies have nearly always turned to war. This is a "last man standing" strategy. The scale of the violence will be such that the last person standing may stand on a pile of radioactive slag.

Adapting to Peak Oil

People come to the runningonempty2 conversation looking for hope, and we offer hope. People sometimes don't recognize it as such.

When people think of "hope," at least initially, what they really look for is something that will help them to maintain their present lifestyle. This doesn't exist.

There is no way that we can go forward through the 21st century spending energy like it was cheap. It is easy to say "we must downsize our lifestyles." It is not easy to accomplish this in real life. Our economic and social systems encourage us to use more and more energy. "Difficult" does not mean "impossible," and therein lies the contribution that permaculture can make to the goal of managing the declining fossil fuel resource availability to avoid war and mass suffering and the consequent extreme damage to the biosphere.

Within the peak oil discussion community, there are a variety of opinions as to how the future will play out.

Some believe there will be a **fast crash.** They say we are too oil-dependent and our systems are so brittle that the minor declines of the early years of the peak period will shock us into a downward spiral of violence and chaos. This will result in a relatively quick (a few months to a few years) collapse of "civilization as we know it," and a rapid die-off of the human species from the present 6+ billion to somewhere less than one billion. This is the position of the folks behind the http://www.dieoff.com website.

Others believe that we will initially experience serious economic difficulties, which will over time develop into absolute shortages of important resources (such as food and fuel). This will be characterized by extreme poverty for many. They expect that order will be maintained and that die-off will not be fast. Over several generations they expect a gradual reduction to a world population of one billion or so. This is the **slow crash** position.

The hope of many is that the **coming decline can be managed.** We can see the record of history and learn how other cultures fared in facing their own dooms. Some adapted and survived, others didn't and fell. Jared Diamond's book "Collapse" is a study of how civilizations choose to survive or fail. While he has been criticized for some of his methods and conclusions, one thing that really stuck with me was his observation that civilizations who choose failure do so by clinging to strategies and tactics that served them well on their Ascent. A Decline always requires new strategies,

new tactics, new ways of doing things to meet changing conditions. People don't see this, so they do “more of the same,” which yields ever-decreasing returns on the investment, and eventually results in collapse.

Competition, exploitation, and violence characterized our Ascent. If we deploy those same strategies on our Descent, we will doom ourselves to rapid and dangerous collapse. If, on the other hand, we learn new ways, characterized by cooperation, conservation, nonviolence, and concepts of sustainability, we have an opportunity to see this situation through to a much more positive ending.

The Bias Towards Optimism

We humans seem to have a bias toward optimism. That isn’t necessarily a bad thing, as long as we understand it is a psychological deal and not a description of actual reality.

When it comes to oil and gas production . . . as the drilling bit turns . . . there are no Energy Fairies nor Magical Oil Wizards to save us that will banish the evil depletion demons so that we have an endless supply of hydrocarbon energy forever, and ever, and ever, hallelujah. Nor will they finagle the laws of thermodynamics so that we can simply switch to hydrogen or corn ethanol to solve our energy problem.

The Oil Fracking Fairy and the Natural Gas Fairy are creations of the petroleum and gas industry propaganda machines. They’re doing what the hydrocarbon industry has always done – talking big to attract investment and boost their stock prices. The rest of their schtick – such as casting aspersions on peak oil – is merely more gravy on their biscuits.

Fairies are fine creatures and every garden should have some. You should tell stories about fairies to your children. They are not a rational basis for rational energy planning. It’s best to keep our eyes on the science and the actual data and ignore the blowhards making noise to attract the gullible.

What about our children?

In all of the discussions of oil and gas production, few people will comment much on what the status of hydrocarbon production will be in 50 years. That's a long time horizon for oil and gas companies. But our children will be in the prime of their lives in 50 years. They may be caring for their parents and raising their own children.

What will they think about us and our short-sighted attitudes towards energy? Are we going to "go for the black gold" and use it all up now, as fast as we can, for the trivial purpose of land and air transportation?

What does that say about us as a people?

Recently, police in my town arrested two parents for starving a child to death. Is this what our present gluttony for oil will do to our children and grandchildren? This is not a 500 year in the future problem. It is right here, right now, and will impact us, our children, and our children's children.

For the sake of the children, it's past time to resist the political and economy hegemony of the oil and gas industries, who are in effect selling our children's future down the river for the sake of boosting their quarterly profit points. Sure sounds to me like an industry governed by amoral sociopaths.

Email of July 4, 2012 from Dr. Colin Campbell to the Advisory Board of the Association for the Study of Peak Oil – USA. Reprinted here with permission of Dr. Campbell.

I think at the heart of the Peak Oil issue is the need to properly define the different categories of oil and gas, each of which has its own endowment, costs, properties and depletion profile. I recognise the following:

1. Regular Conventional Oil and Gas

2. Heavy Oil (<17.5 deg API - a measure of density)

3. Bitumen (defined by viscosity)

4. Oil Shale (immature source rock, from which oil can be extracted by heating)

5. Shale Oil and Gas (that can be extracted by artificially fracturing reservoirs lacking adequate natural porosity and permeability)

6. Deepwater oil and gas (>500m)

7. Polar oil and gas

8. NGL from gas plants

9. Non-conventional gases (coalbed methane, hydrates etc.)

I think it useful to treat everything in terms of production to the end of the Century to avoid having to worry about some irrelevant tail end. So far as Regular Conventional oil is concerned my current estimate is

Production to 2100

Past -- 1115 Gb

Future -- 885

>From known fields -- 779 ("reserves")

>From new finds -- 106

>Total -- 2000

The peak of production was in 2005 and the current depletion rate (annual/future) is 2.5% a year. Regular Conventional dominated past production and will likely continue to do so for years to come. It therefore probably has a major influence on the peak of all categories, which is much more difficult to determine. My current estimate is that their peak was in 2008 at 82 Mb/d, but one cannot exclude the possibility that it might be overtaken over the next few years by a small amount. A debate rages as to the precise date, but misses the point when what matters is the vision of the long decline on the other side of it.

There is nothing new about artificially fracturing reservoirs to increase production. Indeed in the early days in Texas they sometimes put nitroglycerine down a well to cause an explosion. But higher prices and the advent of horizontal drilling have increased the scope. The targets are mainly source-rock sequences where it is possible to tap interbedded siltstones and other rocks lacking adequate natural properties. In some cases, the clays or shales forming the source-rock itself contain small pockets of trapped oil and gas that can now be tapped. The wells are costly and have a short life, but the resource in the ground is enormous and at present unquantifiable. No doubt there are sweet spots that are developed first. There are obvious environmental objections.

It is probably too soon to analyse the impact of the production of oil and gas from these sources, but in general it could be argued that the First Half of the Oil Age saw the rapid growth of industry, transport, trade and agriculture, fueled largely by cheap and easy oil. It allowed the human population to rise six-fold in parallel. Logic suggests that the Second Half, which now dawns, may be marked by a corresponding contraction. During the First Half, the banks had been lending more than they had on deposit, confident that Tomorrow's Economic Expansion was collateral for To-day's Debt. But Economic Expansion relies on easy cheap energy which is not there any more, explaining why debt went bad and major banks failed. Governments, working on outdated economic principles, have reacted by printing yet more money out of thin air, hoping to restore consumerism and prosperity, but may have made a bad situation worse. The transition to the Second Half threatens to be a time of great political and social tension, as already witnessed by riots from Moscow to Wall Street and revolutions in North Africa and the Middle East.

I imagine that as producing countries come to perceive the issue of depletion they will move to restrict exports to conserve as much as possible for their

own future. It makes eminent national sense although offending the principles of globalism whereby the resources of any country are deemed to belong to the highest bidder. Already King Abdullah of Saudi Arabia has said that he wants to leave as much wealth as possible in the ground for his grandsons.

By all means the United States may come to rely on its ample resources of Shale Oil and Gas, and its people may revert to more rural and happy lives seeking to make each region self-sufficient.

There is nothing new about this situation as empires have waxed and waned throughout history whether we speak of the Romans or the Aztecs. In the past their decline came when they exhausted the fertility of the soil at their disposal, but perhaps this time it will be due to the exhaustion of easy cheap oil-based energy.

Who knows ?

Best regards

Colin Campbell

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03041 Energy Efficient versus Energy Conservative

The cheapest energy is the energy you don't use.

Everyone is in favor of "Energy Efficiency." We like it and we want more of it. And in fact, we get more of it, all the time. We do more work with less energy per unit of work.

So why does total energy use continue to increase? Because energy efficient is not the same thing as energy conservative.

Energy efficiency is a measure of the amount of work you get out of a given unit of energy. All things considered, energy efficiency is a good thing, because it is better to do more work with less energy than it is to do less work with more energy.

But it's not the same as energy conservative.

To be energy conservative is to actually conserve energy and that means using less energy.

This is a particular caution when buying appliances rated by the government's Energy Star program.

Energy Star rates appliances within certain classes, which is a matter of size. It doesn't rate them against some ideal of lower energy use. A particular appliance might have a great Energy Star rating – "best in its class." However, if the class as a whole are energy hogs, that Energy Star rating doesn't say much. The Energy Star system often does not rate smaller and more efficient appliances. An Energy Star rating is not actually a statement of energy conservatism. It is only of about the energy efficiency of a particular appliance compared with others of its class.

It's a fine thing to aim for energy efficiency. Energy conservatism is more important.

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03051 Embodied Energy

"If it can't be reduced, reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned or removed from production." -- *Pete Seeger*

Wikipedia says –

> Embodied energy is defined as the sum of energy inputs (fuels/power, materials, human resources etc.) that was used in the work to make any product, from the point of extraction and refining materials, bringing it to market, and disposal / re-purposing of it. Embodied energy is an accounting methodology which aims to find the sum total of the energy necessary for an entire product life cycle. This life cycle includes raw material extraction, transport, manufacture, assembly, installation, disassembly, deconstruction and/or decomposition.

This method of energy accounting allocates all energy costs to the end user. This isn't an easy process. For example – how do we allocate the energy embodied in infrastructure such as highways, energy utility grids, and commercial and industrial buildings to end users?

Fortunately for me the author and you the reader . . . we are not here to develop embodied energy accounting. My purpose is to help people do practical design work that will benefit their lives and the ecologies in which they live, move, and have their being.

The design take away we need to know about embodied energy is that **everything you buy** – all of your stuff, kit, gear, whatever you care to call it, including services – has **energy embodied** in its manufacture and distribution. Energy conservation is therefore not only a matter of watching your miles per gallon and turning off the lights when you are not in the room and living in a small space. It is a matter of being prudent and temperate in your use of goods and services in general.

To illustrate this, check out the "Embodied Energy Calculator" at http://thegreenestbuilding.org/ . This is a site that encourages people to preserve existing buildings rather than tear them down. It provides a way to approximate the embodied energy in a building and to report that technical figure as "gallons of gasoline." This is useful because most of us have a good idea what a gallon of gasoline will do for us. In my case, it will take me and my 1995 Geo Metro about 35 miles around town in stop and go traffic. On the highway it would take me about 50 miles.

I live in a house that has 1,548 sq.ft. According to the calculator, the energy embodied in the materials and construction of our house equals 1,083,600 million BTUs. If we divide this by 115,000 (the number of BTUs in a gallon of gasoline), the embodied energy of my house is the equivalent of 9,423 gallons of gasoline.

That's a lot of energy. I could drive 329,805 miles on that much gasoline.

This is why their slogan is – The greenest building is the one that is already built.

A few best practices relating to embodied energy conservation:

Shop the aftermarket first. Thrift stores, flea markets, swap meets, and other kinds of second-hand shopping are friends of the planet and the cause of energy conservation.

Never build a new house or building. Or, if you must, have a damned good reason for any new construction. New construction should use as many recycled and locally sourced materials as possible to lessen the embodied energy burden of the new construction. "Damned good reason" does not include any feeling of entitlement you might have to build a brand new house just because, you know, you feel entitled to a new house because you are special and you can afford to build a new house. If a hurricane, earthquake, tornado, or fire destroys your house, that might be a good reason to build a new house. Or. . . you could decide to buy and renovate an existing house, which will embody less energy than new construction.

Use recycled materials. If you must buy new, look for products made with recycled materials.

Rent or borrow instead of buying. Think neighborhood equipment cooperatives, car share programs.

Be temperate in your needs and wants for stuff. If you live in a full size house, and rent a storage unit for storage, you may have Too Much Stuff. Putting surplus to work is a basic permaculture ethical concept! This doesn't mean that you shouldn't do things like food storage. It does mean that there is such a thing as too much of a good thing when it comes to stuff.

Think of ways to use invisible structures to help you use less new stuff. Local sharing programs, equipment cooperatives, and plain old-fashioned borrowing are ways to accomplish this goal.

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03061 Urban Energy Issues

Cities, like cats, will reveal themselves at night. -- *Rupert Brooke*

Think of the urban energy distribution systems as resource sectors that impact the site of your design – your life. While cities use less energy per capita than the suburbs or rural areas, urban life as we know it would not be possible without the expenditure of vast amounts of fossil fuels.

The big resilience issues with energy in urban areas, from the viewpoint of your urban lifestyle, are:

-- Transcontinental supply lines.

-- Centralized distribution systems.

-- Alternatives are not readily available and involve low EROEI.

-- Urban heat island effect.

-- High ecological prices of energy.

-- Transportation systems designed to waste energy.

-- A built environment designed to waste energy.

-- Invisible structures designed to encourage energy waste and gluttony.

-- Political criminality that allows special interests to corrupt the public policy process.

-- Climate instability driving an increase in extreme weather.

-- Resource exhaustion.

-- Irrational economic structures that centralize wealth and divert public resources for private gain.

These issues add up to a lack of individual control over their energy destiny for most people in urban areas. Due to the toxic interactions of these factors, urban energy systems are brittle and can fail catastrophically and quickly without any warning. The potential failure points are many.

Cities require such huge amounts of fossil fuels because of their designs. Poor design always increases work and pollution. We intentionally designed and built our cities without consideration of the true costs of energy. Since the system externalizes many of the costs related to energy, when we made our cost-effectiveness calculations we didn't take them into account. As with any other design situation, incomplete and inaccurate information leads inevitably to bad design choices.

The system programs us to live in denial about peak energy issues. People often look for guilt-free greenwash solutions that will allow them to continue to use as much energy as they want, without encountering any of the consequences of energy gluttony. That's nice work if you can get it, but there ain't no such thing as the Energy Fairy (otherwise known as TANSTATEF).

If you doubt this, go back and read 03021 Thermodynamics again:

-- You can't win.
-- You can't break even.
-- You can't get out of the game.

Your commitment to redesign your own lifestyle, and the structures and systems that support you and your household, is

the beginning of the redesign process for the urban area where you live. You are the seed from which a metropolitan-area energy renaissance will begin.

Here are five important energy design principles and strategies for both your life and your larger urban area are:

-- Everything connects to everything (Holistic Principle)

-- Use less energy! Use less stuff!

-- Important services and needs should be supplied by more than one element or system. (Principle of Redundancy)

-- Catch and store energy!

-- Use invisible structures to achieve energy goals.

-- Start at your personal doorstep.

Everything connects to everything (the Holistic Principle).

I built iPermie using sections and chapters. Don't let this map I created, which neatly categorizes the subject matter, confuse you about the ultimate nature of reality which is holistic. Everything connects to everything else. While we're talking about energy conservation in this chapter, we can't do a good job on energy if we don't think about issues of economics, food, community, and basic principles of design. Our cities work the way they do now because of the poor design of our urban systems. The present model of urban design has been driven mostly by political decisions that dictate patterns of work, residence, and transportation and that govern the built environment. Social injustice creates economic distortions that promote violence, greed, crime, and alienation. Solidarity is not a desirable value and we systematically leave people behind for the wolves to devour.

Demand Destruction is the Place to Begin.

The most important decision to make about energy is to use less. The urban lifestyle of the future is energy conservative. This starts at the micro-level of your own lifestyle, one of many seeds of a sustainable future being planted in your urban area. It continues as you join with your neighbors and others to create and support invisible structures for your urban area that make it easier to live an energy conservative lifestyle.

This section has several articles packed with ideas for practical actions in support of a more energy conservative lifestyle.

Important services and needs should be supplied by more than one element or system. (Principle of Redundancy) and Catch and Store Energy.

Permaculture design approaches issues like this by first noting the vital nature of urban energy supplies. Since energy is important, we can't depend on only one source (the grid). Prudence suggests that we need backups in case the energy grids fail.

Your design issue with these alternatives is to decide what works for you in your lifestyle situation as redundant energy supplies.

You may not be able to deploy these alternatives by yourself. One of the lessons of urban living is the necessity for community. In other words, I should probably list, "practice community building skills" as the first energy alternative on the list, since it is a prerequisite for preparing a rational energy plan for your lifestyle.

Passive Solar. Wherever you go, passive solar is the first on the list of energy alternatives. The advantage of the sun it is that it is everywhere and using it is low tech. Passive solar heats and cools buildings, cooks foods, and heats water using the natural power of the sun. It can be as simple as a five gallon bucket and

lid painted black sitting in the sun as a passive solar water heater. Or passive solar can be as complex as a system designed to heat a large dormitory. The disadvantage of the sun is that it doesn't work when the sun doesn't shine. Cloudy days and night time are challenges, which is why we use thermal mass to soak up heat during the day, store it, and radiate it at night during the winter.

Biogas. Use of biogas digesters in urban areas is a promising area for urban energy development. It's not really a single apartment-scale option. Office and apartment buildings could cycle sewage through biogas digesters which could provide some of the energy necessary for the building's operations. Your housing coop could install such a system, as could your college dormitory.

Propane. This is only of moderate utility, since it is a fossil fuel dependent upon a long supply chain. It has the advantage of storability and thus is a great short-term option in case the conventional utility grids go down due to catastrophic weather, economic collapse, or civil unrest. When it's gone, though, it's gone. In the meantime, it is widely available in urban areas, burns cleanly, and could be used to cook food, heat a room, or run a small electrical generator.

Active solar systems convert sunlight to other forms of useful energy, usually heat or electricity. They can be used to heat air or water. Many do-it-yourself designs are available, for both air and water heating. Renters could build or buy systems that they could take with them when they move. Solar hot water systems and solar air heaters are important components of active solar systems.

Solar photovoltaic systems can provide on-site electrical generation. It's not cheap. It's not prohibitively costly. Most utilities have buy-back programs where they agree to let your solar cells spin your meter backward. They buy any surplus that you generate. Over time, a grid-connected PV system can pay for themselves. You get paid when you don't have to buy the energy your PV systems generates that you use in your house. You get paid if to make a surplus and the utility buys it from you. You could start small with inexpensive battery chargers that can run your radio, entertainment devices, and lights. You could make a portable system that would move with you if you change apartments.

Wind Power. Wind power requires sufficient clearance and good winds. It is not necessarily suitable for all urban areas. Where it works, however, it is an excellent supplement for home energy systems.

Wood. If you live in a high rise apartment building or college dormitory, wood is not a practical choice. If you live in an house or a town home, a wood burning stove is a possibility. A considerable amount of wood is available in urban areas for free in the form of trimmings of trees and bushes. We harvest a considerable amount of wood each year from our small 1/7 acre lot 24 blocks from downtown Oklahoma City. One issue with using wood is the atmospheric pollution. You can reduce the amount of air pollution caused by a wood burning stove by only burning dry wood. Freshly cut wood has as much as 50% water content. Wood needs to season for 6 months to a year. Fireplaces are inefficient and create a lot of smoke. It is better to use a newer, EPA certified wood burning stove. Make small hot fires. Hardwoods are denser and give more heat per pound of wood. Enjoy the fire, not the smoke!

Bring invisible structures to bear on your energy situation to promote resilience.

Successful urban permaculture design involves the intelligent and creative use of invisible structures. If you lived in a rural area on an acreage, you could manage and harvest a woodlot for energy. Or you could grow an energy crop like sunflowers or canola. But you live in a city, maybe on a small 1/8th acre plot or in a high rise apartment building or in a duplex or triplex. The go-it-alone-self-sufficiency program won't work for you.

It doesn't work for most people in rural areas either, but that's not our focus here.

Harnessing the power of invisible structures to support sustainability will make or break your plan to live more sustainably in the city and do your part to stop our headlong rush towards the ash heap of history.

Support municipal power initiatives. One of the dangerous issues going forward is the dominance of investor-owned utilities in most urban areas. Municipal power (electrical and natural gas systems owned by cities) and electrical power cooperatives are more sustainable than the for-profit energy utilities. The for-profits continually bleed off profits to support their non-productive shareholders and bureaucracies. They sell their energy to the highest bidders. For example, the California electricity crisis of the year 2000 impacted most major urban areas in the state – except for Los Angeles. LA did not deregulate its power system. It did not sell its generating plants. As a result, when the crisis hit, Los Angeles had spare electricity to sell, so the citizens of Los Angeles made money off of that situation. Under the law, cities can force utilities to sell their assets to the city. It usually requires a vote and the city must pay the utility for its property. This is usually done by issuing revenue bonds which are paid off by energy sales. Urban areas need to control their own energy destinies. Putting their critical energy supplies at the mercy of amoral corporate aristocrats is a risky maneuver that may cause the citizens major grief as the energy declines hit us.

Invest in renewables. Encourage your utility to increase its investment in renewable energy generation including wind and solar. Programs where utilities agree to buy-back energy generated on-site by homeowners provide economic incentives to install solar PV and wind generation. More distributed solar PV and wind generation builds community resilience. If your utility has a renewable energy option, take it, even if it costs you a little extra every month.

Reform building codes to require more insulation for residential, commercial, and industrial buildings, in accordance with your climate.

Create a regulatory and economic environment that encourages the development of a **diverse system of transportation alternatives** to private automobiles. This will be discussed in much greater detail in the section on transportation.

Use regulatory reforms to require resilient energy systems for large multiple unit apartment buildings in case one or more of the energy grids go down. At present, building owners pay to flush away humanure into the city's sewer system, and then pay more money to buy natural gas to heat water and provide heating and cooking fuels. In the future, we will not do anything nearly so stupid. Humanure and urine will be retained on site and passed through bio-digesters to make methane gas for cooking and heating purposes and yield fertilizer as a by-product, which will either be used on-site or sold at a profit to urban gardeners. Water will be heated by solar panels, with methane providing back-up power. Methane can power electric generators. Building owners will advertise the amenities of their public restrooms in order to encourage people passing by to come in and use them, adding profit to the building's systems. Don't scoff, in ancient China, farmers alongside highways competed to build attractive roadside privies, to encourage travelers to use theirs and thus give the farmer the advantage of the additional fertility.

District power systems that serve neighborhoods can provide another level of resilience. These could be multiple hybrids using wind, active solar, PV, steam power generated by biological fuels or by biogas made from humanure and other biological input. Municipal governments can provide regulatory incentives and financial and technical support for such systems.

Start at your personal doorstep.

Cities are vulnerable to energy problems because households are vulnerable. We lack *persistence* – the ability to resist damage. If the energy grids go down, we freeze in the dark during the winter and swelter in the dark during the summer. In the spring and fall, we may be comfortable temperature-wise, but we will be in the dark and our freezers and refrigerators will be defrosting.

You need a household energy system to boost your persistence in case there are problems with the urban grids. The point of a household energy system is to have a comfortable life while caring for people, caring for the planet and having a care for the future. You need to remain safe and comfortable even in the absence of the urban energy grids in the event of a temporary outage or a longer term catastrophe.

Elements of a Household Energy System

Cooking:

-- Efficient cooking system for daily use. If you use electric, look at induction cooking systems.

-- Outdoor summer kitchen. Cooking outside in the summer keeps the heat and humidity out of the house, increasing the comfort of the occupants and reducing the need for AC.

-- Solar cooker, you could make your own, hundreds of designs at http://solarcooking.org/plans/

-- Heat retention cooker – http://solarcooking.wikia.com/wiki/Heat-retention_cooking

-- Dutch oven

-- Camp stove – something like a wood gasifier stove (see http://journeytoforever.org/edu_hobostove.html

http://www.instructables.com/id/Woodgas-Can-Stove/
http://www.instructables.com/id/Wood-Gas-Stove-1/
http://www.spenton.com/ – this commercial site has the best explanation of what a wood-gas stove is and why it is so efficient.

-- Propane camp stove and extra propane.

Keeping warm in the winter:

-- Passive solar. Windows on the south side of your house, or a low mass sunspace on the south side of your house (north side if you are in the southern hemisphere).

-- Active solar air heaters.

-- Excellent and regular attention to sealing drafts and stopping air infiltration.

-- Go with zone heating instead of whole-house central systems (unless you can afford to go "all the way" for top-of-the-line choices like ground source heat pumps and etc.) Inexpensive oil-filled electric heaters work fine, as do vented propane or natural gas room heaters.

-- Super-insulation in accordance with your climate.

-- Extra blankets + an excellent sleeping bag for all residents of the household plus some extras,

-- Small tent (sleep inside a small tent pitched over your bed or a couch) or make an improvised canopy bed.

-- Layered cold weather clothing. The first layer is **wicking underwear** made from wool, silk, or synthetic fabric. The synthetics have toxic fabrication issues but some of them are less expensive than wool or silk. Cotton is not a good choice. The importance of wicking underwear is that it wicks the dampness of perspiration away from your body. This helps you stay cool in the summer and warm in the winter. The second layer is **insulation.** You can choose between natural fleece (wool, goose down) and synthetics. The third layer is for **weather protection.** This is the windbreaker and rainshedder layer that protects you from snow, wind, and other weather conditions.

-- In an emergency blackout or grid collapse situation, take advantage of the tendency of rooms to heat up when packed with people. Each adult human body equals about a 100 watt electric heater. Ten people in a smallish room is the equivalent of a 1000 watt electric heater.

Keeping cool in the summer:

-- Excellent and regular attention to sealing drafts and stopping air infiltration.

-- Super-insulation in accordance with your climate.

-- Shade is your friend. Plant deciduous trees and shrubs that lose their leaves in the winter to shade your house in the summer.

-- Go with zone cooling instead of whole-house central systems (unless you can afford to go "all the way" for top-of-the-line choices like ground source heat pumps and etc.) Inexpensive 5000 btu window units work fine if your house is shaded, well sealed against air infiltration, and super-insulated. If you aren't shaded and super-insulated and aren't well-sealed against air infiltration, you will make up for your lack of passive systems with active payments from your wallet to your energy utilities. You will need larger air conditioning equipment and will need to run it longer.

-- In the absence of air conditioning, at night, ventilate, ventilate, ventilate. Keep the house opened up until it starts to warm up in the morning. At that point, close the windows and doors until the temperature inside is the same as the temperature outside. Then you open the windows.

-- Keep the air moving around inside with fans, even if you have air conditioning. Moving air makes you seem about 10 degrees cooler than you actually are, so with the proper use of fans, you will run your air conditioning equipment less. If you don't have AC, fans are more important. A properly shaded house plus ceiling and ventilating fans can take 20 degrees off the outside temperature. In most areas, that is a significant temperature reduction even if some of it is only "apparent" due to the wind effect.

-- Hydration is essential. If the heat becomes actively uncomfortable, take a cool shower or go outside and spray everybody with a water hose.

-- A portable water purification system is a must for (all seasons of the year) in case of problems with the city water supply.

Transportation –

-- Sturdy and comfortable walking shoes and regular practice walking in them.

-- Bike and/or trike. You'll find that a bike trailer will be useful.

-- I have a friend who skates to work.

-- Carefully select your residence in consideration of the geographies and destinations of your life.

Miscellaneous other household energy issues.

-- *Lighting:* Use compact florescent and LED lighting. Use mirrors on walls to reflect and increase light intensity. Use task lighting. Turn the lights off when rooms are unoccupied. (Your grandfather was right about that.)

-- *Ghost loads:* Avoid them by using on-off switches on strips of plugs.

-- *Temperance.* Be judicious about accumulating electronic junk.

-- *Small batteries.* Minimize their use, but if you must, always use rechargeable. Stock and use solar small battery chargers like this one from C Crane Company (no compensation paid by the company for this reference, I am just a satisfied customer). http://www.ccrane.com/more-categories/batteries-chargers/solar-powered-battery-charger.aspx#.UMa5VqxJTcs

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03071 Keeping Warm in the Winter

Winter is the time for comfort, for good food and warmth, for the touch of a friendly hand and for a talk beside the fire: it is the time for home. -- *Edith Sitwell*

This is the first in a series of chapters on practical energy conservation. Some things will be repeated several times over the several chapters. That repetition should suggest something about the importance. You can use this as practice to note the beneficial connections among the various strategies, techniques, and tools of energy conservation.

Energy conservation is critical because the days of cheap energy are history. These days we're paying more money for less comfort.

Or you can work smart and design better to use less energy and spend less money for it. Smart work means more money in your pocket for other things you want or need.

Start with **believing in yourself.** You are not a helpless prisoner of giant energy corporations. You can take control and arrange your life so that you spend LESS money on energy. You have to actually rise up and do these things though. Magical wishing won't cut your utility bills by one small coin. **Procrastination is the thief of time** and that's a big problem when it comes to living more sustainably.

Get used to **not being as toasty sweating warm in the winter** as you'd like. If it's winter and you're running the heating system so hot that you can sit around in short-shorts, sandals, and a tank top, STOP that! You have an excessive sense of entitlement to all the energy you care to burn.

Dial down that thermostat more. **Unplug** the heater more. You live in a house, not a sauna!

Bundle up your body! Dress for the season indoors. Wear loose layers of clothes. Start with a layer of wicking underwear such as is discussed in 03061. Clean clothes keep you warm better than dirty clothes. Don't forget a hat, even indoors & in bed! Put blankets and quilts on sofas and chairs, so people can bundle up while they sit. If the floors are bare, put down area rugs. Snuggle! That's what winter is for!

When you go outside, keep dry. Wet clothing loses its ability to insulate, and can suck heat right out of you. Stay out of the wind as much as possible.

Heat less of your house. Zone heating is a primary energy sustainability design strategy. Only heat rooms when occupied by people. It is easier to keep a room warm when several people are inside it, than when there is only one. Remember this especially if a power failure cuts off your heat during the winter.

Fill your house with more people or move in with someone else. As the good times are go bye-bye, the economic situation goes from bad to worse. The sooner we adapt, the easier it will be. Larger households are better able to get by in these tough times. More people in the house mean more income and that helps pay utility bills. Rent rooms to friends and relatives or work with

programs that help people find additional roommates.

If you are low income . . . Your local utility, government, or a charity **may have a free weatherization program.** Search for information and if you qualify for low income assistance, get in the waiting line for help with things like insulation, plastic for windows, caulk, repairs, etc.

Heat always moves to cold. Next to turning down your thermostat and dressing for the season indoors . . . **stopping drafts is the MOST IMPORTANT THING** you can do to reduce your winter heating bill. A draft is a place where heat leaks out of your house.

Use a stick of burning incense to find the drafts in your home. It's best to do this on a windy day. Look around doors, windows, light switches, places where pipes enter your house, electrical sockets, and any cracks in walls. Hold the incense stick close to wherever you want to check and see if the smoke rises slowly or blows one way or the other. If it's blown around, you have a leak. Stop that leak or your heat will leak out of your house and you will end up cold.

Caulk is cheap. Use caulk to close up seams and cracks where you find drafts. If there are larger openings, fill them with newspaper and plastic, a board, some dry wall, or use cans of spray foam to plug the cracks. We used 90 tubes of caulk and 20 cans of foam to do our house, which has about 1500 square feet. Read the book Insulate and Weatherize, from Taunton Press, and follow its recommendations literally. You can find it at your library.

If your windows are drafty, **put plastic over them.** Yes, plastic is always a problem but so are leaky houses. Use a staple gun to attach the plastic to the window frame. Put narrow strips of wood around the window frame to hold the plastic securely in place. If your windows are really drafty, do this on the inside too. Don't just use a staple gun. Put the wood strips in place too. If you don't use the strips of wood, the plastic won't work as well as an air seal.

Get Free Heat From the Sun! Whenever the sun shines through your windows, open up their curtains or blinds and let the sun shine in and fill your house with warmth.

Fill empty two-liter bottles with water, put some food coloring in the water so they look dark (mixing several colors like red, blue, and orange usually turns the water dark). Put them in the sun so they soak up the heat. Later they will radiate that heat and help you stay warm. More solar water bottles are better than less! If you don't have food coloring, paint the outside of the bottles black.

Increase the heat coming through a window by placing a piece of cardboard covered with aluminum foil on one side outside to reflect light into the window. You could duct-tape some of those reflective auto sun shades together and use them to reflect light inside the window. This reflector starts at the bottom edge of the window, so for most houses it won't actually be on the ground. To keep it from blowing away, brace it with something or lay it on something and duct-tape it. Milk crates and boxes are good for this. Put some weight in them so they don't blow away.

Cover up your windows and doors when the sun does not shine through them. Use layers of blankets, quilts and curtains or put up window shades you make out of rigid board insulation. You could duct tape reflective auto sunshades together to cover you're your windows, and sandwich them between blankets to help you keep your warmth inside and the cold outside.

The curtains or blankets covering your windows need **to go all the way to the floor** and you **need a cornice board or valence at the top.**

A cornice board is a box attached to the wall that hides the top of the curtain and

the curtain rod. A valence is the same thing, only made with fabric. If you don't do something like this, air that hits the window will cool and fall to the floor. That falling wind current will draw additional air behind the curtain against the window glass at the top where it cools, falls, and the cycle continues. You break that cycle by interrupting it at either end. This is the reason why curtains have traditionally been "full length," going all the way from the windows to the floor.

The best situation is to have both – let the curtains fall to the floor and put a cornice board or valence up top. If you are a renter and don't have cornice boards handy (they aren't common these days), tack a blanket or quilt to the wall just above the top of the window, and drape it over your window curtains/quilts so it covers all of the top of the curtain and its rod. This creates the same effect as a cornice board only with fabric. That's cheaper and its portable too. Of course, cornice boards are portable. If you install them and then you move, you can take them with you when you leave.

Insulating your walls. If you don't have good insulation in your walls and can't afford to install some. . . Hang layers of sheets, quilts, and blankets on walls to insulate the room. Run curtain rods close to the ceiling along the walls and use those to hang sheets or blankets against the walls. Insulate walls with bookcases or stacks of newspapers.

For walls and windows, several layers or curtains and hangings are better than one or two. Go the extra mile in covering up your windows. You'll be glad you did.

Stack boxes of Styrofoam against exterior walls. Ask your friends to save all the Styrofoam packing peanuts they get for you. Shred Styrofoam cups and use blocks of Styrofoam. Cover the boxes with cloth hangings for aesthetics. Styrofoam has an R-value of about 3.8 per inch so a 12 inch deep box in your attic or against a wall is R-45 which is pretty good insulation. When you move, take your insulation with you. Styrofoam is a fire hazard. You can lessen that somewhat by lining the inside of the boxes with aluminum foil.

If you have an uninsulated attic (or a not-insulated-very-well attic) put boxes of Styrofoam on the floor of the attic. Another attic possibility is cardboard, which has an R-value of 3-4 per inch. Stacks of cardboard can insulate attics and walls.

At Night . . . Turn the thermostat down or the heater off and pile on the blankets. Dress warmly for bed in sweat pants and shirt, socks, and maybe even a cap (depending on how cold it will get and how low you set the thermostat). Take a hot water bottle to bed with you.

Make a Canopy Bed! Put a frame over a bed and hang sheets and quilts over the top and the sides to make an old-fashioned canopy bed. Or pitch a tent over your bed or a couch. This creates a smaller space and protects you from cold drafts in the night so you can stay warmer.

Don't pour heat down the drain! When you take a shower, put the stopper in the tub. Let the water cool before draining. Let your hot cooking water cool first. This adds humidity & heat to the inside of your house that would otherwise go down the drain.

Air dry freshly-washed clothes **inside the house.**

Floors. If you have bare floors, put down area rugs. You can layer these for even more insulating effect. Area rugs can be placed on top of carpet to increase the insulating effect.

Food helps you keep warm. Eat good meals with lots of carbohydrates for fuel. Winter is a great time for warming and nourishing soups and casseroles. Drink plenty of fluids.

Hot Water. Use less of it by installing low-flow shower heads and faucet aerators. This can cut your hot water

requirements as much as 50%, saving 14,000 gallons of hot water/year/family of four. Low-flow showerheads go for as little as $10 - $12 at a home supply store and they are easy to install yourself. You'll never know it's not a full-flow shower head. It will drench you nicely in the shower. If you rent, change out the existing full-flow showerhead for the low-flow. If you move, take your low-flow with you and reinstall the full-flow.

Insulate the hot water pipes. Insulate the hot water tank with a special "jacket" made for the purpose (typically $10-20 at home supply stores), or wrap it with insulating materials. If it is a gas water heater, do not cover the top or the bottom, the thermostat, or the burner compartment of the tank

. Lower the temperature on the water heater to 120 degrees.

Take quick showers, not baths.

To make a simple solar water heater: get a 5-gallon plastic bucket with a tight fitting lid, and paint it black. Fill with water, put the lid on tight, and set it in the sunlight for a few hours. Voila, easy and free five gallons of hot water. Use as hot water, or let it slowly cool inside your house and add to the warmth inside.

Lights. Your grandfather was right: Turn off the lights when you're not using them. Compact florescent bulbs work in regular light fixtures, last longer and use much less energy. They cost a little more, while they use 75% less energy than regular bulbs and last for thousands of hours. Use less electrical lighting during the day when natural light is available. Use more "task lighting" -- smaller lights focused on what tasks.. LED lights use even less energy although they cost more than the CFLs.

Washing Clothes. Wash clothes in cold water. Wait until you have a full load, don't do small loads. Instead of using the dryer, air dry your clothes outside on a line. Get some racks to use for indoor clothes drying when its raining or too cold outside, or put clothing on hangers to dry.

If you go to a laundromat, there might be a sign that says "Free Drying." Don't believe it. The prices to wash at such laundromats are always higher than they are at the laundromats where customers pay for drying. At a commercial laundromat, the customer pays to wash and the customer pays to dry. As a sales gimmick, some laundromats combine that into one transaction – the price to wash includes the price to dry – so there is no such thing as a free dryer in a laundromat.

A better choice is to wash the clothes at the laundry, bring them home and hang them on the line to dry.

Dishwasher. What is the best thing to do with your dishwasher? Disconnect it and sell it for scrap metal. Don't buy into the culture of death idea that there is something wrong with household tasks like washing dishes because they are "women's work." Make washing dishes a family or household activity -- when many hands pitch in, the work is less tedious and gets done faster. At minimum, don't use the heat dry cycle. There is a considerable amount of propaganda out there justifying the dishwasher as a "green" lifestyle choice. I remain suspicious of all it. Too much of it sounds like greenwash to me.

Small batteries. Everyone should minimize their reliance on small batteries because they are noxious items to manufacture and to dispose of. If you must use small batteries, always use rechargeable batteries. For $30 or less, you can get a solar powered battery charger and some rechargeable batteries and go solar. Or you could use a charger that runs on household current. Small batteries are expensive -- the fewer you have to buy, the more money you have for other things. A good source for inexpensive solar-powered small battery chargers is C. Crane Company (I receive no compensation for this recommendation; I am simply a satisfied customer and have not found anything like this elsewhere.)

http://www.ccrane.com/more-categories/batteries-chargers/solar-powered-battery-charger.aspx.

Gadgets and Ghost Loads. Many modern appliances and gadgets have "ghost loads." They use power all the time, even when you think they're "off." When an appliance isn't in use, turn it completely off. Unplug it if necessary -- especially the television (which consumes lots of energy). The best choice is to plug them into an extension cord or power strip that has an on-off switch. Use the switch to turn the television or whatever off and on, and you will avoid wasting power via the "ghost loads" in the appliance. Be wary of bringing more electrical gadgets into your house and scrutinize what you already have. Do you really need all that stuff?

If you have a water bed, drain it and **replace it with a regular bed.** A waterbed heater can use as much electricity as a refrigerator. While you still have it, insulate it well during the day when it is winter or it will attempt to heat your whole house. Never use the television for "background noise" while you're doing something else; a radio consumes less power.

Computers. Don't leave your computer equipment on 24/7. It is a myth that turning computers on and off is hard on your computer.

Work with your friends and neighbors to increase your safety, quality of life, and happiness. It's easier to put plastic on your windows if you do it as a group. Get together with friends and family and do everyone's windows. Go on a crusade against leaks.

This is the way we win the war against hard times and find happiness and contentment for ourselves and all we love. If we want more beauty and wisdom and justice and love, the place to start is **to live beauty, wisdom, justice, and love** in our own hearts and households. That requires learning to become energy conservative. We want to be liberal with our beauty, wisdom, justice and love. We need to be conservative with our human and fossil fuel energy.

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03081 How to Stay Comfortable and Safe During the Hot Summer

"The window air conditioner allows architects to be lazy. We don't have to think about making a building work, because you can just buy a box." *Cameron Tonkinwise*

Heat always moves to cold. Keep this fundamental principle in mind.

Your House

Stopping drafts is critical. When it is cooler inside than it is outside, heat wants to get inside. Stopping drafts is therefore important to maintaining your comfort levels during the hot summer. A draft is a place where heat rushes into your house.

Use a stick of burning incense **to find the drafts in your home.** Do this is on a windy day. Look around doors, windows, light switches, places where pipes enter your house, electrical sockets, cracks in walls. Hold the smoke close to the window seam or the electrical outlet, or wherever you want to check, and see if the smoke rises slowly or blows one way or the other. If its being blown around, you have a leak. Stop that leak, or heat will have an easy way into your house.

Caulk is cheap. Use caulk to close up seams and cracks where wind comes through. If there are larger openings, fill them with newspaper and plastic, a board, some dry wall, or use cans of spray foam to plug the cracks.

We used 90 tubes of caulk and 20 cans of foam to do our house, which has about 1500 square feet. Read the book **Insulate and Weatherize, from Taunton Press**, and follow its recommendations literally. You can find it at your library.

Pop quiz: How many times thus far in the energy section have I advocated caulk? Twenty bonus points for the correct answer, awarded in your imagination. What does this repetition suggest about the importance of caulk?

Insulation works in the summer just like it does in the winter. In the winter, insulation helps you keep the heat inside and the cold outside. In the summer, insulation helps you keep the heat outside and the cool inside. If you have more insulation, you will need less air conditioning to stay comfortable during the summer.

Shade is your friend: Keep the sun's heat from hitting windows, doors, walls. Indoor curtains are not enough, although they help. Once the sun hits the glass and window frame, the heat gets inside the house, even if you have curtains.

You could use auto sun shades to make a cheap redneck-style outdoor window shade. Duct tape two or three of them together (depending on the size of the window). Hang them on the outside of the windows. A roll-up window shade works fine.

Shade cloth can be used to shade doors and windows. One or more curtains inside will help. Choose white or another light color (sheets are doable and cheap).

Shade the doors just like you shade your windows.

The best shade for your walls, windows, and doors is trees and other plants. While it takes years to grow a tall tree, vines like Morning Glories grow fast. Scarlet runner beans not only produce shady vines, they produce tasty beans that you can eat.

Keep the air moving around inside. Use fans to create breezes during the day and the night. Moving air makes you feel 10 degrees cooler than the actual temperature. Use fans even if you have an air conditioner. Moving air makes it seem like the temperature is about ten degrees cooler than it actually is. With fan breezes inside, you can set the thermostat higher than would be the case without the fans, and maintain comfort.

Minimize heat buildup inside the house. Avoid activities that create heat inside the house:

Cook outside to avoid increasing the heat and humidity inside your house. Eat small, light meals, spaced throughout the day, rather than two or three big heavy meals.

If you have a dishwasher, don't use it or at minimum don't use the heat dry at the end of the cycle.

Take cool showers, not hot steamy showers. Run the exhaust fan to remove the humidity from the bathroom.

Many electronic devices such as "instant on" televisions draw current all the time, and thus create heat all the time. Plug them into an electrical outlet strip and turn it off and on with the switch on the strip. This will eliminate those unnecessary "hot plates" that add heat to the indoor climate.

Don't use the clothes' dryer. Hang your clothes on a line outside to dry.

If you smoke, do it outside.

Turn your computers off when they are not in use.

Replace your incandescent lights with compact florescent bulbs or LED lights.

Shade the outside parts of your air conditioner. If the air conditioner is in bright sunlight, it works less efficiently. Shade the compressor or the outside part of a window AC with an awning or some other kind of shade. Don't block the air intakes.

Window AC is more energy conservative than conventional central AC, even though central AC is more efficient than a window unit.

With central AC, most people cool the whole house, all the time. With small window AC units, people only cool the occupied rooms.

Conventional central AC loses about 20% of its efficiency by sending cool air through ducts in non-air conditioned spaces (typically attics). Window units send their cool air directly into the room. When people leave, they turn off window units. If they have central AC, people leave it on all the time, whether they are home or not.

The bottom line for AC is that you are better off with small window units than whole house central AC.

If you have no air conditioning, ventilate your house at night. Keep the house closed up during the day until the inside and outside temperatures are the same. Then open up the windows and doors. If practical for your situation, only open windows and doors that are shaded during the day. At night put box fans in the south and west windows to pull hot air out of the house. Put box fans in north or east windows to draw in cooler air. Open every window and door to facilitate cross breezes.

In the morning, close your windows and doors when the temperature outside is the same as the temperature inside.

Your Body

Pay attention to your own body. Stay *hydrated.* Drink at least a cup of water every 20-30 minutes during extreme heat periods in the summer, even if you aren't thirsty. Avoid soft drinks and alcoholic beverages. The idea that an ice-cold soda pop is the perfect solution to thirst is a delusion encouraged by advertising. The

more soda pop you drink, the more thirsty you will be, the hotter you will feel, and thus the more uncomfortable you will be. Soft drink advertisements are LIES! "Sugar free" drinks are as bad as the sugared versions. Try squeezing a little lemon or lime juice into your water for a refreshing treat and skip the useless calories of soft drinks.

Dress for the season. Wear shorts and a light shirt. Loose-fitting clothes are cooler and more comfortable than tight fitting garments. Go barefoot or wear sandals. Natural fabrics are cooler than synthetics. Merino wool underwear will wick perspiration moisture away from your skin and help you remain more comfortable. At night, use light cotton sheets on your bed. Minimize indoor fabrics, as fabric increases interior humidity. Wear a hat outside with a wide brim to shade your face and protect your head.

If the heat becomes oppressive, **dowse your head, arms, and feet with cool water, or take a cool shower.** We often go outside and dowse each other with a water hose. Keep a spray bottle of cool water handy and give yourself spritzes of cool water. Dip cloths in cool water and wrap around your neck, wrists, and ankles.

At night, wrap yourself in a damp sheet.

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03091 Energy Conservation for Renters

Conservation is a state of harmony between human beings and the land. Aldo Leopold

The importance of household energy conservation.

According to the Union of Concerned Scientists, **the operating energy of our housing is one of the top three household contributors** to the emissions that drive global climate change. Reducing the operating energy cost of our dwellings is one of the top three lifestyle evolutions recommended by the Union of Concerned Scientists.

If you rent, you want an energy conservative dwelling. Efficiency is fine. Conservative is better. You can use a lot of energy and still technically be efficient. The aim of energy conservatism is to actually use less energy – fewer gallons of gasoline, kilowatts of electricity, and/or dekatherms or cubic feet of natural gas.

Location, location, location.

Choose your rental apartment (or house, condo, town home, duplex, etc.) carefully.

The more walls with adjoining apartments, the more energy conservative the apartment. Apartments below and above the apartment make the apartment in-between them more energy conservative. The ideal situation is an apartment whose door opens onto an interior hallway, with apartments adjoining the other three walls, and an apartment above and below the unit. Avoid top floor and corner apartments. The least energy conservative apartment configuration in a multiple unit building is a top floor apartment on a corner with an outside wall facing north.

Four-plexes are better than duplexes because they have more shared walls and if you are on the ground floor of a two-story building you have another unit on top.

You want windows that can open and shut.

If your geography has cold winters, look for an apartment with an east-west axis so that you have a long south facing fall. You want lots of windows in that wall. You want overhangs to shade the wall and the south-facing windows during the summer. (Readers from the Southern Hemisphere will want many windows on their north-facing walls.)

Exterior shading of the walls and roof with trees helps you keep cool in the summer. Deciduous trees, which lose their leaves in the winter, are better than evergreens because in the winter, you want the sun. Evergreen trees are desirable on the north side, which don't get much sun in the winter and are often hit by cold north winds.

Ask the landlord about insulation and the age of the heating/cooling systems in the apartment. You want more insulation rather than less and newer systems instead of older.

Everybody will not be able to live in an interior apartment with apartments on either side, on top, and below. Do the best you can to find the most advantageous solution for your situation. In the process, you help educate landlords about the needs of renters. This stacks additional functions on your dwelling search.

Reducing Drafts. If your apartment has a lot of drafts, ask the landlord to correct

the problem. If the landlord is not responsive, it would be worth the small money cost for you to buy some caulk and foam and fix the leaks yourself.

Insulating Windows. You can make movable window insulation out of rigid board insulation. Cut it to fit the windows. To get extra insulation, duct tape more than one layer of the insulation board together. Wrap them in aluminum foil to make them fire resistant. To make them look nicer, cover with contact paper, paint, or fabric. Take them with you when you move to a new apartment.

You can (and should!) hang heavy drapes over windows. The best configuration is for the curtains to fall all the way to the floor. You need a cornice board or valence at the top. This prevents a convection current from developing between the curtain and the window that would draw warm air from the room up along the cold window. That will cool the air and then the room and that's not what you want in the winter.

Go the extra mile in covering up your windows and that will help keep you warm in the winter and cool in the summer. You may want several layers of hangings over your windows. Before we made our insulated interior shutters, we duct-taped auto sun shades together and sandwiched them between blankets and hung them over our windows. We were poor and had hardly any money to pay for natural gas to heat our then-drafty duplex. We cared less about aesthetics and more about staying warm cheaply because we didn't have much money.

Walls and Attic. Put heavy furniture against your exterior walls and it does the job of insulation. Bookcases full of books are great for this purpose.

Wall-hangings are useful insulation. Run a curtain rod along the ceiling and hang floor-to-ceiling drapes along the walls, which could be re-purposed comforters, blankets, etc. More layers are better than one.

Your clothes can be insulation. Make your walls a closet and hang your clothes up against exterior walls.

Stack boxes of Styrofoam against exterior walls. Ask your friends to save Styrofoam packing peanuts for you. Shred Styrofoam cups and use blocks of Styrofoam. Cover the boxes with cloth hangings for aesthetics. Styrofoam has an R-value of about 3.8 per inch. Thus, a 12 inch deep box in your attic or against a wall is R-45 which is pretty good insulation. When you move, take your insulation with you. Styrofoam is a fire hazard. You can lessen that somewhat by lining the inside of the boxes with aluminum foil.

If you have an uninsulated attic (or a not-insulated-very-well attic) put boxes of Styrofoam on the floor of the attic. Another attic possibility is cardboard, which has an R-value of 3-4 per inch. Stacks of cardboard can insulate attics and walls.

Floors. If your floors are bare tile, wood, or linoleum, area rugs insulate the floor and make the apartment seem warmer. You can sew additional fabric underneath the area rugs to increase their insulating value. Rag rugs are a traditional home craft that uses old cast-off fabrics (like old worn out clothes) to make beautiful and useful rugs that will help your floors stay warm during cold winters. Learn more about this craft at –

http://ragrugcafe.com/

http://www.motherearthnews.com/Do-It-Yourself/Make-Rag-Rug.aspx

http://www.craftpassion.com/2010/03/recycle-tutorial-braided-rag-rug.html

Kitchen. Kitchen energy conservation tips work for renters too. See 03131 Kitchen Energy for more info.

Thermostats. Adjusting the thermostat conserves energy. It is not cheaper to leave your thermostat at the same temperature 24/7. It is cheaper (money and energy) to adjust the thermostat so

you heat or cool less while apartment is empty.

In the summer, set the temperature higher and use fans to maintain interior comfort. When you leave, set it even higher and lower it when you get home.

In the winter, set the temperature lower and dress for the season indoors. At night, lower the thermostat and use extra quilts and blankets. When you leave, set it even lower and then raise it when you get home.

Ask your landlord for a programmable thermostat so you can set it to adjust itself the temperature to match your comings and goings.

If your apartment use **steam radiators for heat**, put aluminum foil on the walls behind the radiators to reflect more heat into the room.

Canopy beds. A canopy bed is a great portable energy conservation device during the winter. We associate canopy beds with the castles and nobles of the medieval era. However picturesque they may be in retrospect, at the time they served the utilitarian purpose of keeping people warm at night in drafty stone castles that were not well heated. The structure actually originated in lower income dwellings and nobles copied the idea.

At its most simple, any bed can become a canopy bed by putting four posts that extend up three to four feet from the level of the bed. These posts hold up a four-sided frame. Sheets or blankets or quilts hang from the frame to below the level of the mattress, and cover the top. This creates a nest for sleeping and for snuggling.

Keeping Cool. Every renter needs a set of fans. Moving air takes as much as ten degrees off the apparent temperature. If you have air conditioning, fans allow you to set the thermostat at a higher temperature and remain comfortable. If your rental has ceiling fans, they will help you stay comfortable while reducing your energy costs.

The most efficient portable fans have an enclosure around the edge of the fan blades so that the air blows straight out in front of the blades. If there is no enclosure (referred to as a cowling), then air will "leak" off the edges and go elsewhere and you get less cooling effect for your energy expense.

We measure fan strength in "Cubic Feet per Minute" (CFM). When shopping for fans, you want the highest CFM for the lowest watts.

Watts are a measure of work done with electricity.

More watts = more electricity = more energy expense.

Less watts = less electricity = less energy expense.

More CFM at LESS watts = the better deal.

Always turn fans off when you leave the room. They work by creating a mini-wind chill effect on your skin. In the absence of a human being, they do nothing for the temperature. Running a fan in an empty room is a waste of energy.

If you have ceiling fans, change the direction of the fan depending on whether you are in a heating or cooling season.

During the summer, the ceiling fan should rotate counter-clockwise. It blows air downwards. This helps cool the people in the room.

In the winter, the fan rotates clockwise and pull air up. This helps move the warm air that collects near the ceiling around the room and warm it up. It only works when the fan is set on LOW.

Typically each ceiling fan has a switch to change the direction of the blades. Change the setting only when the fan is off and the blades do not rotate.

This applies only to ceiling fans, not to other kinds of fans.

Window fans are another great friend of the energy frugal renter. Use them at night, when it is cooler outside than it is inside. Put one in a south-facing window facing out, so it pulls air out of the apartment. Put another one in a north-facing window facing in, so it pulls cooler air into the apartment. If you don't have south and north facing windows that open, set them up so they are on opposite sides of the house, that way you get a breeze effect.

Whatever fan you get, experiment with its different fan speeds to determine what works best for you. The top speed may not be the most "cooling" in your situation.

Use compact florescent or LED lights. Most apartments come equipped with standard incandescent lights. Every renter needs a set of bulbs, either compact florescent or LED lights. The new LED lights are even more energy conservative than the florescent. Since they are new to the market, they are pricey. Both are available in a variety of lighting "colors." Don't hesitate to ask at a store for a demonstration of a bulb to make sure you like the color of its light. When you replace the landlord's incandescent bulbs, keep them safe. When you move out, take your efficient light bulbs with you, and put the landlord's incandescent lights back into the fixtures.

Avoid "All Utilities Paid" rentals. "All Utilities Paid" rentals are rarely a good deal for the renter. You will always pay more for your energy if the landlord pays the bill. Avoid this kind of rental unless your situation is such that you can personally get service from a utility. Some municipalities and water systems require that landlords pay the water bill, so you may not be able to avoid that. On the positive side, these apartments may be better insulated and have other energy conservative features.

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03101 Energy Conservation in Dormitories

We, the generation that faces the next century, can add the solemn injunction that if we don't do the impossible, we shall be faced with the unthinkable. – *Petra Kelly*

The first question you're probably asking yourself is – why does this matter? I'm not paying the energy bill for this dorm room.

Actually. . . you do pay the energy bill for the dorm room. The price of room and board I includes the cost of the energy used to operate the dormitory.

And in any event – do you remember those pesky permaculture ethics we talked about in Section 0? About those ethics, we can observe –

It's never wrong to do the right thing.

It's never right to do the wrong thing.

Nor can you achieve a good end with bad means.

Now that we have that clear . . .

If you have a thermostat in your room, turn it down in winter and up in the summer.

During the winter. . . Heat your body and individual space rather than the whole room or apartment. Dress for the season when indoors and at night. Extra blankets are a better energy deal than running the central heating all night.

During the summer . . . keep the wind moving with fans and you will remain comfortable even with the thermostat turned up a bit.

Your windows are like open holes to the outdoors. During the winter, keep them well-covered whenever the sun does not shine through them. During the summer, cover them during the day. Several layers of blankets and curtains will work well for you.

Turn the lights off when you aren't in the room.

Don't leave your computer and its associated peripherals up and running when not in use.

Beware of ghost loads. Plug televisions and other electronic equipment into extension chords or outlet strips that have on-off switches. Turn them off with the switch to make sure they aren't drawing ghost loads while you think they are off.

Take short showers and conserve water by not running water while brushing teeth, shaving, cleaning contact lenses, etc.

Drive less. Walk, ride a bicycle, take public transportation, and carpool more. Driving an automobile is one of the Top 3 major energy problems of modern life.

Use rechargeable smaller batteries, and recharge them with a solar battery charger such as this one –

http://www.ccrane.com/more-categories/batteries-chargers/solar-powered-battery-charger.aspx (I receive no consideration from Crane Co. for this recommendation. I am merely a satisfied repeat customer.)

Get your roommates on board with the energy conservative program!

So as it turns out, there is actually a lot you can do about your energy consumption while you live in a college dormitory! What matters is that you do what you can, with what you have, where you are.

Use the permaculture organization you started on campus to organize a competition between dormitory buildings to see which building can reduce its energy and water footprint the most.

Your school administration will like you a lot for this effort. It will give you some cred you might be able to exchange for something else on your permacultured college list.

You are in college to learn skills that will help you in life. Using less energy is one of those important skills. Learning to be energy conservative is one of the skills you will need to make it through your life. The sooner you start, the more you will learn.

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03111 Energy Conservation in Transportation

Your grandchildren will likely find it incredible - or even sinful - that you burned up a gallon of gasoline to fetch a pack of cigarettes! -- *Paul MacCready, Jr.*

Energy conservation in transportation can be summed up in these three easy to remember techniques.

1. Walk, ride a bicycle, take public transportation, carpool more. Drive a personal vehicle less.

2. If you do drive a personal vehicle, don't be stupid about it. Drive and accelerate slowly, at the optimum rates for miles per gallon. Use hyper-mile techniques.

3. If you must travel between cities, take the bus or a fully-loaded train. Don't fly in airplanes unless there is absolutely no other way to get there. Don't look for reasons to fly anywhere.

That's really all there is to it.

There's no secret thing to do. There is no shortcut. There are no energy fairies to save us. We have to drive less and drive slower and take the bus or walk and ride a bicycle more.

Personal vehicles are one of the top three contributors to energy consumption and the anthropogenic emissions that drive global warming. One of the most productive activities you can do to save the planet is to stop driving – or to drive MUCH less.

Use Less Energy When You Drive

If you must drive, don't be stupid about it. My intention is not to be gratuitously offensive by using the word "stupid." I just want us to wake up to the consequences of our actions. When we jump into the car and zoom down the street, accelerating fast and braking to stop, we waste gasoline by the gallons. Meanwhile, we send soldiers to bleed and die in the Middle East so that the developed countries can have a secure petroleum supply line. In other words, the cheap gasoline we are fond of comes at the cost of human sacrifice – civilians and soldiers alike. To be stupid about our gasoline consumption is a terrible insult to those who have given their lives for the sake of fossil fuel transportation.

So let's not send our soldiers to war overseas and turn right around and stab them in the back by refusing to moderate our own petroleum consumption. Here are some tips to get with the program and start caring for the planet, caring for people, and having a care for the future.

One good idea is to **install a fuel consumption monitor.** That way you can get good information about your gasoline consumption and modify your driving behavior accordingly.

Maintain your vehicle. Keep the **tires inflated** to the correct pressure. Keep **engine tuned** and **change the oil** when it needs it.

Don't carry around **extra weight**.

SLOW DOWN! More speed = more fuel consumption. Miles per gallon decrease rapidly above 55 MPH. Unless there is an emergency, never drive faster than 55

MPH. Every 10% increase in your speed will cost you 10-20% in more fuel due to increased air resistance. The most efficient speed is the speed just after the highest gear has been engaged by the transmission. For most cars, that's about 45 miles per hour or so.

Accelerate gently! One caveat to this is that if you drive a fuel efficient vehicle, it may be better to accelerate faster to get to the optimal driving speed. However, if you drive a large heavy vehicle that gets poor gas mileage, you want to avoid fast acceleration as much as possible.

Don't drive aggressively. Leave early so you aren't in a hurry and thus aren't tempted to drive aggressively.

Coast in neutral when practical.

Anticipate! Think and look ahead and drive so you can coast to stops. Coast in neutral with the engine idling, until you stop, if conditions allow.

Organize your trips to minimize driving around. Some GPS systems will figure trip itineraries for you.

Fill your tank when it gets to half empty. Fill up at night during the summer to avoid contributing to ozone problems.

Inflate tires to the proper pressure. Running with tires at 20% less pressure than they should be will cost you 10% more fuel.

If you have a standard transmission, **drive in the highest gear possible.** Engines are more efficient at lower speeds than they are at higher speeds. If you don't have a standard transmission, sell your automatic transmission vehicle and get a standard.

When driving in town at low speeds in the summer, don't use the air conditioning, roll down the windows instead. When driving at higher speeds on the highway in the summer, roll your windows up and use the AC.

Make sure your engine is properly tuned and kept in good repair.

Don't drive with your lights on during the broad daylight.

If you start driving substantially less, tell your auto insurance company. You may get a discount, especially if you no longer commute to work by car.

Stay away from drive-up windows. Eight seconds idling uses more gasoline than it takes to restart the car. Hours spent idling at drive up windows wastes fuel and contribute to global warming gases. A personal sense of entitlement to drive-up window convenience is a selfish indulgence the planet and its people and critters cannot afford. Park the car and go inside!

Even in cold weather, a car does not need more than 30 seconds to warm up the oil so you can start driving.

Don't idle your car for long periods of time. Turn the car off. If you must idle . . . in an automatic shift vehicle, always shift into neutral so the engine doesn't try to move the car forward while you press on the brakes.

Avoid driving during rush hour if at all possible.

Do not follow other vehicles closely. Leave a cushion of space between you and the vehicles ahead of you.

When driving up a hill, **don't increase the throttle** in order to maintain speed. Keep the same amount of throttle (pressure on the accelerator pedal) and allow the vehicle to slow down naturally, unless it gets so slow that you're causing a traffic problem.

There is no such thing as a magical free gasoline energy device. Don't waste your money proving that this is true.

If you buy a personal automobile –

-- Don't buy a new car or pickup.

-- Do get a manual transmission. Automatic transmission vehicles are about 10% less frugal in fuel consumption.

-- Do get a small engine. Bigger engines = fewer miles per gallon.

-- Do get a smaller vehicle. Bigger vehicle = more weight = fewer miles per gallon.

The Energy Problem With Longer-distance Traveling

If we are serious about our permaculture ethics, we have to become more responsible about traveling.

Americans and Europeans have a high sense of entitlement to all the travel we think we can financially support. Whether it be a cross country road trip, a vacation flight to Europe, the Mediterranean, or the States, or a spring break trip to beaches of Florida, we rarely contemplate the ecological consequences of our travel addiction.

Governments, organizations and businesses, including the government, travel often and everywhere as they do business. Annual conferences often meet in exotic locales that require long distance air travel.

I don't say "never travel." Family is important and with modern life being what it is, families don't always live in the same geographic area. Family occasions may require travel. Every time we fly, we cause serious damage to the planet. If we want to be authentic and ethical in the modern world, it's time to limit our travel. When we do travel, we need to travel by the most eco-friendly method, which is the bus.

However nice we are as people, and however much good we intend by our actions, our travel does not come with a free "No Damage to the Ecology" card. The goal must be to "travel less."

In the future, our ability to travel will be constrained by our circumstances. The day soon comes when families that want regular personal contact will need to live in the same geographies or be satisfied with keeping in touch by letters, emails, Facebook, Twitter, Picasa, and etc. Commercial enterprises will learn to do business without air travel. Organizations will find ways to maintain their activities without annual conferences.

Here are some ideas about reducing travel:

Business travel adds to business expense. If the profit for a particular business trip is not clear, the business trip should be cancelled. Video and teleconferencing should replace a lot of traveling for in person meetings.

Citizens should demand that governments drastically reduce the travel of politicians and government employees at the taxpayers' expense. Congressional junkets to the far-flung corners of the earth are a grotesque waste of tax money and should be forbidden. Politicians who take such junkets should be turned out of office at the next election. There should be no exceptions to this.

Organizations should never hold annual national gatherings. A national gathering for any purpose should be held no more than once-every-four-years. That was the traditional rotation of the ancient Olympics, and I think it still makes sense in the modern era. If the organizations in which you participate continue to hold annual conventions, don't go! Elect different leaders who will commit to caring for the planet and having a care for the future by going to a once-in-four-years annual convention. Boycott three out of the four annual conventions and attend only in the fourth year. A meeting schedule that does less damage to the planet schedules local meetings in years 1 and 3, a regional meeting in year 2, and the national meeting in year 4.

Ration your vacation travel. Do more staycations and travel close to your home. Do fewer vacations involving international or other long distance travel. Students may want to continue their traditional trip abroad during their educational years, to "back pack around Europe." That should be the last overseas trip for quite a few years. Instead, travel via the internet and personal

correspondence relationships with people all over the world.

When you travel between cities, take the bus or ride a mostly loaded train. Get over any class prejudices you may have about riding the bus.

Every decision to travel by air is a deliberate decision to poison the earth's atmosphere. You may decide to do it anyway. You shouldn't delude yourself about what you're doing and the consequences of your action.

For further information. . .

You can post questions and ideas about transportation fuel conservation in the forums at the Ecomodder site: http://ecomodder.com/ .

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03121 Energy Conservation for Homeowners

That which is not good for the bee-hive cannot be good for the bees. --*Marcus Aurelius*

The importance of household energy conservation.

According to the Union of Concerned Scientists, the operating energy of our housing is one of the top three household contributors to the emissions that drive global climate change. Reducing the operating energy cost of our dwellings is one of the top three lifestyle evolutions they recommend.

If you own your dwelling, you have more freedom to make changes in the building that will reduce its energy and carbon emission footprints. Here are some ideas to reduce the amount of energy required by your dwelling. They can be applied to apartments/condominiums and town homes (terraced housing) as well as to single family dwellings on city lots.

Stop the air leaks. The first thing to do is to find and stop the air leaks. The previous documents of this section have already discussed that process. We used about 90 tubes of caulk and 20 cans of foam to seal every crack and hole we could find in the building envelope of our house, which is a Craftsman bungalow originally built in 1929. We tuck-pointed the exterior brick veneer. In the attic, every place that two pieces of wood came together, we laid a bead of caulk on the seam. This is a relatively inexpensive process that pays major dividends, winter and summer. We used the book Insulate and Weatherize, from Taunton Press, and followed its recommendations literally.

Super-insulate the walls, floor, and attic/ceiling. My rule of thumb is that whatever insulation level works for attics should be used in the walls and the floors too even though the recommendations for walls and floors are always less than attics.

People sometimes justify putting more insulation in the attic than in their walls because they say "heat rises." While this is true, convection is only one of the three ways that heat moves toward cold. Heat will most certainly move in any direction toward cold. The attic recommendations should be used for the walls and floors. I suspect that the real reason for the present recommendations for wall and floor insulation are the limits of what can be done with conventional 2 x 4 or 2 x 6 stud walls.

How is this possible in existing construction? It's actually quite simple. First we insulated the existing walls with blown-in cellulose insulation. Then we built new walls, 5-1/2 inches inside of the existing walls, all the way around on our exterior walls. We put dry wall over the frame and blew in more cellulose insulation. We now have 9 inches of cellulose insulation in our walls, giving us R-33, almost double the typical R-19 insulation of a 2 x 4 stud wall.

We ran a bead of caulk around the edges of each piece of dry wall before we put it in place on the wall.

We did not connect the new frame that we built to the exterior walls. Instead, the non-load-bearing frame anchors to the floor and ceiling. This avoids the problem of "thermal breaks," which are places in your house where there is no insulation.

After we completed our original project, we realized that we needed to insulate the

interior walls. At several places, interior walls meet exterior walls, and without insulation in the interior walls, those places are thermal breaks. Insulating the interior walls is part of the floor insulation process since each interior wall occupies a bit of floor foot print.

People sometimes say – "but you lost floor space!" We have 1,548 square feet, and we don't even notice the missing square feet incorporated into our new walls. We gained beautiful deep window wells and that is a feature that almost everyone who comes to our house remarks about.

Depending on your situation, insulating your floor may be impossible (e.g., if your house is built on a slab). If there is a crawlspace, you could insulate the exterior of the stem wall or you could insulate directly under the floor. If insulating underneath is impossible, you may decide to insulate above your existing floor, by adding insulation on top of the existing floor and building a new floor on top of the insulation. This is probably the least desirable choice, although it may be the only choice in some situations.

It is unfortunate for the whole planet and for our species and all the other critters of this planet that the generations who came before us had such cheap energy prices due to political finagling that they designed their buildings and cities to waste energy.

The world has not been served well by its architects and home builders, who consistently rank profit before ecological reality. Taken as a whole, our entire built environment wastes energy at prodigious rates as a matter of building design! People paid money to construct buildings that operate about as inefficiently as is possible! They paid money so they would have to pay even more money than necessary in operating costs and upkeep.

Ventilate the attic. There are many attic strategies. In our particular case in Oklahoma City, we went with attic ventilation. We have 6 passive turbine ventilators in our attic and a system of soffit vents all the way around the roof overhang. If you have an attic, you need a strategy for it that is consistent with the needs of your climate.

Insulate the windows. We have excellent double-pane, argon filled, low-e coated windows. The problem is that even the best energy efficient window is only the equivalent of an R-3 insulation panel. Since we have R-33 walls, we felt we needed something better than R-3 in our windows. We built insulated interior window shutters for all of our windows.

We used a rigid board insulation and cut pieces to fit our windows.

We duct taped four layers of the insulation board together for each window, creating an R-20 insulated shutter. They are three inches thick.

We covered the shutters with green felt, contact paper, or canvas slip covers. for aesthetic purposes.

The shutters for the north facing windows fit snugly into the window well. The sun never shines through those windows (we have a porch on the north side), so we don't get any heat from the sun through them during the winter. On the east and west sides of the house, where we want sun during the winter when its shining, we put the shutters on rails so that they can slide back and forth. In the summer, we keep them closed during the day and open them at night.

If you want to avoid using foam, which has environmental issues in its manufacture, you could build wooden boxes sized to cover or fit into your windows and fill them with cellulose insulation. Cellulose has less insulating value than foam, so you would need to make them thicker to get to the R-20 insulation value.

For the south side of the house, where we have large floor to ceiling windows in a passive solar sunspace, we made large shutters, 4' x 8', that are R-20. We enclosed them in canvas slip covers.

During the winter, we take them down during the day and put them up at night. During the summer, we put them up during the day and take them down at night. When not in use, they stack at one end of the sun porch.

Yes, it takes a minimal amount of work every day to operate the shutters. It's not much and it helps keep heat in during the winter and keep heat out during the summer. After several years, the task is so well integrated into our household routine that we barely even notice the work.

Take advantage of passive solar. Our house is not an ideal site for passive solar. Its long axis is north - south. East-west is the ideal orientation for passive solar. (I got the property before I began learning about these issues.) When you have lemons, you can always make lemonade and that is what we have done.

We took the south wall off of our old utility room and installed double pane patio doors as windows. We installed two double-hung windows that would open for ventilation purposes. This is our solar sun porch. We have vents on the north wall of the sun porch into the rest of the house. Every door in the house has a vent above it next to the ceiling. We have vents in the walls that separate the east and west sides of the house (our long axis is north-south) at the ceiling for warm air and at the floor so the cold air can return.

During the winter:

The sun shines into the sun porch, heating the air and the materials of the room.

The heated air rises and the convective loop draws warm air into the house where it circulates.

As it cools it falls and the cooler air returns through door ways and floor vents into the sun porch, where it heats up and the process repeats.

The first winter after we made this change to our house, when I told people we no longer used natural gas for heating, they would ask – "How do you heat your house?" I replied – "Magic."

If you want to really delve into this, you could calculate the amount of thermal mass necessary to store enough heat from the sun so that you need no back-up heat. Those calculations are beyond the scope of iPermie. There are links in the Additional Resources section to help you get up to speed on this more technical issue.

Manage your hot water situation. Start with a low-flow shower head and faucet aerators. The flow of shower water through our "low-flow" shower is better (more "drenching") than the water flow of our old wasteful shower head.

We have an electric water heater, so we installed an on-off switch for it. We only turn it on when we need hot water. Electric water heaters are much better insulated than gas water heaters. With five people in the house, we don't turn it on every day. When we have the funds, we will install a solar hot water heater and the electric tank will simply be a back-up for when the sun doesn't shine.

Be prudent about what you bring into your house. We don't have a dish washer nor a garbage disposal. We do have computers and televisions. We plug them into on-off electric plug strips so that we can turn them all the way off when we aren't watching them. Check the energy consumption of anything electric you bring into your dwelling.

Say No to the electric can opener and yes to the food processor (if you preserve and process food).

Yes to the microwave (if you're not worried about leaking energy), no to the garbage compactor and disposal.

Yes to washing machine (if otherwise you would drive to a laundromat), no to electric or gas dryer. Hang your clothes on a line to dry. If there is a laundry within walking or bike ride of your house, doing your wash at the local laundromat is better than buying a washing machine. In either case, dry the clothes on the line.

These are decisions you make with the members of your household. Do not mindlessly accumulate energy burning junk in your life. Weigh the advantages versus the disadvantages of each. Be intentional about your energy usage.

Lighting. Compact florescent lights are the low-hanging fruit of the lighting conservation tree. The newest frontier, however, are the LED lights, which are even more energy conservative than compact fluorescents. Their price at this time is high. As production increases, the prices will decline. This is the same consumer curve that compact fluorescent's followed earlier in the 1990s.

Deciduous shade is your friend in the summer. If you own a house on a lot, plant deciduous trees so that they shade your house during the summer. You want deciduous trees – which lose their leaves in the winter – because in the winter, you want the sun to hit your house. In the summer, you want your house to nestle in a nice shady sea of green.

While it takes years to grow trees, vines grow quickly. Plant morning glories for the shade of their leaves and the beauty of their flowers. Plant runner beans for the beauty flowers and the tasty beans.

Paint your roof white. If you have a dark-colored roof, paint it white. The easy and cheap way to do this is to use white wash – which essentially is a solution of water and slaked lime. It will need to be renewed every few years. In the meantime it is an insanely cheap way to change the color of your roof to reflect sunlight. Scientists have crunched the numbers and the advantage of the white roof in the summer outweighs the disadvantage of a white roof in the winter.

Create Buffer Zones between your house's walls and the environment. The design for our house calls for enclosing the front porch, building an enclosed summer kitchen at the southwest corner of our house (which is the primary entrance used by the residents), and a screened/enclosed porch at the southeast corner of the house.

The front porch will be enclosed during the summer with window screen. When winter comes, we will put up storm windows. This creates a buffer zone between the north wall and the rest of the environment. It will lessen the impact of north winds blowing on that wall.

The summer kitchen at the southwest corner will be screened in the summer and have storm windows for the winter. This creates a winter air lock entrance for the house and expands the passive solar sun porch.

The enclosed porch at the southeast corner of the house as screens for the summer and storm windows for the winter. During the winter this creates an extension to the passive solar sun porch.

Unlike the sun porch itself, the southwest and southeast extensions will not be insulated. They will buffer the west and east walls of the sun porch, and the south walls of two rooms from the exterior environment.. They will be "low mass sun spaces" which will heat up during the day, providing heat for the inside environment. They will cool down at night. This is fine since there are super-insulated walls between these two sunspaces and the rest of the house.

Use efficient heating and air conditioning equipment. One of the exceptions to avoiding new stuff is when you replace heating and AC equipment. New equipment is much more energy conservative than older equipment.

Before you immediately decide on central heating and air, you should investigate zone heating. Instead of cooling or heating your whole house, **with zone heating you cool or heat only the areas that people occupy.** If you have followed these recommendations and super-insulated your house for your climate, you will find this easier to do.

The capital equipment for zone heating and cooling is much less expensive than central air or heat pumps. We use the smallest size of window AC (5000 BTU) that retail for about $99 and portable oil-filled electric heaters that retail for about $60-70. We have not bought expensive but highly efficient equipment like ground or air source heat pumps.

If you can afford the capital expense, ground source heat pumps are the most efficient central heating and air system available. A ground source system may not need repairs often, but if something goes wrong with the buried pipes, repairs can be expensive. A variation on this theme is the air source heat pump. Air source have lower capital costs than ground source heat pumps, but they may have higher operating and maintenance costs.

Solar Heating. Solar air heaters work like solar water heaters, only they heat air instead of water. Ventilating with the warmed air from solar air heaters is an earth-friendly way of staying warm in the winter.

Hydronic heating systems, which use hot water to provide heating, can be combined with solar hot water heating.

See http://www.builditsolar.com/Projects/SpaceHeating/Space_Heating.htm for ideas and plans for solar air heaters.

District Heating. As we develop ideas like neighborhood service centers, it will become possible to take advantage of some efficiencies of scale for heating and cooling homes. Typically using hot and chilled water, a district heating system provides the businesses and residences in a geographic area with heating and cooling services. This may be one of the most energy conservative methods of providing home climate conditioning services. Europe uses solar thermal techniques with district heating. A district heating service could be operated by a neighborhood cooperative owned by the persons benefitting from the service.

Solar PV. Solar PV systems make a lot of sense for home-owners who have invested time and effort in demand destruction by behavior changes, insulation and weatherization, and installing efficient HVAC systems. Most utilities allow situations where the your electric meter actually runs backwards as the solar cells generate electricity. They will buy any excess power that you generate from you at a wholesale price. While most people won't sell much energy to the utility, by offsetting your power usage with solar PV, you can save a considerable amount of money and avoid carbon emissions.

Passive House Movement. This is a new school in home design that aims for low costs per square foot for energy use. This option is more fully developed in Europe, where governments have heavily taxed energy as a way of discouraging energy gluttony. This is one reason why Europe operates a high civilization with about half the energy consumption of the United States. It has seven basic principles:

> Superinsulate. Eliminate thermal bridges (places where building elements are not insulated and thus provide an easy path to lose heat in the winter or gain it in the summer). Make it airtight. Specify energy- or heat-recovery ventilation. Specify high-performance windows and doors. Optimize passive solar and internal-heat gains. Model energy gains and losses using the Passive House Planning Package, or PHPP.

http://www.eco-logic.info/pub/Principles-of-Passive-House-Design-Part-I

http://www.eco-logic.info/pub/Principles-of-Passive-House-Design-Part-II

The passive house goal for total energy consumption is 120 kwh per square meter. Our house is at 106% of this standard.

More information about the passive house retrofit standard is at –

http://solaroregon.org/workshops-and-education/tours/goal-net-zero-2010/passive-house-talk-outline-tad-everhart .

http://www.passiv.de/en/03_certification/02_certification_buildings/04_enerphit/04_enerphit.htm

http://www.viking-house.ie/passive-house-retrofit.html

A hierarchy of goods.

If you have a limited amount of money, work on behavior changes and make permanent investments in weatherizing and insulating your dwelling first. Don't scatter your money and do a minimal job on several different tasks. It's better to go all the way for the best choice that is practical for you on one item. Later, when you have more money, go all the way with the next item on your list.

Always start with personal behaviors.

Then do caulking and weatherizing.

Third is insulation, including insulated shutters for windows and doors.

Fourth is better equipment or replacing existing whole house equipment with less expensive zone equipment..

If you can't afford a major structural insulation project, use the low cost techniques described in 03071, 03081, and 03091.

Regarding more efficient HVAC equipment . . . Your big decision is the choice between central or zoned systems. Central systems condition the whole house; zone systems heat or cool specific areas of the house, when occupied by people. My observation is unless you can go all the way with the heat pump systems, you will end up being more energy conservative with zone heating and AC equipment. The capital costs will be much less than either conventional central or heat pump systems.

Once you go all-in for super insulation and weatherization, you will need less heating and air conditioning equipment, which is another reason for doing the insulation first. You won't need as much AC and heating power with superinsulation and a superior job of eliminating leaks and drafts. Before we did our "extreme green renovation," it took four window unit AC's, with 35K BTU of AC power, pretty much running 24/7, to keep our 1500 sq ft house cool. Now we keep cool with four 5K BTU window units. By their energy ratings, they should only cool a total of 600 square feet (150 sq ft each),if all were running at the same time. We usually run only one or two at a time. With our shady exterior, super insulation, window shutters, and ceiling fans, we do pretty good at moderating the interior temperature without AC. That helps us need less AC.

The best summer choice, that cares for the planet, cares for people, and cares for the future, is to not use air conditioning. Depending on where you live, this can be an easy or a heroic choice. If you live in an area with a hot and humid summer climate, most people will consider it a radical choice, except for those who have no choice in the matter and do so by necessity. We lived without AC for five years in central Oklahoma. The techniques we used are described in 03091. One of the secrets to successful living without AC is to stay out of air conditioned environments. The human body in fact acclimates to temperatures. If you stay out of air conditioned environments, your body will adapt to the situation and you will be much less uncomfortable than you think will be the case. When we lived without AC, I was most uncomfortable for the first couple of hours after I got home from my perfectly air conditioned work environment.

Just Do It.

Our house in Oklahoma City, built in 1929, which we renovated in 2005, is at 106% of the Passive House standard for total energy use per square meter. Our

additional kwh of heating load per square meter of our house is 15.89 kilowatt hours per square meter. Heating load for new passive house construction is 15 kilowatt hours per square meter.

Total energy use allowed per square meter is 120 kilowatt hours per square meter. We used 18,254 kilowatt hours, consisting of 14,208 actual kilowatt hours billed and paid during 2011 (five residents in the house) plus 3,546 kilowatt hours allowed for the half cord of wood we burned. A half cord of oak firewood contains12.1 million BTUs. Divide this amount by 3,412 BTUs in one cord of wood and you get 3,546 kilowatt-hour-equivalents in ½ cord of oak hard wood.

The passive house allowance of 120 kilowatt hours per square meter would give us a total kwh allowance of 17,280 kwh for our 144 square meter (1568 sq ft) house.

We think this is pretty good for amateurs.

We did not have the money for the advanced efficient heating and heat exchange equipment used in passive house construction so we use inexpensive zone heating and cooling equipment ($70 oil-filled electric heaters and $99 5K btu window air conditioners).

Since this was a retrofit, there was a limit to what we could do about thermal bridges.

We spent about $13 per square foot on our renovation. This included a complete electrical rewiring of the property since the wiring was 1929 vintage and had not been updated and some structural repairs that needed to be done. We did a lot of the work ourselves, so that's a non-monetary cost. The total amount is less than what many people would spend on a kitchen upgrade, even if we add in the cost of our labor. When we exclude these costs, which were not directly related to the "greening" of our home, the cost of the "extreme green renovation" falls to $9.04/square foot.

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03131 Energy issues in the kitchen

With its array of gadgets and machines, all powered by energies that are destructive of land or air or water, and connected to work, market, school, recreation, etc., by gasoline engines, the modern home is a veritable factory of waste and destruction. It is the mainstay of the economy of money. But within the economies of energy and nature, it is a catastrophe. It takes in the world's goods and converts them into garbage, sewage, and noxious fumes—for none of which have we found a use. -- *Wendell Berry*

The kitchen is an area of intense energy and resource use. Understanding the energy flows and sinks of your kitchen is critical to successful permaculture design.

Waste Heat. As we use energy, it loses some heat (thanks to the 2nd law of thermodynamics). We refer to this as "waste heat." Heat always moves toward cold, which is why we think of hot items "radiating heat" as they cool down.

POP QUIZ! How many times thus far has the 2nd law of thermodynamics been mentioned in iPermie? What does the frequency of references to this scientific principle suggest about its importance for permaculture design and sustainable living?

We like waste heat from cooking in the winter, when it is cold. It is not popular in the summer, when it is hot.

In both summer and winter, waste heat is expensive energy that entropy drains into a sink. In this case, the sink where the energy dissipates is the atmosphere surrounding the hot pot or stove or oven. Or it may actually be your kitchen sink, as a hot liquid drains down into the sewer system.

There's not much you can do in summer about waste heat, except to move heat-producing activities like cooking outside. This strategy **deflects** the unwanted waste heat from your living quarters.

But in the winter, you want that heat. So you look for ways to recover and collect that heat in your living areas. You won't get all of it thanks to the laws of thermodynamics, but each new use helps.

This can be as simple as letting hot water or liquids cool before pouring them down the drain (winter strategy). Others are more complex, like air to air heat exchangers used in ventilation systems.

Calculating kitchen energy consumption. If you use natural gas or propane for cooking only, calculating your energy consumption for cooking and hot water could be a simple matter of looking at your summer natural gas bill or adding up the bottles of propane.

If you use natural gas or propane for heating water and space heating, you will have to do some math and time your cooking.

Suppose you want to know how much natural gas it takes to boil a chicken. To measure this, you could time the cooking. The formula is –

TIME of cooking in hours TIMES the BTUs PER HOUR of the burner EQUALS BTUs of natural gas used to cook the chicken.

To convert these BTUs to cubic feet of natural gas (a common billing unit), DIVIDE the BTUs by 1020, which is the number of BTUs in one cubic foot of natural gas.

Compare different types of cooking to determine the energy conservative fuel efficient method. For example, it could take as much as two hours to roast a chicken in the oven. It would take about an hour to poach a chicken in water on top of the stove. It would only take 15 minutes to cook a 2-1/2 lb chicken in a pressure cooker. Which method uses the least energy?

Or consider a pot roast. Cook it in the oven for about 3 hours, or cook it in a pressure cooker for 45 minutes or cook it in a crock pot for about 8 hours.

This suggests a design decision for anyone who wants to cook chicken or beef roast: Add a pressure cooker and crockpot to your kitchen equipment if you don't already have them.

Here's a chart of pressure cooker times.

http://fastcooking.ca/pressure_cookers/cooking_times_pressure_cooker.php

For 120 volt appliances, the best way to determine usage is with a Kill-a-Watt meter or similar device and actually measure the consumption. Do this over time and you will develop detailed statistics on how much energy these appliances use.

A 220 volt kitchen appliances (like stoves and ovens), rated at 2500 watts, that runs for one hour, uses 2.5 kwh. However, unlike a stove-top burner, an electric oven does not run continuously. It cycles on and off to maintain the set temperature. One rule of thumb I found while researching this chapter suggested dividing the amount that would be used if run continuously for an hour by two. Other than that, I am not aware of a low-tech practical way to determine the exact energy usage of an oven. Convection ovens do use less energy than regular ovens.

We have a similar problem calculating the natural gas or propane usage of an oven in operation.

Any way you look at this though, in the kitchen you need to design for reduced energy consumption.

Demand destruction. Developing a kitchen that will care for people, care for the planet, and have a care for the future means using less energy. Look for opportunities to completely reduce or even eliminate the use of fossil energy, in favor of renewable/passive solar or manual alternatives.

How can I do this with less fossil energy?

How can I do this without any fossil energy?

Scrutinize every appliance you have and ask yourself if its energy consumption is worth it. And after observing and evaluating, you may decide that yes, this energy expenditure is valid because it leads to other synergies later or it is work that you need or want to do.

That's why a pressure cooker is useful. It does the same work as a boiling pot, only much faster.

Later in this article there is a list of little tricks you can use in the kitchen to shave your demand, a few BTUs at a time. Don't scorn such pennies or euro cents. Pennies add up to dollars and cents add up to euros and every BTU you don't import from the coal mines and etc. is a BTU you don't have to pay for and a BTU that doesn't damage the earth. The popular attitude that "it's not worth it" to save "in small things" is one of the more toxic aspects of the currently popular madnesses and delusions of crowds. Here's a useful wisdom saying – "The one who is faithful in small things will be faithful in large things."

Use your crockpot. It is one of the most conservative of cooking appliances. Maybe you could add a retained heat cooker? This is an insulated box that cooks via the retained heat of the food

placed inside a box. Bring a covered pot to a boil, then place it inside of the retained heat cooker. The insulation retains the heat as the food continues to cook.

Appropriate Scale. Appropriate scale keeps visiting us everywhere we go in the permacultured kitchen. Use kitchen appliances in proportion to the size of what you cook. If you need to boil a small amount of water, use a small pot and a small burner. Most people don't need a supremo-gigantico-maximo-humongoid refrigerator with four different spouts or chutes puncturing its door plus a hair dryer, drink mixer, and automatic defrost. It's taller than you are. Of course, people may *think* they need something that huge. That is a **delusion fostered by clever advertising propaganda** that sells extra large appliances to make extra large profits for the appliance companies.

When it comes to appropriate scale, the question "should we substitute energy for time," often comes up. Is it really worth it to run the food processor to chop one onion for dinner, when you add in the time required to get the food processor, set it up, do the chopping, clean it afterwards, and then put it back where it belongs? If you're doing just one onion, probably not. If you need to shred 20 pounds of carrots for a large food processing or cooking project, the expenditure of time and energy may be worth it due to the time savings it offers to the people in the kitchen.

If you bake one pie, a tabletop convection oven will be a better choice than a full-size oven.

Do only what is needed. If you need a cup of boiling water, don't boil a quart. Prepare what you need and don't waste energy boiling water you don't need. You may not need to cook every meal. As you develop your menu plans, look for opportunities to prepare meals that don't require cooking. This may be a seasonal strategy, because just as everything else, your permacultured kitchen changes with the seasons.

Induction Cook Tops. If you use electricity for cooking, induction cook tops are generally considered more efficient and energy conservative than a regular electric kitchen range. With this form of cooking, heat is applied only to the cooking vessel. No extra energy goes elsewhere. However, it only works with cooking pots that are made of magnetic materials, such as cast iron and stainless steel. More information about induction cook tops is available at http://theinductionsite.com/proandcon.shtml.

Solar cooking. Free heat from the sun can make a significant contribution to your kitchen energy budget. Free BTUs float down on the beneficial rays of our friendly neighborhood star every time the sun shines. I built a solar oven out of a cardboard box and aluminum foil and measured 325 degrees inside on a spring afternoon. I've seen a "Global Sun Oven" at work (a manufactured version solar oven) and it works as advertised.

The pre-eminent internet site about solar cooking is http://solarcooking.org/. See http://www.solarcooking.org/plans/ for a directory of plans (and photographs of the cookers.)

The Global Sun Oven is a commercially manufactured household solar cooker. They make a village size version that could be used commercially in the US. Access their information at http://www.sunoven.com/ .

Retained Heat Cooking. This is a crockpot without electricity. You heat the food to boiling, cook it for 5 to 15 minutes depending on the food (5 minutes for rice, 15 minutes for large dried beans or whole potatoes) and put it in an insulated box. According to the folks at the solar cooking archive, it can save 20-60% of the energy required to cook a food.

The Solar Cooking archive has great information about retained heat cooking at http://solarcooking.wikia.com/wiki/Heat-retention_cooking .

E-book on retained heat cooking, $6.99 from Bamboo Grove Press, http://www.bamboogrovepress.com/Ebooks.htm. I have a copy and it is worth it if you plan to incorporate retained heat cooking into your design. The history of the hot box has a fascinating history and it is a good example of how the cross-generation transfer of domestic knowledge has become problematic over time. The author created her first hot pot using a laundry basket. She simply wrapped a cast-iron Dutch oven with several layers of blankets and sleeping bags and put it in the basket! She said it took about 5 minutes.

Fuel Efficient Outdoor Stoves. The "Rocket Stove" is an efficient way to cook with wood. The Solar Cooking Archive has a page on these stoves at http://solarcooking.wikia.com/wiki/rocket_stove. Approvecho has what is probably the definitive site on rocket stoves, including extensive plans, at http://www.rocketstove.org/.

Ice Box. An even more low-energy option for refrigeration than my chest refrigerator is the old-fashioned ice box, using ice made in your freezer. Here is a plan to build a modern version of an old-fashioned ice box: http://www.ehow.com/how_5020653_make-ice-box-refrigerator.html.

Outdoor Bread Oven. In 2004, I visited Italy and stayed for part of the time with a farm family in a small village. They had an outside oven – a "forno" – which they used to bake bread and other items. The Additional Resources folder has references to books on this subject.

Quantity cooking. If you plan to cook one item, for less than twice the energy, you can cook two or three or four. Cook, freeze, and serve later is an excellent strategy for reducing energy consumption in the kitchen.

Food Preservation. Use solar food dryers to dry food. One simple design is a couple of racks covered with mosquito netting, hung in the sun. A more elaborate version can be built that draws air in, heats it, and exhausts it through the top. This type can dry several racks of food. Once again, the Solar Cooking Archives brings us a rich trove of information on the subject. http://solarcooking.wikia.com/wiki/Solar_food_dryers . I have often thought that once the petroleum gets too expensive for our cars, we'll park them in the sun and use them to dry food. In fact, we could do that right now.

Cooking Outside. Cooking inside during the summer adds heat and humidity that you don't want. If you have air conditioning, it will take energy to get rid of the cooking heat and humidity. Thanks to the laws of thermodynamics, it will take more energy to cool and dehumidify the air than you put into it while cooking. If you spend 2,000 watts cooking, it will take more than 2,000 watts of cooling energy to remove the heat and humidity from the air. If you don't have AC, cooking inside during the summer will make the inside of your house or apartment more miserable.

We cook outside all summer long, presently on the front porch, which is cool and shady. I use a crockpot, a natural gas stove that we had converted to run on propane, a "turkey fryer" (when we do canning), and a pressure cooker. Before we got the propane kitchen stove, we used a two-burner propane camp stove equipped with an adaptor so it will run off a 20 lb. cylinder instead of the expensive 1 lb. cylinders. These are available from propane dealers "everywhere." I use about two-three twenty-pound cylinders of propane for four months cooking on the porch, 15 - 15 gallons. I do my prep work in the kitchen and take the food out on the porch to cook.

Gas versus electric stoves. Gas and electric cooking methods have similar efficiencies in the kitchen. Natural gas

and propane release pollution to your interior environment – nitrous oxide, carbon monoxide, and sulfur dioxide. Electric stoves using grid generated electricity from fossil fuel resources release pollution into the atmosphere. One way to finesse this is to buy wind generated electricity from your local utility.

How will you cook if you can't get grid-generated electricity or natural gas or bottled propane? The time to learn to cook without hydrocarbons is before the power goes out and the natural gas pipelines dry up.

Hand dish washing in the sink versus electric dish washer . Hand washing of dishes is more energy conservative than using a dish washer. Sure, there's studies that say this isn't true. I wonder about the involvement of dish washer manufacturing corporations with those studies and in any event, I've measured our usage of water when washing dishes and hand dish washing is certainly more water frugal than using a dish washer. Not buying a dish washer avoids the energy investment in the machine.

If you have an automatic dish washer, don't use it. If you don't have one, don't buy one. If you have one and you just have to use it . . . Resist the temptation! If you fail and give into temptation, at least don't use the heating element to dry the dishes. Let them air dry. See this Dept. of Energy page on dishwashers. http://www1.eere.energy.gov/consumer/tips/dishwashers.html for more information on greening our dish washers and their environmental/energy impacts.

The embodied energy of the appliance counts against the automatic dishwasher as an energy debit. I have lived all of my life since leaving home without a dishwasher. I always just wash the dishes. Despite my busy lifestyle, and cooking as much as I do, I don't find this to be a terrible chore. I don't think that washing dishes is beneath my dignity as a human person. I like to eat. How can I disapprove of washing the tools of my eating?

Ignore the pro-dishwasher propaganda that purports to "prove" that washing dishes in a dish washer is as energy and water efficient as doing them by hand. As we should all understand by now, there are lies, damn lies, and then there are statistics and research studies paid for by corporations looking for profits. The pro-dishwasher propaganda fails the common sense test.

Tips for hand dishwashing.

-- Do a good job of wiping and scraping the plates into your compost container.

-- Put a couple of inches of hot water in the sink with the dish soap and while the water fills the sink, wash any small, relatively clean items like glasses, cups, and silverware. Rinse them with water running into the same sink, thus double using the water – once to rinse and then to wash. Continue this until the washing sink is as full of water as you need it to be.

-- Start running cold water in the 2nd sink or a basin (a basin is better if you aren't plumbed for grey water). Continue to wash and rinse until the rinse sink is as full as it needs to be. Then, dip the rest of the items after you wash them in the rinse water and wipe dry with a towel. Water plants with the water.

-- Do the dishes promptly. Letting food dry on the dishes increases the work. Leaving dirty dishes "for later" creates a large pile of dirty dishes that will take too long to wash. That's what you'll think anyway. "They say" that a sink full of dirty dishes is a leading cause of eating out and I believe that. Wet dirty dishes are a major food safety hazard. Wash them after each meal, avoid aggravation, and be happy!

-- Beware of your dish washing detergent. Use the Environmental Working Group database on cleaning products to find out if your dish washing soap is safe to use. Many common dish washing detergents contain formaldehyde, a known carcinogen.
http://www.ewg.org/guides/cleaners

Investigate energy ratings. The published energy ratings of appliances are "best case" reports. When shopping, ask yourself how often "best case" turns out to be the rule in regular usage.

In the US, much is made of Energy Star ratings. There is often less there than meets the eye. The government gives ES ratings for classes of appliances. They award the rating based on best efficiencies within the class. A gigantic humongoid energy-wasting refrigerator equipped with every possible doodad (ice makers, automatic defrost, large cubic capacity, ice water dispenser, tooth brush, back massage, cocktail mixer, etc.) may be Energy Star rated and thus the best gigantic humongoid energy-wasting etc. in its class. From a permaculture design viewpoint, it is still an energy pig. You can smear lipstick all over it and it will still be a pig.

Pop quiz! How many times have I discussed this problem with Energy Star ratings? What does that suggest about Energy Star ratings?

There's no free lunch. **Gee whiz energy consuming doo dads consume energy.** It's what they are designed to do. If you want to use less energy, you need fewer gee whiz energy consuming doo dads in your life and you need more efficient doodads for the ones you feel are the necessary keepers. Here are your choices:

-- Use more energy wow-gee-whiz-doo-dads, consume more energy, pay more money, do more harm to the earth and to the future.

-- Use fewer energy wow-gee-whiz-doo-dads, consume less energy, pay less money, do less harm to the earth and the future.

Use natural materials. Particle board cabinets can out-gas formaldehyde and adhesives for years. Noxious and dangerous chemicals are common sights on the ingredient lists of many household cleaners. A better idea is to use natural materials as much as possible in your household food system structures and supplies. Find used cabinets made from natural materials. If all you want is an aesthetic make-over, just replace the fronts of the cabinets and drawers, keep the existing structure in place.

Alternatively, if you have money to spend, support a local craftsperson to build you some cabinets that will last into your children's lifetime. Use local wood or local recycled heritage woods.

Go natural and nontoxic for counter tops. See the Buyers guide to green counter-top materials at http://greenhomeguide.com/know-how/topic/3.

Find safe substitutes and nontoxic suggestions for household products at http://www.inspiredliving.com/health/envir~non-toxproducts.htm.

Use real dishes and serving ware, cloth rags and napkins instead of paper and plastic.

Never bring Styrofoam into your house or onto your property except to use as homemade insulation in your attic or along your walls.

More ideas are in the Additional Resources document for this section.

Ceiling fans in the kitchen? Absolutely and if it's a large kitchen, you want more than one. Ceiling fans are a great low power way to circulate the air.

Small batteries. You may use some small batteries in the kitchen. Small batteries are a serious environmental problem, and we should work to minimize our reliance on them. You can reduce the harm by using rechargeable batteries, and go one step further by using a solar battery charger. I have several small battery chargers that I bought online from C.Crane Company. I have used these for years and they continue to work fine. They will charge up to a D size battery.

Cooking Conservation Tips

With electric stoves, turn off the burners before the cooking finishes. The food continues cooking as the burner cools.

Crockpots, roaster/toaster ovens, and electric frying pans are more efficient than full size electric stoves. Large ovens don't cook small meals efficiently, so use those small appliances for small meals.

When you do heat up the oven, cook several dishes at once. Alternate their placement in the oven so that air circulates easily.

Preheat ovens only as long as it takes to bring it up to baking temperature. Avoid "extra preheating."

Glass or ceramic oven pans are the most efficient.

When cooking with electricity, convection ovens and induction element tops are most efficient.

Ensure the flame on a gas stove is blue. When the gas doesn't burn efficiently, the flame turns a yellow color. That wastes gas and pollutes the interior atmosphere of your house. Don't use that burner until you fix it.

Pressure cookers use less energy for stove top cooking because foods cook in less time.

Uncovered pans can use 3 times as much energy as a covered pan to cook the food.

Defrost frozen foods before cooking them.

Use the smallest pan that will fit the recipe, and match the burner to the pan if possible (use a small burner for a small pan).

Keep the metal splash guards under the burners clean, blackened guards will absorb, not reflect, cooking energy.

Refrigerator and freezer.

These appliances use about 14% of the average household's energy.

The best bang for your refrigeration buck is to switch to a chest refrigerator (depending on how much money you want to spend, described elsewhere in this section). Higher priced upright refrigerators can equal the energy savings of a chest refrigerator, but they cost more.

According to the Green Building Council, side by side freezer/refrigerators use 10% more electricity. Through the door ice and water dispensers use 20% more energy. Automatic defrost units use 40% more energy (and degrade quality of the food). http://greenhomeguide.com/know-how/article/creating-a-green-kitchen-from-resource-planning-to-maintenance

A refrigerator with a freezer on top is more efficient than a refrigerator with a side-by-side freezer.

Avoid extra doo-dads like automatic ice makers, water and ice dispensers, automatic defrost. The intent is to save energy by not having to open the door. The actual impact is to increase energy consumption.

Size your refrigerator carefully. More cubic feet equals more energy consumption. Less cubic feet equals less energy consumption.

A refrigerator works best when correctly maintained and optimized for efficient use. If it isn't working correctly, it will use energy inefficiently. It needs to be repaired. It won't get better by itself.

If you have a small freezer compartment in your refrigerator, use it only for short-term storage and ice. For this kind of minimal freezer use, keep the fridge freezer at 20 to 25 degrees Fahrenheit. If you use it to store meats, the freezer temp needs to be at 10 degrees F or less. The main compartment of the refrigerator should be in the 37-40 F degree range.

To measure this, you will need 2 small inexpensive thermometers. Put one near the center in the freezer compartment and one near the center in the refrigerator. After an hour or so, check both temps at

the end of any cycle (when it stops humming). Record those temperatures. Turn the appliance's thermostat up a notch, & check the temperature again at the end of the next cycle. Keep doing this, up or down, until you get the temperatures right. If your refrigerator has an adjustable opening between the freezer and the refrigerator compartments, you can experiment with the width of the opening as part of this regulating process.

Make sure there is space around the refrigerator for air to circulate -- at least 3 inches between the refrigerator and any nearby counters or walls. Don't pile things on top of it, which will restrict air circulation even more.

The refrigerator is most efficient when it is full, not overcrowded (food holds coolness better than air and air needs to circulate in the refrigerator).

Freezers, on the other hand, work best when they are full. Fill empty spaces with 2 liter pop bottles filled about 3/4ths full of water.

Don't let the frost build up in your freezer-- when it is 1/4 inch deep, defrost the freezer.

Move the refrigerator away from the wall once a year and vacuum the coils - they work most efficiently when they are clean (do this more often if you have a pet that sheds a lot).

Let hot foods cool before putting them in the refrigerator. Put them in the refrigerator before 2 hours have elapsed. Make sure that all dishes and foods are in airtight containers.

Don't hold the door open while you decide what you want to eat, especially during hot and humid weather.

Locate the refrigerator away from the stove, out of direct sunlight, and away from any heating ducts.

If you use an extension cord to power your refrigerator, it must be the same gauge (thickness) of wire as the house wires, 14 gauge. Ideally, the refrigerator should be on its own circuit (breaker or fuse), with no other appliances or lights using that circuit. If there are additional electrical outlets on that circuit, don't use them if you can avoid it. The freezer should be on its own circuit.

If the door gasket isn't fitting tightly, replace it. If your refrigerator has an automatic ice maker or butter warmer, disconnect it.

Hot Water.

Use less hot water (and water in general) by installing low-flow shower heads and faucet aerators. This can cut your hot water requirements as much as 50%, saving 14,000 gallons of hot water per /year for a family of four. They are cheap and easy to install.

Insulate the hot water pipes. Insulate the hot water tank with a special "jacket" made for the purpose (typically $10-20 at home supply stores), or wrap it with insulating materials. Do not cover the top or the bottom, the thermostat or the burner compartment of the tank.

Lower the temperature on the water heater to 120 degrees.

Take quick showers, not baths.

You can make a simple solar water heater: get a 5-gallon plastic bucket with a tight fitting lid, and paint it black. Fill it with water and set it in the sunlight. Voila, easy and free five gallons of hot water.

If you have the capital, or can build one yourself, a solar water heater is a great investment.

If you have an electric hot water heater, install an on-off switch and only turn it on when you need hot water.

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03141 Design an alternative cooking system for your household.

There's no harm in hoping for the best as long as you're prepared for the worst.
-- Stephen King, Different Seasons

Your assignment is to design an alternative cooking system that will work for your household in the event of an emergency that takes down the electrical and natural gas distribution grids.

Assume you have no natural gas, and no electricity from the grid.

As a stacked function, depending on the design, it could be a way to cook when there is no emergency that uses less fossil energy. E.g., if you envision using a retained heat cooker during an emergency, you could certainly use it when there wasn't an emergency, and cut your fossil fuel expense/consumption accordingly.

Fuels can include the sun, wood, charcoal, on-site generated electricity, bottled propane, kerosene, etc.

Observe. What are your goals for this project? What do you want/plan to cook under these circumstances? What resources (space, equipment) are available? What strategies/tactics will you use? Do you do any cooking right now that doesn't involve grid generated electricity or natural gas? What length of time will you be using your alternative cooking methods? Only during an emergency, or regularly?

Start your lists. What items are necessary? What functions are involved? What spaces?

Who does this work? One person by himself or herself? The whole family? Rotating jobs?

What are the safety issues with alternative cooking methods in your particular dwelling?

What scale is this project? How big is your household? A design for a student in a dorm room would be different from one for a family of six living in a suburb or a family of four living in a high rise apartment building.

Study and Evaluate. Do you have the equipment you need? If not, what needs to be built or bought? Do you have the necessary skills?

Do others need to learn these skills?

Do you have enough space? Need more?

Where will you do this alternative cooking? In the regular kitchen? Outside?

How long do you think you could use alternative methods to prepare your food? That is, what is the maximum length of time during an emergency that you could prepare food? A day? Week? Month?

Design. Make your design decisions based on your observation and evaluation. Where? When? What? How? How much?

Stage your decisions. What comes first? Middle? Last? Never mind the fact that this is a small design, put first things first and second things second and third things third, so you get a feeling of what it is like to organize a set of tasks such as this.

Budget. If any of this will cost money, get some estimates and develop a budget. Decide on a source of funds.

Write the report. Write the report and add it to your lifestyle plan.

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03151 Chest Refrigerator

I always think if you have to cook once, it should feed you twice. If you're going to make a big chicken and vegetable soup for lunch on Monday, you stick it in the refrigerator and it's also for Wednesday's dinner. -- *Curtis Stone*

Several years ago, I researched refrigeration options. I found very efficient fridges on the market – all of which were insanely expensive (Sunfrost, et al), starting at $2,000 and going up from there.

Then an internet search turned up these links –

http://mtbest.net/chest_fridge.html

http://www.builditsolar.com/Projects/Conservation/chest_fridge.pdf

These links describe insanely cheap way to get maximum energy efficiency AND energy conservatism for your refrigeration needs.

How? Transform a chest freezer into a chest refrigerator by using an external thermostat to operate the freezer at refrigerator temperatures.

So I got a free chest freezer from a friend, and bought an external thermostat for $60 from an online supply house.

These thermostats are often available at local home brew stores, since home brewers use them to age their brews in chest freezers kept at the proper "beer aging" temperature. See http://tinyurl.com/yjnajkd for an example.

I plugged the external thermostat into the wall outlet, and plugged the chest freezer into the thermostat. I put the sensor (a long coiled wire with a metal sensor at the end) inside the chest freezer, resting it on a piece of metal toward the middle that was probably designed to hold a rack. You don't want the sensor at the bottom of the chest refrigerator, because cold air tends to sink and the items toward the top will not be properly cooled. I did not do any of the "surgery" on the thermostat described in the articles at the links above, in fact, I think I have a different kind of external thermostat.

I ran the metal wire into the chest refrigerator by simply laying it in place over the lip of the refrigerator on the gasket. The door closes just fine and the gasket prevents any cool air from escaping.

I organize the items inside the chest refrigerator in boxes and a basket. I put frequently used items (like butter and ketchup) in the basket. Meats, dairy, veggies – all have their own boxes. Leftovers go in individual containers right on top, so we use them quickly. I put an empty box with a rack on it (from the refrigerator this replaced) to keep the items up off the floor of the chest refrigerator. Over time I've used different boxes. Sometimes they are color coded. Sometimes I write what's inside on their lids. All the boxes I've used are plastic. I have not found boxes made with more sustainable materials that will work in this particular application.

It took about one week to get used to the top down orientation, as opposed to the side view of a conventional refrigerator. It took even less time to get used to a new flat space in the kitchen. Now it has

additional functions – sorting mail, staging groceries into the pantry, and food prep. The lid doesn't accumulate stuff because people open it several times during the day.

After about a year, I replaced the original chest fridge with a new chest freezer. The first one was quite large (18 cubic ft) and that was too big. I replaced it with a 10 CF chest freezer. That works just fine for our household of five.

The chest refrigerator needs to be cleaned each week. Moisture collects on the floor of the chest refrigerator. If the chest refrigerator doesn't connect to a drain hose, you will need to clean that out each week.

The size and efficiency of the original chest freezer matter. I started with one that was older, less efficient, not-so-much insulation, and nearly twice as large as I needed. It's power consumption was nearly twice the consumption of the smaller/newer chest freezer I bought in 2007.

The brand of external thermostat I have swings 4 degrees on either side of its setting. I keep mine set at 37 degrees.

Why does this work?

In a regular upright refrigerator, every time you open the door, the cold air, which is heavier than the warmer air in the kitchen, falls out. When you open the door of a chest refrigerator, no cold air falls out, since it's already lower than the warmer kitchen air.

Freezers are much better insulated than refrigerators.

The chest configuration seems to hold more items than the same amount of cubic feet in an upright configuration. With a system of boxes, you can make (for example) your "veggie storage area" bigger or smaller based on how much you have – you just use a larger box or an additional box for veggie storage if you have a lot of refrigerated veggies on hand.

On July 17, 2007, after 184 hours of running (7.7 days), the chest refrigerator had used 3.5 kWh of electricity, or .46 kWh per day. That average daily electrical consumption held steady through the next reading on July 24, 2007, a total of 15 days running. That gave me a base line for the hot months of the year.

I began measuring again in the fall.

On October 27, 2007, after 98.5 hours runtime (4.1 days), 1.31 kWh had been used, or .32 per day. I measured again on January 21, 208, after 507 hours of runtime (21.1 days). During that period, it used 6.09 kWh, or an average of .32/kWh/day.

On June 23, 2008, after 411 hours runtime (17.1 days), the chest fridge registered 8.02 kWh consumption, or .47/day.

So I take .32 kWh/day as the cold season average consumption and .46 kWh/day as the warm season average usage.

This totals an annual electrical consumption of 142.35 kilowatt hours for the chest refrigerator.

A typical American refrigerator consumes between 500 and 1000 kilowatt hours per year. A Sunfrost Refrigerator, which is a super-efficient refrigerator, consumes about the same amount of energy as the chest refrigerator. They cost about $2,200 for a unit that holds the same amount as our chest freezer. We paid about $250 for our chest freezer and $60 for the external thermostat. Our total cost was about $310.

How to set up a chest refrigerator.

1. Get a chest freezer. Newer is better than older, and smaller is better than larger, depending on the size of your household and amount of refrigerated space needed. Most people overestimate their refrigerator needs. As a result, they refrigerate things "too long" and end up with spoiled food. If leftovers won't be eaten in two days, freeze them. Bottles and other containers should be dated so you know how long they've been around.

2. Get an external thermostat. These instructions are for the Johnson Controls external thermostat referenced at the URL above.

3. Place the long coil of wire and the temperature sensor inside the chest by opening the lid and finding a place to lay the sensor in the middle to upper part of the chest. I use twist ties to hold it in place on a ledge that was already in my freezer (it is for a basket). The wire and sensor are durable. At the same time you don't want to bang it around.

4. Plug the external thermostat into the outlet, and plug the freezer into the external thermostat. Hang the temperature control somewhere close by, and set it at 36 degrees F. If you want to monitor its power usage, get a Kill-a-watt meter (widely available on the internet) – plug the meter into the outlet first, plug the external thermostat into the meter, and the freezer plugs into the thermostat.

5. Let the chest refrigerator cool down, and load **it with the items from your other refrigerator**.

6. Clean it every week. You will regret it if you don't.

7. Sell your old refrigerator or donate it to charity.

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03161 Lower Your Hot Water Bill with a Simple On-Off Switch

I believe in getting into hot water. It helps keep you clean. – *G.K. Chesterton*

When it comes to cutting your hot water bill, many people reach for the "on-demand" water heaters. Their problem is high capital costs for purchase and installation.

Fortunately, there is an easy and "value priced" hot water option for people with electric water heaters: install an on/off switch.

Tank water heaters waste energy when they keep a tank of water hot 24/7/365.

Installing a simple on-off switch on an electric water heater is a value priced way to finesse this problem without spending as much as on-demand heaters cost.

We went with the value price option. We had to rewire our house anyway, so we bought an off-the-shelf mid-priced electric water heater from a big box store. We had the electrician install an on-off switch for the hot water heater. You can get the same result by flipping the breaker switch, but most breaker boxes are outside. We decided we would be more likely to actually do this if we located the switch inside and we did not have to go outside to turn it on or off.

We intend to add a solar water heater as the implementation of the permaculture design for our home progresses. When this happens, our present tank will become back-up heating and storage for the solar system.

Electric water heaters are much better insulated than natural gas or propane water heaters. They don't have a chimney in the middle, so the tank stays hot longer.

We added insulation to the tank by wrapping fiberglass insulation around it and securing it with duct tape.

The new switch, installed by itself, without any other electric work, would cost about $200 according to a bid solicited by a public television program that did a documentary about our house. We installed our switch as part of a whole-house re-wiring, and that particular job was not priced separately from the others.

When the hot water tank has cooled to the ambient temperature, it takes only about five minutes after we turn on the switch to get a stream of hot water.

We installed a low flow showerhead to reduce our hot water usage. We like its spray better than our previous standard showerhead. It cost about $11 at a big box store and we installed it ourselves.

We love our on-off water heater switch and the money it saves us. This was one of the best innovations we implemented in our ongoing quest for the Extreme Green.

Oklahoma solar hot water installer David Nordahl described a second alternative in a discussion in the Oklahoma Sustainability Network listserv.

At his house, he has two, small electric water heaters – one in the bathroom (8 gallons) and one in the kitchen (4) gallons. Since they are small, they work on 120 volts. He has a solar hot water system, and the tanks are back-up and storage for the solar hot water. This has an added advantage of providing nearly

instant hot water without an expensive re-circulating system. The capital costs are low, since it doesn't use 220V wiring.

All of us need to head towards solar hot water systems. Both of these systems will work well as back-ups for solar hot water systems.

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03171 Energy Projects

This curious faith is predicated on the notion that we will soon develop unlimited new sources of energy: domestic oil fields, shale oil, gasified coal, nuclear power, solar energy, and so on. This is fantastical because the basic cause of the energy crisis is not scarcity: it is moral ignorance and weakness of character. We don't know how to use energy or what to use it for. And we cannot restrain ourselves. Our time is characterized as much by the abuse and waste of human energy as it is by the abuse and waste of fossil fuel energy. -- *Wendell Berry*

Here is a tip jar/grab bag of miscellaneous energy conservation ideas.

Bubblewrap Insulation for Windows. This is a great value-priced fix that can cut heat loss through windows by up to 50% in the winter. You can often get bubblewrap for free from places that sell bulky items. Cut the bubble wrap to fit the window. Simply spray a fine mist of water over a window and apply the bubblewrap. Usually one application is all you need. If undisturbed, the bubble wrap will stay up all winter. The bubble side goes next to the window. You can apply a second layer of bubblewrap the same way. Put up the first layer, spray it with a mist of water, then put up your second layer. In the spring, take it down, roll it up, and store it until the next fall. There are reports of bubble wrap lasting longer than six years in these window insulation applications. Lots more details plus pictures at http://www.builditsolar.com/Projects/Conservation/bubblewrap.htm .

Cardboard Shutters. Cut several pieces of cardboard to fit a window, and duct-tape the edges so they stay together. Place in a window so there is a gap between the cardboard shutter and the window. (Creating the air gap provides some insulation, and the cardboard provides insulation.) Size the cardboard so it fits snugly, and wrap it in aluminum foil, taping the foil as necessary to hold it all together. The aluminum foil helps a bit with the thermal resistance and with fire resistance. http://www.builditsolar.com/Projects/Conservation/CardboardShutter.htm

Window Quilts. Make a window quilt covering for a window. Besides using the heaviest batting you can find, put a layer of Mylar between the batting and the outer cotton quilt squares. Hang this over the window so it comes into contact with all of the window frame. Some people put little magnets on their window frames and sew them into the edges of the window quilt, so it clips tightly to the window. Whenever the sun shines through the window in the winter, take the quilt down and soak up the heat. You can get the same effect, more casually, by hanging layers of blankets/curtains over your windows. You can place a sheet of Mylar between the layers. One cheap way to do this is to use auto sun shades, which can often be bought for as cheaply as a dollar in the dollar stores. Cut and/or duct tape them together so they fit over the window, layer with blankets and quilts.

Shade cloth. If your windows and doors are not shaded by plants, shade cloth is a way to block the sun from hitting your windows and doors. Shade cloth is a specially woven cloth, designed for outdoor use, that provides shade. You want to hang them on the outside of the windows, to prevent the heat from hitting the windows. You need a little gap between the window and the shade cloth.

Many windows are set in a frame so you could simply staple the shade cloth to the wooden frame and it will cover the window with a little gap. Or you could nail some steel washers onto the frame, and sew some small magnets into the edge of the cloth so the magnets will click onto the washers and hold the shade cloth in place. Buy shade cloth at garden supply stores.

Do-it-yourself Solar Air Heating.

A Survey of Air Heater Options – http://www.builditsolar.com/Projects/SpaceHeating/SolAirHtSysBook/Chap02.pdf

How to build a 150 sq ft solar collector http://www.builditsolar.com/Projects/SpaceHeating/solar_barn_project.htm

How to build a high efficiency solar air heater (20 sq ft) http://www.builditsolar.com/Projects/SpaceHeating/Kreamer%20Air%20Collector.pdf

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03181 Stuff

Our pleasures are not material pleasures, but symbols of pleasure – attractively packaged but inferior in content. -- *Alan Wilson Watts*

In 03051 Embodied Energy, we learned that all stuff has energy embodied in its making, transportation, storage, and retail distribution.

Thus, Stuff, as in "all the stuff you buy, haul around, live with, and etc." is an energy conservation issue. Everything you buy has some energy embodied in its production and distribution. The production of the goods and services we consume requires much of the energy used in the United States. So as you think about living in smaller spaces and driving less, you need to contemplate how you can Use Less Stuff.

Besides the hydrocarbon issue, stuff is a problem for your time, attention, and human energy too.

So just how much stuff do you really need? *Especially new stuff.* That's why learning to explore and shop in the after-market is a critical urban permaculture skill.

Strategies for reducing your use of stuff:

Borrow stuff! If it's something you won't use much, try to borrow the item rather than buy.

Rent! This is particularly useful when it comes to tools, since most cities have businesses that rent tools to the public.

Clothes do not make the man, nor the woman. While it is certainly not necessary to dress in a shabby manner, we can question how many outfits are prudent in light of the ecological costs of clothing.

Organize what you've got so you can find the stuff you have. If you have so much stuff that you can't find stuff, then what you effectively own is a large amount of trash. Don't buy something because you need something and can't find it. That just complicates your problem.

Beware of hoarding! Permaculture is about the responsible distribution of surplus. While energy storages are important, they should not consume our available space and drain us emotionally.

If you buy new, **buy as much quality as you can**. For example, it should be possible to buy a watch of good enough quality that as long as you didn't lose it, you would never have to buy another watch for the rest of your life. I use canning jars, a pressure cooker, and cast-iron cookware that I inherited from my grandmother. Some of these items are more than sixty years old and still going strong. The generation that follows me will inherit them and continue to use them.

De-cluttering your existing stuff. Everything you own can be divided into these categories:

-- Beautiful things,

-- Emotionally important things,

-- Tools and other items that efficiently help you do useful work,

-- Consumables – food, clothing, etc.

-- Everything else.

Beautiful and emotionally important things help you enjoy life, remind you of who you are and where you came from, and are part of life. They can become "too much of a good thing."

Tools and other useful items are important to help you do the necessary works of your life. They could become "too much of a good thing."

Consumables are important and some storage of these items is necessary and prudent, depending on your household and circumstances. The category that sometimes gets us in "stuff trouble" is Clothing and Accessories. How many pairs of pants – or dresses – shirts – blouses – shoes – etc. do you actually need?

"Everything Else" is the big problem category. These days, people with 3,500 square foot homes rent storage units to store their "toys." "The one who has the most toys, wins" is the general attitude.

This attitude is kills the earth and litters the planet with land fills.

Everybody needs to learn and practice moderation in our use of the goods of the earth.

If you have a surplus of stuff, stop hoarding. Put your stuff into circulation via the after-market. Have a garage sale, advertise items on Craig's List, sell stuff at a flea market. You can raise some capital this way that will be helpful for the implementation of your permaculture goals for your life.

Alternatively, give your excess stuff to a thrift store or charity that helps the poor, or give items directly to other people. Give books to libraries and to students. Keep the ones you need and especially love. Put others into circulation so that people can enjoy and learn from them too.

You should be in control of your stuff. Your stuff should not be in control of you. By limiting your acquisition of new stuff, you live a more energy conservative life and that is good for you, good for others, and good for the planet and all of its associated creatures. What's not to like about that?

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03191 The Diderot Effect

There was a period when I believed stuff meant something. I thought that if you had matching side chairs and a sofa that harmonized and some beautiful lamps to light them you would have a home, that elegance signaled happiness. -- Anna Quindlen

In 1769, the French philosopher Dennis Diderot penned an essay that remains famous today – "Regrets on My Old Dressing Gown, or, a Warning to Those Who Have More Taste Than Fortune."

The essay recounts the events that follow upon his receipt of a gift of a new dressing gown, to replace the old, frumpy, tattered-but-comfortable dressing gown that he had worn for many years.

He comes to rue his decision to accept the new gown, because next to his new gown, his old possessions seemed shabby, tawdry. So item by item, he begins to buy new "stuff." He goes in debt to "trade up" as we would say in the modern era. He writes, "I was absolute master of my old dressing gown, but I have become a slave to my new one." He leaves us this advice:

> My friends, keep your old friends. My friends, fear the touch of wealth. Let my example teach you a lesson. Poverty has its freedoms; opulence has its obstacles.

Merchants are well aware of this psychological effect. They exploit it all the time. It's not new to the modern era. Diderot's essay comes to us from the 18th century. Even earlier than that, in the fourth century BC the Greek philosopher Epicurus said –

> Do not spoil what you have by desiring what you have not; but remember that what you now have was once among the things you only hoped for.

Advertising and media create powerful social norms that drive personal desires, feed the urge to gluttony, and seed us all with feelings of perpetual dissatisfaction. No matter how much stuff we have, we are never satisfied. We must always have more. It doesn't matter if we spend millions of dollars on stuff, we still feel as though we don't have enough stuff. We therefore need more money so we can buy more stuff.

That is the pattern.

We need different and better patterns if we want better outcomes.

The path out of the pattern in which we are enmeshed begins with observation.

What is in your life that creates these urges to consume?

How much commercial television do you watch?

How many ads do you see on the internet?

Sometimes just knowing what happens to you is a major step out of the trap. You may need to avoid the brainwashing mental stimulation from the media that drives you to consume, at least in the beginning as you build your strength and resistance to ad campaigns. .

We're talking about this in the energy section because all stuff embodies energy in its materials, manufacture, and distribution. Conservation of stuff is an essential aspect of conservation of energy.

Moderation and temperance in our use of material things are important virtues. Actually, they are critical, because if we don't get over our gluttony for material things, all is lost for the planet, its peoples and all its critters.

You can raise some capital for your permaculture design implementation by selling excess stuff that you don't actually need to own.

You can contribute to the proper distribution of surplus by donating items you don't actually need to own to charities.

This orientation toward frugality and temperance does not mean that your life should lack beauty or style. You can have all the beauty and style you want in your life, and it will be all the more precious because it won't be in control. In other words, as someone once said, "Don't have a lifestyle, instead, embrace style."

Oh yes, and get over that juvenile "ewwwwww temperance" emotion. Temperance is beautiful because it is kind and loving to all people, to the earth and all the critters of the earth, as well as its plants and trees and all the life of the oceans and skies.

In other words. . . **Reduce, reuse, rot, repurpose, return, repair, recycle, renew, refuse, make over, make do.**

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03201 Waste and Cycling of Resources

The case for recycling is strong. The bottom line is clear. Recycling requires a trivial amount of our time. Recycling saves money and reduces pollution. Recycling creates more jobs than landfilling or incineration. And a largely ignored but very important consideration, recycling reduces our need to dump our garbage in someone else's backyard. -- *David Morris of the Institute for Local Self-Reliance*

Here's a fun project for this week.

Keep all your trash and carry it around with you. No, I'm not talking about all those low-life friends of yours. This proposal is for real trash – paper, plastic, stuff that you throw in the garbage.

OK, you can leave out any wet trash so you don't create obnoxious odors. You can put stuff into the recycle bin. But hanging onto all the rest of your personal trash for a week, and carrying it with you wherever you go, teaches an important lesson. If you don't do it, no permaculture police will come knocking at your door. You might not learn a lesson that needs learning at a visceral level however.

Among the various functions stacked on this project, you will create less trash this week. As the week progresses, and you have more trash on hand, you will find ways to create less trash so you have less to carry with you.

POP ASSIGNMENT: List the various functions stacked on this assignment. What beneficial connections does it have to other functions/activities of your life?

Many people are oblivious to the amount of trash we produce. They may do some token recycling, that's about as far as they will go.

We don't want to think about the trash that organizations, institutions, and businesses produce "on our behalf".

As you go out and about, check out the size of the commercial waste containers behind the locations you go, the schools you attend, and the places where you worship.

Take a sniff of the garbage containers of restaurants and you'll learn that they don't compost their organic waste, it just goes into the landfill. Do this in the middle of the summer. Tasty. Talk with the owners or managers of your local restaurant and encourage them to sign up with a compost service or compost their own food waste. Tell them how unappetizing the stench is that wafts from their dumpster.

The basic lesson to learn is –Reduce, reuse, repurpose, rot, return, repair, recycle, renew, refuse, regenerate, make over, make do, do without.

Reduce your use of stuff. Look for items with minimal packaging. Carry your own reusable bags so you don't bring home paper and plastic bags. One of the advantages of the after market at swap meets, flea markets, and thrift stores is minimal packaging. If you don't accumulate junk in the first place, you have less trash in the second place.

Re-use and re-purpose items. Years ago, when I was about 12, I was at my grandparents house, and after lunch, I threw an empty pickle jar into the trash. My grandfather reached down into the

trash can, pulled out the jar, and said, "Bobby Max, we already paid for that jar. Why would you want to throw it away?" Good question indeed. In my immature understanding, I thought the glass jar, now empty of pickles, was useless trash. My grandfather, who lived through the Depression on a farm in southwest Oklahoma, knew better. Now I know that too. In my kitchen, we repurpose jars for many uses. We drink juice, milk, and water from jars that once held, pickles, mayo, and jam. Jars on shelves hold pasta, rice, flax seed, spices, and other miscellaneous cooking ingredients. In the utility room, small jars – with lids! – hold screws and nails, thus keeping them from getting jumbled around.

Rot! Compost all compostables! Because a rind is a terrible thing to waste.

Return! If you buy, look for products that can be returned for recycling or reprocessing when their useful life is over, or that can be refilled.

Repair. Don't buy something if it can't be repaired. If you decide to not buy something, it can be helpful if you contact the manufacturer and explain why.

Recycle. If you can't use it, recycle it. Paper, cardboard, glass, metals, and plastic are recyclable. You need a materials cycling center to sort and store such items pending their pickup or delivery. In some areas, non-profit organizations collect such items with the proceeds benefitting their causes.

Refuse. Some things should just be refused. Straws. Styrofoam. Plastic bags. Etc.

Regenerate! Remember the laws of thermodynamics! Every time we do something, a little of the usefulness disappears forever to us. So we not only need to be energy conservative and to use less stuff, we need to learn how to regenerate systems so that we have what we need, without destroying the planet, going into the future.

Make over. Use materials you no longer need to make items you do need. Make Christmas cards from junk mail and magazines. Make crafts from cans and bottles. Make dish rags and cloths from old clothes and make quilts from scraps of fabric.

Make do. Or as all of my grandparents and great aunts and uncles used to say, "Do what you can, with what you have, where you are", sometimes said as "what-cha do with what-cha got."

Do without. Practice voluntary temperance in your use of material goods. Just because you can afford something, does not mean that you should buy it, have it, use it, keep it, and then waste it.

The problem with trash is that almost everywhere, the system subsidizes trash at every step of its journey, from pick up at your curb to burial in a landfill or burning it in an incinerator. Because disposal is artificially cheap – and many of the costs are shifted elsewhere, "externalized" as the economists say -- there are no financial incentives built into the system to discourage making more trash. So we and everyone else continue merrily on our way, destroying useful resources and burying them in landfills.

Strategies to address this problem can include –

-- Mandatory return fees for "disposable" bottles and cans.

-- Mandatory curbside recycling (including sorting of recyclables by class),

-- Municipal composting including mandatory composting of restaurant and household organic wastes.

-- Mandatory fees on the amount of packaging, based on its cyclability and volume.

-- Market pricing for garbage removal and disposal.

Personal actions include –

-- Shopping the after-market,

-- Always using reusable bags when shopping.

-- Spending your money (“voting with your dollars”) at businesses that do a good job of recycling. Not spending your money at businesses that don't recycle or compost.

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03211 Design a materials' cycling process for your household.

Listen up, you couch potatoes: each recycled beer can saves enough electricity to run a television for three hours. -- *Denis Hayes*

Observe.

Carefully watch the use of resources in your household systems: –

-- Where does your stuff come from?

-- What you do with it?

-- Where does it go when you finish with it?

-- How much trash do you dispose of each week?

-- What materials do you cycle (recycle bin, compost, repurpose, make-over, etc.)? In what quantities?

How can you cycle those resources in your life and community to meet the needs of your life and its many different elements and the life of your community in all of its complexities.

You need to know what quantities of materials and resources your life requires. Where do these items come from and what happens after you are finished with them? Does someone use them again? If not, what happens to them? What connections are present with other aspects of your life?

How much trash is produced on your behalf by organizations you belong to and businesses you patronize?

Who does this work of materials cycling? One person by himself or herself? The whole household? Rotating jobs?

Save your receipts and look at them. Examine your trash. How many cubic feet of trash do you dispose of every week?

Study and Evaluate.

What energy and resource sinks swallow the resources from your household food systems? How do they operate? This may be a complicated question and accurate answers may be elusive. Persistence is worth it, however, because knowing how something works can give us clues as to how we can modify/redirect the process to produce less waste.

What plans, processes, equipment, or whatever would make it easier for you and your household to recycle materials?

What efficiencies can be gained by better design? How can you reduce the conversion of useful items into trash? Reduction in demand is always the first step in cycling of your resources.

Can you account for everything – "all the stuff incoming" and "all the trash outgoing"? If not, how close can you get?

Design.

Make your design decisions based on your observation, study, and evaluation.

What systems or structures do you need to put in place to cycle the resources in your life? Do you need a set of bins for the various kinds of recyclable items? What do these bins look like? Where do the bins go? How big are they? They need to be as big as necessary to hold what you accumulate between pick-ups/emptying's of the cycling containers.

Where? When? What? How? How much?

What can you do to influence the organizations and businesses in your life to increase their cycling of material resources?

Stage your decisions.

What comes first? Middle? Last? Never mind the fact that this is a small design, put first things first and second things second and third things third, so you get a feeling of what it is like to organize a set of tasks such as this.

Budget.

If any of this will cost money, get some estimates and develop a budget. Decide on a source of funds.

Write the report.

Write the report and add it to your lifestyle plan.

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03221 Energy in an Emergency

By failing to prepare, you are preparing to fail. – *Benjamin Franklin*

Information to use when there is no electricity or natural gas due to a utility shut-off or natural or man-made disaster.

Got juice?

The essentials of an emergency power system are:

-- a source of power (car alternator, portable generator, wind or solar power),

-- batteries – small rechargeable batteries, auto, and marine batteries. For emergency purposes, the best choice is a marine or golf cart battery. In an emergency, an automobile battery will work.

-- a battery charger

-- an inverter (to change the battery's 12 volt DC power into AC power),

-- a way to distribute the power – good quality extension cords.

Small inverters are cheap and will run a couple of lamps or a radio, or even a small TV or freezer (look at electronics or auto parts stores, or catalogs), up to whatever their rated capacity is. For example –

> A 350 watt inverter could run three 100 watt lights – 3 x 100 watts = 300 watts, which is 50 watts less than the capacity of the inverter. It would not be able to run four 100 watt lights, since 4 times 100 watts equals 400 watts, which is 50 watts more than the inverter can handle.

Most inverters have a surge capacity, usually about twice their run capacity. A 750 watt inverter may have a 1500 surge capability. This means that for a short period of time, the inverter can handle the higher 1500 surge capability. This allows the inverter to power something like a freezer. While that appliance runs on less than 750 watts, it will need a surge of maybe 1200 watts for a brief moment to start the freezer motor.

Small inverters can be plugged into the cigarette lighter of a car. You use a good quality extension cord to connect the inverter with the house.

When the battery gets low, the inverter automatically shuts off and the car can be started to recharge the battery.

Inverters may come with clamps so that they can attach directly to a battery.

If you bring a marine or auto battery into the house, place the battery away from any open flames and in a well-ventilated area. As a battery discharges (by powering lights or whatever), it produces a minute amount of hydrogen gas. So that's why they say "put in a well ventilated place away from open flames."

> In other words, do not place your battery and inverter in an enclosed utility room with a natural gas or propane water heater that has a pilot light! Even if there is an open window! Don't put the battery and inverter into the living room, in the middle of the family, plug in the inverter and start watching a movie.

Put the battery elsewhere, in a *well-ventilated space with no open flames* and run an extension cord into the living room to watch your movie.

You could use a generator to run lights, a TV, computer, freezer, etc.

Or you could use a generator to charge batteries, which you would then use with an inverter to run your stuff.

Generators are noisy. If you can rig a connector, an ordinary motorcycle muffler will muffle the noise of a portable generator. Here's an article about that conversion with pictures. http://joelsgarage.blogspot.com/2006/03/quiet-generator-muffler.html .

Generator exhaust, like the exhaust of an automobile, is poisonous with carbon monoxide. Don't run a generator indoors. Place the generator outside, preferably on a porch or under an overhang or shed that protects them from the weather.

Generators gulp fuel like it was cheap. Don't think you can run a generator 24/7 in an emergency. You will have to ration your generator usage to meet your fuel availability.

Small solar panels can provide enough sunlight for a couple of hours of lights each sunny day, as long as it is sunny. A value-priced alternative for lighting is to stock the solar yard lights that are sold at dollar stores and lawncare departments. Repurpose them for emergency lights.

Any DC light can be run directly from a battery. You could remove brake or backup lights from a car for this purpose.

Flashlights and battery powered lanterns are useful. Get an inexpensive solar small battery charger and some rechargeable batteries ($2 - $6 each, depending on the size).

A step down voltage converter (plugs into the cigarette lighter) can be used to run small "C" or "D" powered radios or CD players from a car battery.

For all emergency power applications, an inexpensive volt meter will be useful.

Candles are a good idea although most candles are actually made of paraffin, which is a hydrocarbon product and they pollute the interior air. A better idea is to buy soy candles. Don't leave any candles burning unattended or while you sleep. Put candles or battery-powered lights in front of mirrors and you get more light.

How to Keep Warm in the Winter if the Natural Gas or Electricity Grids Go Down

Bundle up your body! Wear several loose layers of clothes. Don't forget a hat, even when you are indoors! If you must go outside, beware of wind and wet. Keep dry. Wet clothing loses its ability to insulate, and can suck heat right out of you. Stay out of the wind as much as possible. Protect your head, hands, and feet. Clean clothes keep you warm better than dirty clothes.

Don't try to heat the entire house. Gather everybody into one or two rooms and don't forget pets. The kitchen and an adjacent room are a good choice. Close doors and hang blankets over doorways. Use plastic sheets, blankets, quilts, aluminum foil & newspapers over windows. Look for leaks and drafts and use cloth, newspapers, caulk, or weatherstripping to close them. (However, don't seal the room so tight that no fresh air can get in. Even if it is cold, you need fresh air to stay alive.) Insulate floors with blankets, newspapers, and rugs.

Get Neighbors together in one house or apartment. Each human body radiates about 100 watts of heat. We're all familiar with the way a crowded room gets warm, so put that to work for you to stay warm during a winter emergency.

Safety first!

-- Open flame heaters, such as kerosene or propane, require ventilation and attention to safety details. Store fuels like propane and kerosene safely outside of the house or apartment.

-- Place the propane or kerosene heater in front of the ventilation opening (such as a window open 1/4 inch). If you place it away from the ventilation opening, the fumes will first fill the room before they exit from the window. Carbon monoxide and smoke detectors save lives!

-- Never use charcoal briquettes or Coleman fuel camp stoves inside a house or garage for cooking or keeping warm. People die every year from carbon monoxide poisoning when they fire up charcoal briquettes inside the house to keep warm. There are no exceptions to this rule.

-- Never run an electrical generator inside a house or a garage. Always put it outside. Make sure it stays dry and let it cool down before refueling it. There are no exceptions to this rule either.

-- Carbon monoxide poisoning is always a risk with open-flame heating indoors. If the room seems "stuffy" and you begin to feel headachy and lethargic and/or your vision gets blurry – get everyone out of the room and ventilate it with fresh air immediately. Pregnant women, children, and unborn babies are particularly at risk of carbon monoxide poisoning.

-- Beware of fire! Place a fire extinguisher where it can be quickly used. If you don't have a fire extinguisher, get a couple of large boxes of baking soda and a bucket of sand. Don't leave candles or open flame heaters burning unattended or while you sleep. Make sure candles are in secure holders that can't be knocked over. Keep them away from small children.

Don't keep a gas cook stove burning 24 hours a day for heat. They aren't designed for that. Turn the burners on to warm things up for a couple of hours and then turn them off. Wait a while before you turn them back on. Turn the oven on, at a moderate temperature, for 3 or 4 hours & then turn it off for a while. Don't leave the oven door open to heat a room. That burns out the thermostat and then the stove won't light. You don't get any more heat with the oven door open than you do with the oven door closed. While the oven is on, make something good to eat to help you stay warm.

Refrigerator and freezer issues

If the temperature outside is below 40 degrees, take the food from your refrigerator and freezer and put it in an ice chest or other box with a tight lid. Put it outside in a covered place, such as a porch or shed. During the day, keep it in the shade. If it is below freezing most of the day, the frozen food will stay solidly frozen too. However, if frozen food thaws, cook and eat it, or cook it before you re-freeze it. Do not simply re-freeze frozen foods that have thawed; cook them first.

Emergency lighting can be candles, flashlights, and lanterns. To increase the illumination, put lights in front of a mirror. DO NOT go to sleep with candles or lanterns burning. The flame of one candle can generate enough heat to keep a person from freezing to death. Make sure there is nothing burnable close to the candles.

When the power goes out, turn off all lights except one and unplug electrical appliances. Turn off the heating system. When the power comes back on, there may be power surges that can damage equipment. Leave one light on so you know when the power comes back.

The sun is your friend! Open the curtains when the sun shines directly through the windows. If the windows are dirty, clean them – more light will pass through them and thus you will have more heat from the sun. Cut pieces of cardboard so they are the same sizes as your south facing windows. Cover the cardboard with aluminum foil. Place them outside the south windows straight out horizontally from the window ledge so that the light which hits the ground in front of the window reflects into the window. As the sun moves in the sky, and light no longer shines directly through a window, cover it with curtains and extra blankets/auto sun shades.

“Store” daytime sunlight for nighttime heat by placing bottles of water (or buckets with tight fitting lids) in direct sunlight coming through your windows. This warms the water. When the sun stops shining on the bottles or buckets, their stored heat will be slowly released. Paint the bottles or buckets black to store more heat. This is free hot water for bathing or washing dishes!

To keep warm at night, bundle up. Use extra blankets. Sleep more than one person in each bed. Wear a cap to bed. Make a “tent” of blankets or sheets over the bed (like the old fashioned “canopy beds”). Or you can make a tent in the middle of a room, and gather the family inside. DO NOT use open flame heating inside a tent.

The best place for babies is on their mother's bodies, in their arms or using one of the ways of carrying a baby and still having your hands free. Check on your elderly and vulnerable neighbors to make sure they are OK.

Food and drink can keep your body warm! Drink a lot of water, and eat frequent meals with lots of carbohydrates. Soups, casseroles, bread, biscuits and gravy are comfort foods for stressful conditions that give you extra fuel to stay warm. Besides natural gas stoves (which may work when the power is out, depending on their ignition system), you can cook inside with propane camp stoves, a wood burning stove or fireplace. You can warm food over candles or cans of Sterno or chafing dish fuel. You can cook outside on a gas grill.

Don’t pour any heat down the drain in the form of hot water! Let hot water cool to room temperature before draining, and you get more heat and humidity in the house. If the air is really dry, put a pot or kettle of water on the stove and keep it at a low simmer.

Newspapers are great for emergency insulation. Just ask anyone who’s been homeless. They can be wrapped around legs, arms, torso, taped over windows, laid on the floor, or layered between blankets. More layers = more insulation. Auto sun shades can be hung over the inside of windows to reflect heat back into the room.

Beware of the tendency to resort to bad habits when under stress.

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03231 Clothing and Laundry

We estimate that 8% of households line-dry their laundry during 5 months of the year. If all Americans who currently do not use a clothesline started to use one for ten months of the year, we could avoid 12 million metric tons of carbon dioxide from
entering the atmosphere, annually.
Project Laundry List

I discuss clothing in the Energy section for the same reasons as Stuff. All clothing embodies energy in its manufacture and distribution.

The garment industry is not known as the epitome of justice in the workplace. Sweatshops are ubiquitous both in the United States and abroad.

That problem at least is well known.

Most people don't know, however, that the price of wrinkle-free clothing includes generous portions of formaldehyde.

Sure, the manufacturers say this is safe. Everybody in business and industry claims that all the chemicals and additives and etc. are safe. What's really going on, however, is a long-term experiment on the effects of exposing human beings to large doses of concentrated toxic substances. One has to wonder if the on-going surge in cancer, which is at epidemic stages everywhere, has something to do with the stew of chemicals we swim in every moment of every day.

Charities receive so many donated items of clothing that they bale it and sell it by the pound for export to third world countries. So much clothing goes to the third world that our exports have destroyed most indigenous clothing manufacturing. It is somewhat ironic that people in third world countries work for cheap wages to sew clothing for the markets of the developed world and the only way they can afford the clothing they make is when it comes back to them as used garments shipped from overseas. A t-shirt first goes to the United States. Someone buys it, wears it, and eventually donates it to charity. The charities sell it to corporations who ship most of those donations to the third world. It's a well traveled t-shirt by the time it gets to Africa.

Approximately 23.8 billion pounds of clothing and textiles end up in U.S. landfills each year.

Buying new clothing drives this process.

Permaculture design shows the way to a better way of living.

First, we would empower the people in low income countries, who presently work to sew clothing for high income countries, to take control of their own circumstances. If they want to work as factory workers, they should do so as the owners of the factory, such as the worker-owners of the Mondragon enterprises of Spain discussed in the chapter on Cooperatives.

Next, we would help people in the high money income countries understand that clothes do not make the man or the woman. The idea that "clothes make the man" or "clothes make the woman" is cheap advertising propaganda that has been repeated so often that we believe as though it was revealed by God. So, as with all things related to energy, we want to use less energy and in this context, that means "buy fewer garments."

Third, we want to empower local people to produce for their local markets, everywhere. I would rather own fewer shirts, but have them well made in my own city, than to have more shirts, cheaply made, by anonymous workers elsewhere.

Several years ago, I paid a local person to make me some shirts. I bought the fabric, gave it to her, and paid her a fee per shirt.

Those shirts looked better for longer than any shirt I have ever bought commercially. Sure, they weren't as cheap as off-the-rack-big-box-store shirts. But I didn't have to buy them every year like I do with the big box store shirts, which rarely are wearable past a year.

We begin this important transition by stepping away from buying new clothes. Shop the aftermarket for clothing. It's the trendy thing to do among many young people already.

If you do buy new clothing, look for the union label or a fair-trade/anti-sweatshop brand mark. Don't subsidize exploitation.

The Dangers of Dry Cleaning.

85% of the dry cleaners in the United States use perchloroethylene as a solvent for dry cleaning. Prolonged perc exposure has been linked to cancer as well as liver and kidney problems. The most common method of bodily contamination is inhalation. This is an issue, not just for people who work in dry cleaners, but for people who bring their clothes home from the dry cleaner. If you've ever whiffed a faint chemical odor on your dry cleaned clothes, that's you inhaling perchloroethylene. Nursing mothers exposed to perc may pass it on through their milk to their babies. Perc is a hazard at every step of its product cycle – production, use, disposal.

There are non-toxic alternatives.

The first and best is to minimize your use of dry-clean-only garments.

The next-easiest alternative is to hand wash your "dry clean only" items and either iron them yourself or take them somewhere to be pressed. Don't wash them in a washer, gently hand wash them in a basin. Find more information about washing wool, rayon, and silk at http://www.care2.com/greenliving/wet-clean-wool-silk-and-rayon.html.

If you're not the do-it-yourself type, look for a cleaner that offers "professional wet cleaning" or "CO2 cleaning." These are both non-toxic methods of cleaning "dry clean only" clothing.

Laundry Day

The general energy-saving method of laundry is to use cold water to wash. Don't do small loads. Only wash a full load. If you have less than that, do it by hand.

Instead of using the dryer, air dry your clothes outside on a line. Get some racks to use for indoor clothes drying when its raining or too cold outside, or put clothing on hangers to dry.

If you go to a laundromat, there might be a sign that says "Free Drying." Don't believe it. The prices to wash at such laundromats are always higher than they are at the laundromats where customers pay for drying. At a commercial laundromat, the customer pays to wash and the customer pays to dry. That may be one transaction instead of two, but there is no such thing as a free dryer in a laundromat.

A better choice is to wash the clothes at the laundry and bring them home and hang them on the line to dry.

Cotton production accounts for 2.4% of total arable land yet accounts for 11% of global pesticide use and 25% of global insecticide use. You can reduce the full life cycle climate change impact of your jeans by up to 50 percent by line drying and washing them in cold water.

In many areas, artisan producers make and distribute laundry detergents that are gentler on the planet. If something like this is not available in your area, go the extra mile to buy an environmentally-safe laundry detergent. Beware of the fake fragrances often packaged with laundry detergent.

For information on line drying laundry on campus, see –

http://www.laundrylist.org/pdf/Hanging%20It%20Out%20On%20Campus%20-%20A%20Guide.pdf

Ten reasons to line dry your clothes.

From Project Laundry List – http://www.laundrylist.org/en/line-drying

10. Save money: You can save more than $25/month off the monthly electric bill for many households.

9. Clothes last longer: Where do you think lint comes from?

8. Pleasant Scent: Clothes and linens smell better without adding possibly toxic chemicals to your body and the environment. Yankee Candle thinks so, too...

7. Saves Energy, Preserves Environment, Reduces Pollution: Conserve energy and the environment, while reducing climate change. Learn how!

6. Healthy Work: It is moderate physical activity which you can do in or outside. You can even lose weight!

5. Get the Sunshine Treatment: Sunlight bleaches and disinfects.

4. Replace another appliance: Indoor racks can humidify in dry winter weather.

3. Avoid a Fire: Clothes dryer and washing machine fires account for about 17,700 structure fires, 15 deaths, and 360 injuries annually. The yearly national fire loss for clothes dryer fires in structures is estimated at $194 million.

2. It is fun! And can be an outdoor experience that is meditative and community-building. It may help you avoid depression.

1. It is truly patriotic! Demonstrates that small steps can make a difference. You don't have to wait for the government to take action!

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03241 Energy Inventory

In the "developed" countries, at least, the large problems occur because all of us live in ways that are either partly wrong or almost entirely wrong. It was not just the greed of corporate shareholders and the hubris of corporate executives that put the fate of Prince William Sound into one ship; it was also our demand that energy be cheap and plentiful. -- *Wendell Berry*

The goal of your Energy Inventory is to track your household's energy consumption so you know how much fossil fuel and other energies it takes for you and your household to live. If you can extend this observation backwards, for example with utility company records, this will be help your understanding of your situation.

I keep a spreadsheet with monthly records going back to 2004, with a few months from 2003 for my primary house utilities of natural gas and electricity. I started keeping my records from my utility bills in late 2005, and got the earlier years' information from the website of my electrical utility. We don't have natural gas service now, but we did before late 2005, and I have two years records of our household's natural gas consumption, which I got from the Oklahoma Natural Gas website.

I have recently started to keep track of the monthly actual usages and average daily use of the primary resources I consume – electricity, water, propane, gasoline, firewood, garbage.

If you live in a college dormitory, or some other kind of group living, get figures for the energy used in your entire building so you can figure out your per capita share. The good news is that because of the density of the housing, dormitory living is energy conservative on a per capita basis.

After setting up the spreadsheet, this activity takes about five minutes/month. I have separate areas in the spreadsheet for each type of household energy – in our case, electricity (hot water, cooking, ventilation, AC, lighting, communications, entertainment, backup heating), propane (for cooking), and wood (backup heating). I don't report solar energy, because the sun, our primary heat source, is unmetered and free.

In the spreadsheet, if you have a personal automobile, you need two sections – one for household operating energy, and one for transportation. In the household operating energy section, you need columns as follows:

Date – most people pay energy bills on a monthly basis, so organize my records on that calendar basis.

Types of energy and amounts used – this will be kWh of electricity, cords or ricks of wood (a rick is 1/3 of a cord), gallons of propane, and dekatherms or cubic feet of natural gas, whatever the fuel is and its typical measurement.

Total Price – include the taxes and fees.

Price per unit, which is the total price divided by the units used.

Heating and Cooling degree days. You'll have to go to a weather service climate observation site for your geographical area to find this information. It is useful to have so you can study how the weather impacts your energy consumption. For example, you could convert the energy required to run your house or apartment (heating, cooling,

cooking, hot water, entertainment, communications, etc.) to BTUs and divide that number by the heating or cooling degree days for that month. If it's a spring or fall month, you might have heating AND cooling degree days in the month, in which case, add them together. This gives you the BTUs you use per degree day. So if your bills are much higher this July than last July, you can figure out if the problem is that the people in your household are burning more energy, or if it was simply a lot hotter this year than last.

Comparison columns. I compare current use to each previous year's usage, in a column. So I have two columns for 2010 over 2009, 2009 over 2008, 2008 over 2007, etc. One column shows the change in units used (kWhs etc.), the second shows the percentage change. I put formulas in these columns so they are automatically calculated when I enter new data.

Because the number of people in my household has varied over the years, I calculate the amount of fuel used "per person."

The second section of your energy inventory is for transportation.

At its simplest, this can be a record of the date, amount bought, price per unit, and total price of the transportation fuels you use in your vehicle. If you have more than one vehicle, you need to track each vehicle and then total your figures.

You could keep track of your mileage based on purpose (school, work, fun, shopping, etc.) This is a minute amount of additional work that can be useful in your ongoing observation of your life.

This observation develops the base line of your energy usage. Once you know where you are, you can start developing design ideas to reduce your total energy consumption.

Besides raw energy, you need to get a handle on how much stuff you go through. One useful statistic is the amount of garbage you produce. Measure the volume of your garbage. If you have a municipal garbage container or containers that you put out for pickup, this will be a matter of determining the volume of the container(s) and how many containers you put out each week. My Oklahoma City garbage cart has its volume stamped on the side – 90 gallons.

The documents on materials and cycling have a number of questions about stuff, waste, and resource cycling that should be answered as part of your observations.

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03251 Additional Energy Resources

I believe that the average guy in the street will give up a great deal, if he really understands the cost of not giving it up.
In fact, we may find that, while we're drastically cutting our energy consumption,
we're actually raising our standard of living. -- *David R. Brower*

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03261 Design Challenge: Your Personal Energy Plan

There is no energy crisis, only a crisis of ignorance. -- *R. Buckminster Fuller*

In permaculture, we learn design by actually doing design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has some small projects that you can work that will help you to develop design skills. Never forget that none of these challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

Your Personal Energy Plan is an important component of the permaculture design for your life.

As you work your way through your energy inventory, you will learn how about the kinds and amounts of energy you use for your present lifestyle.

Your challenge is to determine how to do things differently in your life so that you use less fossil fuel energy and how you can replace all or part of the remaining requirements you have for energy with renewable sources. Don't let the perfect become the enemy of the good. Do what you can, with what you have, where you are.

Many people, when they start to think about energy conservation, want to run out and spend a bunch of money for solar PV panels. Or if they don't have much money, they dream of being able to buy solar PV. We do this because we are all conditioned against admitting that we have an energy problem. We want an Energy Fairy to fly in and save us from the consequences of our energy follies.

This is a staging mistake. Solar PV is a fine goal but it isn't the first goal.

There Ain't No Such Thing As The Energy Fairy – TANSTATEF.

Renewable energy tools, like solar PV, are fine and necessary items in our designs but we have to understand up front that their net energy is much less than fossil fuels. So we must first learn how to live with less energy. Then we can learn how to live with renewable energy systems.

Your energy plan is a design for how you will deal with this issue for the rest of your life. The energy situation will not get better during your lifetime and the lives of your children and grand children. It will get steadily worse for all of your life. To go into this without a personal energy plan invites disaster.

Take this one step at a time.

One sure road to failure is to try to do too much, too fast. So stage your response. First things first. Then come the second things. Etc.

Focus on your own personal demand destruction.

As you proceed through your design process – you constantly ask –

Can I do this with no fossil fuel energy?

If the answer to that is "No" – how can I do this with less fossil fuel energy?

Design your interdependencies so you can live energy conservative.

You don't live in isolation. You live in community. How can your community help you to live energy conservative?

As you radically reduce your demand, you can begin to look for renewable energy resources.

If your utility offers wind generated electricity, sign up for it, even if it costs more. It's the right thing to do. If you live in a dormitory or other campus housing, get your school to sign up for wind generated electricity. Use solar battery chargers to recharge your small batteries.

Write the plan.

This is a written plan. It has goals and points of accountability, so you know where your destination, the route for your journey, and how to recognize the mileposts and destinations on your energy itinerary.

Section 4: Shelter

All architecture is shelter, all great architecture is the design of space that contains, cuddles, exalts, or stimulates the persons in that space. *Philip Johnson*

It is in the shelter of each other that the people live. *Irish Proverb.*

A house is not a home unless it contains food and fire for the mind as well as the body. – *Benjamin Franklin*

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04011 Urban Shelter Design.
A survey of a big subject. Designing for shelter that is constant, persistent, and resilient. Shelter as if people and the planet mattered.

04021 Co-housing, Cooperatives, and other forms of Collaborative Living.
Different structures for different folks in different situations.

04031 Geography, Renting, Ownership.
Should you buy or should you rent? Assuming you have a choice, of course. And perhaps more importantly --- where?

04041 Dormitory Living.
One of the most resource-frugal structures for urban living. Making it even more so.

04051 Tips for living in small spaces.
A tip jar of strategies, techniques, and tools for abundant living in smaller spaces.

04061 Guidelines for house design.
Redesigning your living space to care for people, care for the planet, and have a care for the future.

04071 The Integral Urban House and the Integral Urban Apartment.
The pioneer of the modern urban sustainability movement. If we had all listened to them back in the 1970s, the world would be a very different, and much better place. Millions of people dead in the resource wars of the 70s, 80s, 90s, and 00s would likely still be alive.

04081 Shelter Design Challenges.
Small design projects to further your understanding of design.

04091 Shelter Inventory.
Questions to ask, situations to observe, data you need.

04101 Additional shelter resources.
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04011 Urban Shelter Design

If I were asked to name the chief benefit of the house, I should say: the house shelters day-dreaming, the house protects the dreamer, the house allows one to dream in peace. – *Gaston Bachelard*

Shelter is one of the **three types of infrastructure** (shelter, supply, safety) that protects us from the six ways to die (heat, cold, hunger, thirst, injury, illness). Section 9 has more information on resilience, the six ways to die, and types and layers of infrastructure.

Shelter is a major consumer of energy and one of the primary sources of the emissions that drive global climate change. The present housing built environment has mostly been designed to be energy inefficient. Reducing the amount of energy embodied in our dwellings and their operations is critical to caring for the planet and caring for people. This demands better design for our urban shelters and their operating systems and the development of standard methods to retrofit existing dwellings to be more energy conservative.

Urban design involves the macro and the micro.

Permaculture takes a holistic view and that is as true of shelter as it is anything else. It is always a mistake to simply focus on the details of the individual shelter space to the exclusion of other aspects of design. While certainly the details of the individual shelter are important, so are the macro aspects involved with that shelter. Invisible structures may dictate where the shelter may be, what materials can be used in its construction, who can build the house, its minimum size, the minimum size of the lot, and many other details.

We need at least as much design work for coping with – or changing! – the invisible structures impacting upon a structure as we do the shelter itself.

The problem of new construction.

When we think of housing design, the first thing people want to do is go somewhere and build a brand new house. It will be, of course, perfectly designed as a "green" building, with all of the bells and whistles pertaining thereto.

But we have to ask if any new construction can be considered green, even if environmentally aware architects design it to high standards, due to the embodied energy cost of the materials. That can be mitigated somewhat by using recycled and locally sourced materials, but there remains a lot of "new energy" expenditure in all new construction.

That's why the iPermie focus is on retrofitting existing construction.

There aren't enough resources on the planet for everyone to build a new house that is energy efficient. We have the built environment that we have, for better or worse. It's as much a part of our urban ecologies as the plants, the soil, and the flora and fauna. Permaculture design can help us evolve this built environment in a way that cares for people, cares for the planet, and has a care for the future.

In urban areas, the built environment includes –

-- Individual family houses,

-- Multiple unit housing, which ranges from duplexes all the way up to high rise apartment buildings and complexes with hundreds of units,

-- Commercial buildings (distribution points for products and services)

-- Industrial buildings (places where things are made or rebuilt)

-- Public purpose buildings (government offices, schools, religious buildings, etc.)

-- Abandoned and vacant properties

Housing consistent with permaculture ethics.

A primary urban design evolution for housing that cares for the planet, cares for people, and cares for the future is that we need to live in smaller spaces in more densely populated neighborhoods.

Big living spaces require big energy expenditures, both for initial construction and for operations. There is no such thing as a "green" house of 5,000 square feet inhabited by two people, even if the designer outfitted it with a grey water system, hot water heating, extra insulation, passive solar, and PV cells to generate electricity.

The standard design for human settlement these days mandates the use of personal automobiles. That is a prescription for ecological disaster. To resolve this problem, we need more densely populated neighborhoods in our urban spaces.

When we design situations so that it is easier for people to make good environmental choices, we design to make it harder for people to make bad environmental choices.

People in NYC live amazingly green lifestyles because their built environment and its systems make it easier for them to live their lives closer together, in smaller spaces, with little or no use of a personal automobile.

Urban Design is Personal

Human behavior is a critical aspect of urban ecologies.

-- What we do,
-- Where we do it,
-- How we do it,
-- How often we do it,

– fundamentally impacts the ecologies, including the built environment and the infrastructure of our urban areas.

We can do a **lot by changing personal behavior.**

We can do **more with better design of systems and invisible structures.**

The Personal and the Communal

Our communal behaviors are the sum of our personal behaviors, "only more so" -- due to the synergistic (good) – or dysergistic (bad) – impacts of our collection actions.

As we consider ways to improve the ecological conditions in cities, particular attention must be given to our politics. Local governments can have enormous impacts, for good or for ill, on the ecologies of the areas that they govern. Local government functions that relate to sustainability and permaculture include –

-- Waste disposal and recycling,
-- Public transit,
-- Roads,
-- Zoning,
-- Property maintenance codes,
-- Building codes
-- Parks and recreational facilities
-- Water
-- Education

These communal invisible structures constitute a second layer of design in our pursuit of a system that makes it easier to live good and harder to live bad.

Designing to make it easier to live good.

The built environment can make ecological behaviors easier or harder. You need a place to live that meets your needs

and helps you to live lighter upon the land and make good ecological choices for your lifestyle.

So we start by **designing smaller living spaces.**

Apartment buildings, of whatever size, house a larger number of people in a smaller space than do single family homes. This has some interesting environmental impacts.

New York City, which has 2.7% of the nation's population, emits only 1% of our national US greenhouse gas emissions.

The average greenhouse gas emissions per person in New York City amount to 7.1 metric tons/year. The US national average is 24.5 metric tons/person.

Gasoline consumption in New York City is at the 1920s national average level.

The average New Yorker consumes only 1/4 the electricity during the year that the average resident of Dallas, Texas does.

75% of the households on Manhattan Island do not own a car. Nationally, only 8% of households don't own a car.

The dense population of New York City, coupled with its advanced network of public transit systems, combine to make it **the most energy efficient city in the United States.**

This isn't to say that there aren't ecological issues in New York City, because there are. It does show that the common assumption – "an ecological lifestyle is easier in a rural area than in a city" – is not necessarily true.

A family in a rural area might live several miles from a small town, and even further from a larger town. That burns a *lot of gas* for shopping, school, after-school activities, social activities, medical care, and etc.

It takes a major amounts of wire to provide electricity across miles of rural territory.

Rural houses often have individual wells and septic systems. If they do have a rural water system, one family may require miles of pipe whereas in a city, a mile of pipe might serve hundreds or thousands of families.

Those same people, living in a city, would occupy a fraction of the rural foot print. They would need less road, not so much pipe and wire, less driving, more walking, etc.

I'm not saying "rural is bad, urban is good." Instead, I suggest that the situation of sustainable living is more complex than many seem to think it is. You may find it easier to live more sustainably in the city than you do in a rural area. If people want to move to rural areas from a city, they can follow their dreams. But people should not feel that they have to move to a rural area to live more sustainably.

Designing for Resilience, Persistence, and Constancy.

Long-lasting ecosystems are --

Constant. They maintain themselves.

Persistent. They resist damage and destruction.

Resilient. They repair themselves following disturbances.

The resilience, persistence, and constancy of ecologies derive from the complexity, redundancy, and diversity of its systems and the beneficial connections that unite them. In an ecosystem without human habitations, this "wisdom" encodes into the biomass. In an ecosystem populated by humans, we find some of this wisdom in the actions and behaviors of the people and the dense networks of invisible structures incorporated into urban settlements of whatever scale.

Besides wisdom, humans may bring stupidity and evil to an ecosystem. This is always a problem.

Diversity in scale is a critical aspect of ecosystem resilience, with or without

human beings. This manifests in two ways:

-- form – (size, substance, pattern), and

-- time – (rate and schedule).

If a tornado hits a neighborhood, it destroys human scale structures. The grass, the bacteria, and the little critters survive. Branches may be broken off of trees, while the trees may remain.

If an international financial crisis hits, large corporations may be severely hurt. A healthy economy will have a diversity of enterprises, of different sizes, so that the impacts of international crises will be felt at different levels in different ways.

A national government may become dysfunctional to the point of collapse, while local civil society organizations remains effective and picks up the pieces. **Diversity in scale** is as important among invisible structures and human communities as it is in a mature forest.

In a forest, plants leaf out and bloom on different schedules. Plants and animals propagate at different rates. Everyone does not eat the same thing at the same time.

In a city, everyone does not go to work at the same time or for the same amounts of time. Industries, commercial enterprises, and public purpose institutions all have schedules and frequencies that are not identical with others. Fortunately! In urban areas, uniformity of schedules can be a problem (rush hour congestion) or it can be an asset (large number of people wanting to move at closely scheduled times facilitate public transit instead of private cars).

When it comes to urban shelter, we always want to design for diversity, constancy, persistence, and resilience. This calls for careful attention to both the details of the structure and the systems and situation in which the shelter will be embedded. The more we design our cities in accordance with natural ecologies, the more diverse, constant, persistent, and resilient they will be.

Multi-unit housing is a good ecological choice.

No one should be afraid of multi-family housing as a prudent ecological shelter choice in urban areas. Living in a situation with limited on-site food production capacities simply points to the importance of developing the invisible structures of local food systems and promoting the use of foods derived from your city's foodshed.

Everybody **does not have to grow all of their own food** to have a sustainable future. Sustainability **does not mean the division of labor goes away** or that specialization will end.

Designing for affordability.

One of the critical issues in urban areas is **affordability of housing**. We presently operate in an economy of scarcity where the price of housing is artificially inflated. This is a faux economy whose scarcities are contrived by political and economic design. Special interests regularly corrupt the government in order to increase the price of housing by various political shenanigans.

Government zoning and building codes mandate buildings to accommodate the middle class and wealthy.

In most areas the housing needs of the poor and the working classes are routinely ignored by municipal government authorities responsible for building codes and zoning.

Minimum lot sizes, minimum apartment sizes, and eminent domain combine to reduce the amount of affordable housing and thus drive up the cost.

Governments regularly destroy housing. Eminent domain used for the purpose of redevelopment (in particular) is a constant war on the housing and neighborhoods of the poor. This drives up the cost of low income housing way above where the actual market rents would be set if

eminent domain was not being used to destroy so many low income housing units.

So-called “urban renewal” programs, which use eminent domain to take the properties of the poor and destroy their neighborhoods, are class warfare at its worst. They are due process pogroms directed against those who have no political power.

Urban renewal and eminent domain are acts of political terror wielded by those who covet the neighborhoods of the poor for their own economic benefit. The urban renewal eminent domain scam steals the property of the poor by paying cheap, non-market, politicized prices for it.

We need to abandon the economics of scarcity and design for abundance and affordability because that's how we evolve our cities to care for people, care for the planet, and have a care for the future. Everyone deserves adequate housing, not just the wealthy and the middle class. We should stop destroying the neighborhoods of lower income people and converting their lands for other purposes. Although everyone involved would deny this if asked, driving up the price of rents by non-market mechanisms is a stacked function on these campaigns of political terror we sanitize as "urban renewal", which is nothing more or less than the destruction of low income neighborhood driven by green and corruption.

Besides stopping the non-market politicized destruction of low income neighborhoods, we need more:

-- Small apartments

-- Boarding houses

-- Single Room Occupancy Hotels

-- Housing Cooperatives

When it comes to getting more of these into our urban ecologies, much of the problem is simply a matter of repealing government rules and regulations that forbid the construction of small apartments, the operation of boarding houses, and that encourage and subsidize SRO hotel gentrification.

We need standard models.

One of the more interesting aspects of the Unplugged vision of the future (see 08141) was the “Pod” -- three models of inexpensive manufactured housing that enabled their residents to live low footprint lifestyles consistent with the permaculture ethics. The story is a bit short on details of the housing. Fortunately, we don't lack for ideas and models in the real world that could help us create sustainable living situations at lower cost than is presently the case.

One of the problems we faced in our extreme-green renovation of our home **was the lack of a standard model to follow.** Instructions would have been helpful. People are always hesitant to be the first to make big changes to the living environment. They might not fret about a $20,000 kitchen makeover, because "everybody is doing it" and there are lots of resources and models to follow. Those same people might turn their backs on a $5,000 energy conservation upgrade because nobody they know is doing it and in any event, the government is promising cheap energy prices "forever, and ever, and ever, and ever, hallelujah!"

Going forward, standard models can help people gain the confidence necessary to make these sometimes extreme changes to their built environment. People hesitate to do much “out of the ordinary” with a house that they own because of concerns as to what it might do to the property values. Like it or not, that’s on people’s minds these days. The development of standard models for renovating older housing to become ecologically beneficial is an important task of urban design.

We need the real world equivalents of the Unplugged Pods, either as a renovation of an existing building or as newly manufactured housing that could be done

in an ecological way and thus avoid the concerns about new construction because it is so consumptive of resources.

The beginning of a standard model.

If someone has a dwelling that they want to take in the extreme green direction, here are some basic options. Note that these are mostly suitable for areas with four seasons – where it is hot in the summer, cold in the winter, and mixed weather during the fall and spring. Persons living in hot tropics can use some of these options, but they will need other strategies suitable for their climate.

-- **Seal the building envelope** as best as can be done with caulk, foam, weather-stripping, etc.

-- **Super-insulate the building envelope** – insulate the walls, floors, and attic to whatever the recommendation is for the attic. If there is a range of R-values given for a particular climate, always take the higher number for more insulation. Follow local climate guidelines regarding vapor barriers.

-- Install insulating window treatments that are at least R-20. If you have curtains, Install cornice boards or valences above windows to stop any window convection effect behind the curtains.

-- Add glazing on the south (in the northern hemisphere) or the north (in the southern hemisphere) **to make a passive solar sunspace.** Using vents near ceilings and near the floors, **create a convective loop** to move heat in the winter from the sunspace through the rest of the house. **Shade the glazing** in the summer.

-- If the dwelling is separate from other buildings, **the walls need overhangs.**

-- In most situations, opt for zone heating and AC. Don't install or use central heating/AC unless you can afford to go the ground-sourced heat pump route. Use individual room heaters and small window AC. If you do have central air, install a heat exchanger on the ventilation intake, insulate the ducts or route them through conditioned spaces and keep them out of non-conditioned spaces like your attic. Depending on your climate (how cool it gets at night during the summer) a whole house fan may help you live without any AC.

-- Paint the roof white or plant the roof with vegetation (planting is the best choice, white paint is the next).

-- Shade the exterior walls with deciduous vegetation and plant edible landscaping.

-- Shape the ground around the building to catch and infiltrate rainwater.

-- Harvest rain from the building's roof for storage and use later or for immediate infiltration into the ground.

-- Install plumbing for easy grey water recovery if possible with your local codes. If not, use basins and such to collect greywater for use on the landscape.

-- If the sunspace does not provide enough heat in the winter, **install solar air heaters and additional thermal mass** to get you through the cloudy days.

-- Install **solar hot water heating.**

-- Create canopy beds for the residents to use during the winter. During the summer, remove the side curtains and top drape.

-- Ceiling fans in every room. Install more than one ceiling fan in large rooms.

-- LED lighting throughout.

-- Minimize accumulation of electric junk. No dishwasher, garbage disposal, or clothes dryer.

-- A space for **outdoor cooking in the summer,** to keep the heat out of the house. If an apartment building, this could be a balcony or breeze-way.

-- Very efficient appliances appropriately sized for the household.

-- Larger buildings **need bio-digester systems that treat sewage waste onsite** and produce fertilizer and methane gas which supplies (or supplements) the building's energy needs.

This is not as technical a "standard" as (for example) the passive house standard, discussed in the chapter on energy conservation for home-owners. It is more or less the practical experience of people we know who have years of experience living lightly on the land. It's not focused on buying expensive systems that people may not be able to afford. In other words. . . there are multiple paths to achieve the goals of this iPermie model. This is the low-tech not-so-expensive method.

Much of this applies as much to apartments as it does to individual houses on plots of land.

Depending on the location of the apartment, there may be some structural insulation. An apartment on an interior floor on the south side of a building, whose front door opens onto an interior hallway, with apartments above, below, and on two sides, has a considerable amount of insulation in its location. There is less movement of heat through the walls because there is less temperature differential between the apartments. More heat moves faster when there is a large temperature differential on either side of the wall. However, extra insulation makes for a quieter apartment and that is a big deal for apartment dwellers. So if you own your apartment, insulation has some stacked functions for you.

Maximize Beneficial Connections

Your housing considerations do not exist in isolation.

What is the size of your household? Will it increase over time?

What is the location of your dwelling relative to the geographies of your life? (work, shopping, education, entertainment, etc.)

Is migration to a different place in your future? How soon?

If your accommodation is temporary or rental, what ecological improvements can you make that are portable and can thus take with you if you move or migrate?

How does your shelter relate to the geography of your food supply?

What sectors impact your housing?

What invisible structures impact your housing?

How does your housing connect with invisible structures?

What energies make your accommodation comfortable and habitable? What are the connections between those off-site energies and your lifestyle and your housing?

Housing Checklist

-- Energy reductions to be gained by passive measures? Insulation, caulking, weatherizing, window treatments, passive solar, passive ventilation strategies etc.

-- Energy reductions to be gained by active measures? Replacing inefficient cooling/heating equipment, fans for cooling and ventilation, air to air heat exchangers, solar hot water heating, automatic thermostats.

-- Energy reductions to be gained by behavior changes? Light discipline, vampire loads, use of hot water, outdoor cooking in the summer.

-- Food production possibilities? Container gardening, small scale aquaponics, sprouting, microgreens, community gardens, CSAs, food coops.

-- Resilience, Persistence, Constancy issues? How well built is the structure? What hazards may impact the dwelling and its residents? Water issues? Reduce water consumption by passive and active measures, including behavior changes.

Invisible structure issues? Do the systems of government regulation support sustainable housing or do they drive unsustainability? What needs to change to make the system better?

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04021 Co-housing, Housing Cooperatives, and other forms of Collaborative Housing

Equity. Equality. Self-help. Democracy. Solidarity. These are the guiding values upon which the modern cooperative movement is founded and the basis for the organization of every cooperative enterprise in the world today. *Cooperative Housing Toolbox, Northcountry Cooperative Foundation.*

Collaborative living is an important feature of urban living. While many people have families of adoption or blood to live with, others do not. Yet, living alone is not for everyone.

Collaborative living works with a variety of structures. Co-housing, Housing Cooperatives, and Casual Roommates are three alternative forms of housing that work for many people.

Co-Housing

The Co-housing Association of the United States http://www.cohousing.org says there are six distinguishing characteristics of co-housing that differentiate it from other forms of collaborative housing:

-- Residents participate in the design process.

-- Design fosters neighborhood identity and activities.

-- Some shared/common facilities. While each family has its own family apartment or house with all the rooms of a regular apartment or house, a co-housing community has community facilities, such as a large kitchen, dining and recreational areas, storage and work areas etc.

-- Residents manage their own communities rather than using outside hired managers.

-- Non-hierarchal structure and decision making process.

-- Not a shared community economy. Co-housing is not a commune, or an intentional community where residents share expenses and pool income. People have their own jobs and businesses and keep their own finances separate from the community and the other members.

Housing Cooperative

With a housing cooperative, the members organize a cooperative, a business structure governed on the basis of one member, one share, one vote. The housing cooperative owns the property. The members receive a title to live there in a specific unit based on their ownership of a share in the cooperative. They are democratically owned and governed by volunteer boards elected by the members.

The form that a housing cooperative may take is as varied as the needs of its members. The coop may not actually own any property, but instead lease it from someone else. An estimated 1.2 million households in the US live in a housing cooperative. Some of the common types of housing cooperatives are:

Market-rate cooperatives. Members can sell their shares for "whatever the market will bear."

Limited equity cooperatives. There is a limit on the resale value of the shares. The purpose of such cooperatives is to make home ownership available to people of limited means. Nonprofit organizations

often start them with government assistance. They want to encourage long term occupancy and to discourage speculation.

Manufactured Housing Cooperatives. Most municipalities discriminate against owners of manufactured housing (a/k/a mobile homes, or trailer houses) by greatly restricting where they can locate. This can put the owners of mobile homes at the mercy of a limited group of landowners. A better way is for the mobile home owners to buy land and operate as a housing cooperative for mobile homes, where each member receives a space for their mobile home.

Student Housing Cooperatives. Many colleges and universities have dormitory-like student housing cooperatives close to their campuses to provide affordable housing to students.

Leasehold Cooperative. This type of business organization acquires property by lease, sometimes with an option to buy, and then operates as any other housing cooperative.

Senior housing cooperatives. An increasing number of housing cooperatives cater to seniors and may offer assisted living services.

Other forms of collaborative housing

Roommates. Two or more people living together and sharing expenses. This is the most casual form of collaborative housing.

A Boarding house is a commercial relationship that offers room and board to people who are not related or involved with a household relationship with the landlord. Boarding houses, once upon a time a common feature of urban life, are hard to find in this era. Given the need for housing and community, opening a boarding house could be a paying proposition in the modern world.

Intentional Communities take collaborative housing a step further and the members pool property, expenses, and incomes. They may have an ideological or religious component to their mission. They include traditional monasteries and convents of world religions as well as ecovillages and other developments motivated by secular ideals.

Single Room Occupancy Hotels. This is not collaborative living per se. It is an important form of urban living that unfortunately is increasingly scarce. It has always been the housing of last resort before homelessness. The decline in the availability of single room occupancy hotel rooms tracks the increase in homelessness in many areas. One or two tenants occupy each SRO hotel room. Often the residents share bathrooms and kitchens, although some SROs have private baths and kitchenettes.

Assisted Living Centers. An assisted living center is an organized collaborative living development for seniors that offers some degree of life assistance. They are not a nursing home. They aren't independent living either.

Nursing Homes provide residential care to people who because of illness or disability cannot live on their own and have no one to care for them, or their illness or disability is so great family and friends cannot care for them at home.

Dormitories are organized living situations located on the campuses of colleges and universities. Many schools require freshmen who do not live in the area with their families to live in school dormitories. Dormitories are often an energy efficient method of housing.

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04031 Geography, Renting, Ownership

Many a family who pays rent all their lives owns their own home; and many a family has successfully saved for a home only to find itself at last with nothing but a house. – *Bruce Barton*

For some of us, one of the early questions about shelter is – "rent or own?"

The second question is – "where?" (See Section 8 for more discussion of geography and its importance in permaculture design.)

Don't buy until you find the sweet spot among the geographic destinations of your life – a place to live well-situated for access to the places of your life -- where you work, shop, worship, entertain, etc. If you buy early, before you have found that spot, it may be harder to move later when something more advantageous comes up. Ignore the propaganda that suggests buying a house is strictly a financial decision. It is much more than that. See section 6 for more details about these issues.

A third question is whether you want to rent or own by yourself or in cooperation with others.

Since home ownership in the modern world requires substantial assets, or credit for a mortgage and income to make payments, ownership may not be an actual option for many people. In this unsustainable world of injustice, our financial circumstances often constrain our choices.

Renting provides mobility. If you don't like your location, you can change it relatively easily and without the major expense and hassle that selling your old home and purchasing another home can be.

The landlord is responsible (generally) for repairs. This can have its good and bad sides, as some landlords are not as prompt in making repairs as they should be.

You are limited as to what improvements you can do to the property. You can't add extra insulation to the attic or walls, because it's not your property and it wouldn't make economic sense to make such a large investment in a place where you will be a temporary resident. The landlord might not permit you to do this even if you wanted to spend the money.

If you don't pay your rent, you can be evicted with short notice. Even if you pay your rent, your landlord may decide to evict you anyway once your rental agreement has expired, because of a decision to do something else with the property, although in such cases your rental agreement will give you some protections.

If you buy a home with a mortgage and don't make your house payment, your property can be foreclosed. That takes a longer time than a rental eviction. It is just as inevitable.

In most states your home can't be taken to pay for any debt other than taxes or a mortgage guaranteed by the property. That provides a tremendous amount of security in view of the economic irrationality that is so popular these days. Well, it's yours as long as someone more powerful than you doesn't decide he wants your neighborhood for an economic development scheme. In that case, you may find yourself being forced to sell your property at a cheap below market price.

When you own your dwelling you are responsible for repairs. If the furnace goes out, you don't have a landlord to call.

Other expenses include property taxes and insurance. Property taxes vary greatly from area to area, depending on the decisions that have been made about the way that government services will be financed.

As you will see as you work your way through this design process, permaculture design is as applicable to your situation as a renter as it is to your situation as a home owner. It works in the suburbs, rural areas, and in dense cities with high rise apartment buildings.

Your approach toward shelter will evolve over the years. When you are younger, you may want a more mobile lifestyle. You may want to migrate and move around a bit before you settle down in one locality for long enough that owning a dwelling makes sense. You may need time to develop the resources necessary to purchase a home, whether that be improving your credit so you can get a mortgage or saving so you can pay cash for your home (the better option).

The conventional wisdom is that borrowing money to buy a home is the only practical way to buy a home. However, a mortgage significantly adds to the cost of the home. The general rule of thumb is that if you borrow money for 30 years, you will pay back two times the original cost of the house. So your $100,000 home with a mortgage will cost you more than $200,000.

The payment on a $100,000 loan at 6% interest is $600/month. Over 30 years, you will pay $216,000 for the home. If instead of getting a loan, you made payments to yourself of $600/month for 166 months (14 years), you could pay cash for the home and save $115,000. Actually, it will be less than 166 months because you will get a little interest on the money in the bank.

How could you save $600/month while paying rent?

That's a question that can only be answered by looking at your household size, your income, and how you spend your money. This is a situation where joining together with others could make economic sense. For example, four families could save their money, buy a four-plex, and own it as a housing cooperative.

If you do decide to go with a mortgage (which derives from a Latin word meaning "death grip"), make sure you understand all the details of the loan. Get a copy of all of the loan papers in advance of the closing and go over them carefully. Don't sign a mortgage that includes a "prepayment penalty" if you pay off the loan in advance of its due date.

"The borrower is the slave of the lender." Once you have the mortgage, always make extra principle payments if at all possible, even if the payments are small, so you can pay off the loan faster. To show the impact of even a small extra payment, looking at our hypothetical $100,000 mortgage at 6% interest and a $600/month payment . . . If you pay --

-- $10/month extra principle starting with the first payment, you save yourself a total of $3,500 in interest payments and you pay the loan off 15 months early.

-- $20/month extra saves you $7,000 in interest and pays the loan off 30 months – 3-1/2 years – early.

-- $100/month extra principle cuts your interest bill by $24,500 and you would pay the loan off in 21 years instead of 30.

-- A $150/extra payment/month would save you $33,000 in interest and you would pay the loan off in 18 years.

-- An extra principle payment of $225 would save you $42,000 in interest payments and you would pay the loan off in 15 years and a few months.

I hope the point is made about the advantage of making extra principle payments if you have a mortgage.

Questions to ponder:

Are you already settled in a locality where you want to live for several years, or are you in the mobile/migratory/still looking for a place to settle down phase?

Do you want to rent or own? Is ownership a realistic possibility for your financial situation?

Will you own or rent by yourself (your own household) or in cooperation with others?

If in company with others, your options are co-housing, housing cooperative, casual roommate situation, intentional community, legal partnership (such as a limited liability company).

If ownership is the goal, whatever the legal arrangements, will you pay cash or get a mortgage?

If you get a mortgage, can you make extra principle payments to clear the loan early and reduce your interest cost?

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04041 Dormitory and Group Living

"Living in the dorms are such a huge part of the college experience. You'll never again have the opportunity to live with so many of your friends and meet so many people that are so like you." *Comment by a college student.*

On one hand . . . You have the least amount of control over your shelter circumstances when you live in a dormitory.

But on the other hand . . . you will have a lighter ecological footprint in a dormitory than in most other living arrangements that are available to you.

Dormitory rooms are small. Even when the common areas are added in, the square feet per person will be low by modern standards.

The school will certainly have invested in some energy conservation measures since the operating costs of residential housing are a major factor in school budgets.

Small spaces lead to less energy costs per person.

Students living in dormitories eat in cafeterias where managers buy food in bulk (less packaging cost) and prepare it in bulk (more efficient energy cost).

Less energy equals fewer carbon emissions and a more sustainable system.

While this varies from school to school and from facility to facility, about 10% of the rent dollars students pay goes toward paying energy bills. Additional expenses are caused by behavior-related repairs and maintenance. This is an issue for sustainability because repair and maintenance involves materials, which embody energy in their manufacture and distribution, and energy.

Dormitory living provides excellent opportunities for developing community skills. Universities like to foster unity and solidarity among their campus communities, and a lot of that work goes on in the dormitories and other forms of on-campus residence housing.

The primary way that students can **reduce their ecological footprint while living in campus housing is by fostering changes in personal behavior**. Particular areas of attention include –

Lighting discipline. Our grandfathers were right. When you leave the room, turn off the lights. Don't illuminate empty rooms. Use LED task lighting instead of overhead lighting.

Thermostat. If you have an in-room thermostat, in the winter turn it down when you leave, and in the summer, turn it up. Don't air condition or heat an empty room.

Curb your vampire loads. Turn off the lights and look around your room and note the glowing lights that and then do something about them. Plug televisions and other equipment into electric outlet strips with on-off switches, and use the on-off switch to make sure no ghost loads are being drawn by items in your room. Don't leave your computer and printer on 24/7. Power down anything that is not in use!

Create an **atmosphere of respect toward campus property**. Don't trash property, on or off campus. Deliberate damage and vandalism, as well as ordinary and heavy

use, causes the expenditure of both money and resources in making repairs. This drives up the costs of campus housing and contributes to greenhouse gases and other ecological damage.

Drive less. Walk, ride a bicycle, take public transit, carpool more.

If a road trip beckons, **take the bus or train instead**.

Don't waste food in the cafeteria. Take only what you can eat. Even if you are famished and starving, take conservative portions first time around. If you are still hungry after eating your first plate, have a second, Don't pile a plate high and eat only part of it, throwing the rest away. Hint: if your cafeteria offers trays, don't take one. Eat with the season.

Don't waste water. Take short showers. Don't run the water while you brush your teeth, clean your contacts, or shave.

Buy used text books. Or share text books or use e-books. You'll pay less and damage the environment less.

Shop the after-market to decorate your room. Don't buy a bunch of new stuff that you will be tired of and want to replace next year. Buy used, save money, reduce your ecological impact.

If you need small batteries, **use rechargeable batteries and solar small battery chargers.**

No bottled water! Instead, use a metal water bottle or a water fountain to satisfy your thirst when you are on the go. If your city's tap water taste isn't to your liking, buy a tabletop pitcher water filter.

No air freshner sprays or plugins! Make sure stinky messes don't accumulate and use plants to clean the air.

If you use Christmas lights as decorations, **get low-energy LED lights.**

If you use candles, **get soy or beeswax candles** instead of paraffin candles. Paraffin is a hydrocarbon product. Soy candles are made from soybeans, a renewable product.

Wash your clothes in cold water. Air dry your clothes (hang them up in your dorm room to dry). Ask your building administration to install clothes lines.

Buy from locally owned stores, avoid franchises and chain stores. Don't eat at national chains or franchised fast food, choose to support the locally owned fast food restaurants.

Take reusable bags with you with you go shopping.

Other Forms of Group Living

Besides dormitories on campus, another popular form of group living for students is the casual roommate relationship. By adding more residents, the fixed environmental and financial costs of a dwelling are divided between more people and that's good.

The critical requirement for successful group living is an **agreement that spells out the responsibilities and rights** of all concerned. Never try to run a roommate relationship on a handshake and verbal understanding. People forget, they misunderstand, they sometimes take advantage of vague issues. It doesn't have to be a fancy agreement. A list that spells out what's the rights and responsibilities for the house, signed by all concerned, is good enough. Write it out, date, and sign it!

Managing the housework is an essential aspect of successful management of roommate relations. This should be part of the written household community agreement.

Invisible Structure Issues for Dormitory Living

Helping your school to transition to a more permaculture way of dormitory life is one of the functions stacked on the "organizing a campus permaculture

group" suggestion. When it comes to dormitories, students can win points with campus administrators by organizing and implementing campus information campaigns that encourage students to –

-- Use less water,

-- Use less electricity,

-- Don't waste cafeteria food,

-- Take better care of campus properties.

A campaign like this can have a measurable impact on the expenses of operating your campus and its consequent ecological footprint. By beginning with such a campaign, you will win friends and influence people in your campus administration. This may come in handy as you develop other "more advanced" ideas for your campus such as edible landscaping, biogas digesters, rainwater harvesting, and other projects that will move you toward a campus that cares for people, cares for the planet, and has a care for the future.

Low Impact Small Space Kitchen

Depending on your situation, you may need to contrive a small kitchen for your living space. Here's a minimal kitchen that can prepare great food:

-- Toaster oven

-- Crockpot

-- Hot plate

These additional items will be helpful:

-- Pressure cooker

-- Heating coil (a small device used to heat a cup of water to make tea, coffee, etc.)

-- One cup coffee drip filter (if you are a coffee drinker)

-- Microwave oven (depending on how you feel about microwaves)

If you don't have a sink, you need a basin to wash dishes in. Empty the water outside on the landscaping. This should probably be done surreptitiously as there may be rules against it. Always select a different place to do your guerrilla grey watering. Instead of carrying the whole basin outside, drain it into a jug and take that out with you. That way you could put the jug in a paper bag and no one would know what you are taking out of the dormitory. A funnel will be helpful for this purpose.

I don't advocate mindless disobedience to rules. I do advocate selective, mindful, peaceful, and nonviolent disobedience to rules and laws that drive us toward unsustainability and collapse. Often, the best way to do this is to not announce your plans but to simply do it, quietly and secretly. I know we all have the urge to immediately update our Facebook when we do stuff. There are some things that should not be blogged, statused or tweeted.

Regarding greywater in particular, as we will see when we get to the section on water . . . there is not one single documented case of anyone getting sick from the discharge of greywater into a landscape environment. Laws and rules against the use of greywater on landscape plants rise out of ignorance and are structures that drive us toward collapse.

In Conclusion . . .

Before acquiring iPermie, you probably lived your green life in the future. You figured that as long as you are in college, living in a dormitory, there isn't much that you can do. As we have seen, this is simply not true. There is a lot that you can do, for yourself and your own lifestyle, and for your educational community. The assignment? Just Do it! It's not complicated. It's not rocket science. It's pretty basic. It must be done, if we plan to care for people, care for the planet, and have a care for the future.

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04051 Living in Small Spaces

Small rooms or dwellings discipline the mind, large ones weaken it. - *Leonardo Da Vinci*

Five reasons small living spaces are better.

1. Cheaper

2. Smaller eco-footprint

3. Faster to clean up

4. Everything is close at hand

5. Cozy

Three difficulties of small spaces

1. They must be carefully planned or they quickly into chaos.

2. If multiple people live in a small space, you need careful negotiations about the use of you living spaces, to resolve issues like television and music noise, visitors, overnight guests, etc. As you identify issues, negotiate acceptable solutions among those living in the space.

3. You may need a downsizing process in order to move into a small space. Existing possessions may be too numerous – or too large – to fit into a small space.

The Big Picture on Small Spaces or How to live large in a small space.

You can't own everything. Even if you had a large house – where would you put it? If you are going to live in a smaller space, you must winnow your possessions down to a smaller amount. You can give things away, sell them, ask others to keep them for you, and donate them to thrift stores. Some may be recycled. Other than objects of beauty and emotional value, if you haven't used something in a year, ask yourself if you really need to keep it. Digitize your music, paperwork, and books. Use the public library instead of buying books – or if you like buying books, resell them or give them away after reading them.

Know your priorities for your dwelling. What spaces are most important to you? If cooking is important, allocate more space for cooking and eating. If you don't cook much, dedicate less space to the kitchen area. If you work at home or are a student, your home office takes on a greater importance. If you like to entertain, your living room (entertainment space) should be maximized.

Neat habits help. A large mess in a large space is much less noticeable than a small mess in a small space. In the small space, the small mess takes on the characteristics of a large mess. Clutter is the bane of small-space living. Don't use the floor as a closet! You need a place for everything and everything in its place.

Use all of your spaces, especially those that you typically ignore. Go vertical, to your ceiling, even if that means getting a small ladder/step-stool to reach the top shelves. Use spaces underneath furniture and fixtures (under your bed, under the couch, under tables, under counters, etc.). Use your ceiling!

Stack functions. Look for multifunction furniture, like an ottoman that contains storage, a wall picture that becomes a table, a counter that can be a desk or a kitchen prep area. Move things around to configure spaces for different functions.

Blindry – window shade that is also a laundry rack
http://www.treehugger.com/interior-design/blindry-doubles-window-blind-and-laundry-rack.html

Picture transforms into a dining table
http://www.treehugger.com/eco-friendly-furniture/wooden-wall-picture-expands-dining-table-colombian-design.html

Work room arrangements out on paper before moving in. Make a drawing to scale of your space and use cardboard cutouts for your furniture and the apartment's elements so you can move things around and try different configurations.

Small Space Toolbox.

A hodgepodge collection of bits and pieces relating to managing life in a small space.

Don't use **swinging doors** on cabinets or rooms. Go with sliding doors or curtains on rods.

Build into the walls to create nooks, shelves, drawers, cabinets. The traditional Murphy bed, which these days comes in an amazing number of configurations, including one that lowers from the ceiling (!), has long been a feature of small space living. If you work with a limited budget, use shelving instead of built ins. Use curtains to hide contents and to minimize the dust buildup on the items on the shelves.

Carefully organize the entrance area. Outfit it with hooks, hangers, and/or shelves for coats, books, briefcase, shoulder bags, mail, keys, etc.

Use ceilings and high spaces. Create clothes racks with chains or pipes and hardware on the ceiling or walls. For a natural look, suspend an attractive branch of wood you found somewhere, either au natural or painted a festive color, and hang clothes on it.

Hanging gardens
http://www.treehugger.com/urban-design/hanging-gardens-make-sleek-use-small-balconies.html

Dish rack above sink
http://www.treehugger.com/kitchen-design/kitchen-space-saver-dish-drying-closet-above-sink.html

Bounce some light off the walls to create an illusion of spaciousness. Each room needs at least three light sources. This is more important than you think, especially in small rooms.

Put some mirrors on the ceiling and on the walls.

You'll find **different recommendations for what works for colors**. Some decorators advise light colors, punctuated by bold notes. Others say go with bold colors on the walls. One common theme is to **not be afraid of drama** in your decoration themes. If you like it, why not do it? It's your space. Make it comfortable and attractive for you.

Vertical stripes on the walls make the ceilings seem higher. **Horizontal stripes** wrapping around the walls make the room seem more spacious.

Bring seating furniture into the center of the room away from the walls. Angle it at a diagonal to the long axis of the room.

Use furniture of **appropriate scale** for the size of the dwelling.

Hooks and cup hangers on the walls are useful. Maybe don't put them "everywhere." Do put "lots" of them around the rooms for convenient use.

Wall mounted shelves work nicely. Mount boxes or milk crates to walls, or stack them on the floor going up as high as they are stable. Fasten them to the walls to increase stability. Stacked milk crates are functional and even trendy in some circles.

Use closet space efficiently. This means adding more horizontal storage (shelves) and keeping clothes folded rather than hanging everything on a rod.

Use baskets and boxes to contain clutter. This works better than most people think, especially with small items that accumulate around your desk.

Use project boxes with the necessaries for occasional activities **that can be stored** when not in use.

Raise your bed so you can store things underneath it. How? Bricks or cinder blocks under each leg work.

Large pictures work well as decorations.
.

Don't install a clothes dryer or a washing machine. Wash clothes at a laundromat within walking distance and air dry your clothes in your apartment. Do the laundry every week to minimize the amount of laundry done at any one time. Or you can have an in-house washing machine if you must and you have the space. If you want to care for the planet, care for people, and have a care for the future, you will air dry your clothing. There are small portable washers that hook to your sink. The ecological advantage of a laundromat is that the washers are more efficient (energy and water use) than most home washing machines.

Techniques to reconfigure spaces for different purposes

Put furniture on rollers for easy cleaning and so you can move the furniture around to configure differently purposed spaces in your living area. You should be able to find rollers/casters with locks so that the rolling function can be disabled when you don't want the furniture to move.

Use movable screens or walls to create new configurations. **Organize furniture** into mini-rooms.

A **"Pop-up room"** uses items in storage **to reconfigure a space** for a different purpose. Some of these items may be "flat packed" furniture and dividers that fold out for use. For example, click on this link to see a pop-up play room for kids.

http://www.treehugger.com/sustainable-product-design/my-space-popup-room-for-kids-to-play-with-their-friendsters.html

Kitchen Issues:

Make sure you have an **efficient, uncluttered work triangle** of sink, stove, refrigerator.

Use a pot rack and peg board in your kitchen **to hang stuff up** so it doesn't clutter counter tops or fill up cabinets and shelves.

Locate a small refrigerator underneath a counter, or use the top of a chest refrigerator as a counter. One advantage of this is that since you open and close the chest refrigerator several times a day, the top (which is the lid of the chest refrigerator) will not get permanently cluttered with stuff.

Don't install a dishwasher. It takes up space, contains embodied energy, increases the operating energy of your space, and all of that increases your carbon, energy, and general ecological footprints. Just wash the dishes by hand. Automatic dishwashers do not care for people, care for the planet, nor do they have a care for the future.

Don't install a garbage disposal. This is another money, material, and energy waster.

Equipment for a minimum kitchen without an actual stove:

Microwave oven

Toaster oven

Crockpot

One or two burner hot plate or cooktops.

Pressure cooker

Small refrigerator

One cup coffee drip filter (if you are a coffee drinker)

or a coffee maker if this is a multiple person household.

If you want to be able to cook a large ham or a turkey,
get a tabletop roaster oven.

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04061 Guidelines for dwelling design.

We shape our homes and then our homes shape us. – Winston Churchill

Permaculture is about holistic design. The integration of beneficial connections is a primary goal. The design of your dwelling is one of the places in your life where the integration of beneficial connections (and the elimination of negative connections) is critical. A successful dwelling involves many different systems. Careful design is necessary to ensure that the dwelling works well for all who live there. To take a concept from the Deep Ecology folks –

> The ideological change is mainly that of appreciating life quality (dwelling in situations of inherent worth) rather than adhering to an increasingly higher standard of living. There will be a profound awareness of the difference between big and great. http://www.deepecology.org/platform.htm

In other words . . . You want a dwelling that cares for people, cares for the planet, and has a care for the future. That's why you're reading this.

It doesn't matter if we talk about an apartment or condominium in a multistory building or a house on an inner-city plot or a townhouse or any other kind of housing found in a modern city. Any kind of dwelling can care for people, care for the planet, and have a care for the future, as long as you design in accordance with the context of the dwelling and its neighborhood in the city.

As with anything else in permaculture, start with wherever you are. Then you do what you can, with what you have, where you are. If you live in a college dormitory, your design for a dwelling space will be different from what you will need when you are ready to move to a house or apartment off-campus. So wherever you are in your life, take what you can productively use from this discussion, and file the rest for future evolutions and migrations in your life.

Don't build a new house. Don't buy a new house.

There is plenty of housing already built. You don't need to build a new house.

Most people who want to build have numerous reasons why it is important for them to build a new house. However, a new house cannot care as well for people, for the planet, or the future, as can existing construction because it involves considerable energy embodied in the new buildings materials involved with the project. Remodeling is the true frontier of more sustainable living. Of course, eco-friendly remodeling requires that we be judicious in your use of resources and avoid extravagances like the $50,000 kitchen and the $20,000 bathroom. For those prices, many homes could be renovated to meet the Passive House standards described in the chapter on energy conservation for homeowners.

Besides eco-friendly remodeling of existing houses, a second frontier in urban housing is repurposing existing commercial or industrial buildings for residential purposes.

Given the expected continued movement from rural to urban areas, and the on-going relocations of populations within

countries, it may not be possible to actually avoid all new housing construction, but new housing should be the last option, never the first.

The greenest house is the house that never gets built.

Don't live in too much house.

Big houses bring big bills with the.

More house = more materials = more embodied energy.

More house = more operating energy = more fossil fuel dependency and more emissions that drive global climate change.

More house = more money to buy or rent and more money for property taxes.

If you have a big space, add more people! Aim for maybe 250 - 400 square feet per person as a rule of thumb for household space.

Live in a densely populated neighborhood.

Densely populated neighborhoods use less energy per capita than the less dense suburbs and rural areas. OK, not everybody can move to a densely populated neighborhood. Laws prevent people from evolving their neighborhoods in more sustainable directions. All of us can work to increase the density of the neighborhoods where we do live.

"Densely populated" does not necessarily mean tall high-rise apartment buildings. Li live in a densely populated neighborhood. It is a combination of individual houses set closely together on small plots (about 1/7th of an acre per house, with enough room between them for a driveway), together with duplexes, four-plexes, and small apartment buildings with eight to twelve units. Many of the houses have one or two garage or backyard apartments. Most of the buildings were constructed from 1910 through the early 1930s. It is a livable neighborhood where people from a diversity of races, cultures, and economic status live together.

In areas presently zoned for single family housing, one permaculture improvement would be to change the laws so that householders can add small garage, attic, basement, and backyard apartments. Note that this isn't the advocacy of a big government program to build "affordable" housing. It is simply a matter of getting government out of the way, protecting the rights of the homeowners to use and profit from their property, and then letting spontaneous order have its way. It is a rebuke to the Nanny State dictates of the current regime of zoning regulations that prevent homeowners from adding small garage, attic, and basement apartments to their properties.

If you have extra bedrooms, consider taking in a boarder/roommate. This brings in some income as well as improving the density of the local population. It spreads your base household energy usage over more people, resulting in a lower per capita energy use in your household, even if adding some new people increases the total usage.

The systems of your dwelling should be well integrated and beneficially connected with each other. Stack functions and be redundant.

The **systems** of your house include –

-- Heating, Ventilation, and Air Conditioning (HVAC)

-- Building walls, floors, foundation, roof (structure)

-- Energy supplies

-- Plumbing and water management (includes humanure and rainwater harvesting)

-- Access (doors, sidewalks, driveways)

The dwelling's **functions** include:

-- Food storage, preparation, and consumption

-- Sleeping

-- Entertainment and Communications, maybe some group gatherings

-- Storage

None of these systems and functions work in isolation from the others. They should work together so that the house functions can be carried on in comfort and at a minimum of energy expense. Often, this isn't what happens. That's why we encounter problems:

-- Areas of the house are always either too hot or too cold, rarely comfortable.

-- High levels of noxious chemicals like formaldehyde and other volatile organic compounds.

-- Water leaks (roofs, pipes, doors, etc.)

-- Mold

-- Pest infestations

-- High humidity

-- Noxious odors

-- High utility bills

-- Cracks in walls and foundations

-- Excess noise

-- Infiltration of dirt

If your dwelling has problems like this, they won't get better by themselves. There is no need to resign yourself to just suffering through whatever issues your dwelling has. Instead, work to diagnose the problem(s). You may need to consult experts or the solutions may be obvious. Whatever the case may be, don't let problems with your dwelling's structure and systems languish. They will get worse with time, eventually costing even more than their resolution would cost now. Problems need to be resolved or mitigated as much as possible given the circumstances (money, time, materials, etc.)

The more dangerous the problem, the more urgent the solution.

The more beneficial connections among the house's systems, the more resilient, persistent, and constant the dwelling will be in the face of the challenges of the coming years.

For example . . . **A passive solar sun porch:**

-- Provides space for winter food production (micro-greens, herbs),

-- Is part of the house's passive ventilation system,

-- Provides heat to the rest of the house during the winter,

-- Keeps the wind and wet out (it serves as a buffer zone between the south wall of the inhabited portion of the house and the weather outside),

-- Provides a support surface for a summer trellis with vines which creates a shady exterior for the windows during the heat of the summer and (depending on the kind of vine) may provide some food production.

A screened porch area:

-- Provides a shady place for a summer kitchen, which keeps the heat and humidity of cooking out of the house, this means a more comfortable house and lower energy bills for AC.

-- Acts as a buffer zone between the exterior climate and the wall of the house.

-- Provides a shaded area protected from the elements for an entry doorway into the house.

-- Is a nice place to sit on a cool summer evening.

-- Covering the screened porch areas with storm windows during the winter, provides more buffer zone for the walls AND additional passive solar heat collection areas. If you can't afford storm windows right now, plastic works.

-- Could be a support for perennial climbing vines like grapes that would provide more shade during the summer.

-- Insulation, as part of a whole house energy conservation system –

-- Buffers the interior from the extremes of the outside climate, making it easier to stay cool in the summer and warm in the winter without excessive fossil fuel abuse.

-- Insulates the interior from the noise of the outside world.

-- Reduces the monthly cost of energy. Less money for energy = more money for other important household projects.

-- Because the interior of the house experiences fewer wild swings of temperatures, there is less stress on the materials of the house envelope inside of the insulation and that contributes to durability.

-- Helps eliminate drafts which is another source of lower fossil fuel abuse in the household.

There should be **many beneficial connections** between you, your dwelling and the surrounding geography and community.

The previous section discussed beneficial connections within the house. But no dwelling is an island by itself. Beneficial connections between you, your dwelling, and the surrounding geography and community are good for resilience and for the development of community.

Reduced fossil fuel abuse = less pressure on the development of new fossil fuel sources and less depletion of existing resources and fewer carbon emissions to drive

Reduced water use = less pressure on the development of new water sources and less depletion of existing resources.

More consumption of local foods – both from on-site food production and from patronizing local farms – = more economic resilience.

Rainwater harvesting = less storm water runoff from your property and more water retained on site to nourish vegetation.

Using rainwater for irrigation means less money spent with the local water utility.

The allocation of space in a dwelling is a reflection of the priorities of the persons who live there.

One of the questions about shelter is -- "How do we allocate the space in our house?". In the United States, we often think we need a living room, a dining room, a family room, kitchen, bedrooms, and bathrooms. We need a utility room, a garage, and maybe additional storage. Add a basement and an attic. Then we go out and rent a storage unit elsewhere because we have so much stuff it won't fit into our house.

When I grew up on a farm in southwest Oklahoma, the living room was the family room. There was a separate small dining room, but we ate in the kitchen except on holidays.

When we became more prosperous and moved into town, we had a living room and a family room. The living room was rarely used by anyone other than my sister and I, since that was the location of the piano, and we both had to practice the piano every day. Other than that, if we had visitors from out of town, that is where we would sit and visit with them. Everything happened in the family room. It was next to the kitchen, had the dining area, and was the largest room in the house.

The allocation of space in a dwelling is a reflection of the priorities and lifestyles of the persons who live there.

If a household doesn't do much cooking, a smaller kitchen works well. On the other hand, if you prepare most meals in-house and there is considerable home processing of food, you need a larger kitchen area. Alternatively, other areas of the dwelling can be temporarily repurposed for food processing purposes during such periods.

Don’t let the perfect become the enemy of the good.

Our house has a north-south axis. Anyone involved with passive solar design would say “that’s not the optimum orientation.” We didn’t let the fact that we weren’t in a perfect situation stop us from successfully renovating our house to incorporate a passive solar sun porch which has literally given us free heat since 2005.

One of the tragedies we face is that there has been an almost total collapse in the cross-generational transmission of important knowledge about how to live in a solar economy. As a result, entire cities have been constructed with little or no regard to the most basic issues of solar orientation. We don’t have enough resources to reconstruct all of our cities and small towns – we can’t afford that. We can do what we can, with the buildings we have, in the locations we inhabit.

The type of housing is only of marginal concern to these principles. It doesn’t matter whether you live in a college dormitory, an apartment in a building, in a house on a city lot, or a town home, or any one of the other types of urban housing. The design goal is to maximize the opportunities and beneficial connections that you have with the building you have and to solve or mitigate any problems the housing unit has.

In pursuit of that goal, we do what we can, with what we have, where we are. If we can't make the perfect choice, we make a better choice. If we can't make a better choice, we make a good choice. If we can't make a good choice, we try to avoid making a bad choice. Incremental changes over time contribute to a lifestyle that cares for people, cares for the planet, and cares for the future.

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04071 The 21st Century Integral Urban House and the 21st Century Integral Urban Apartment

Live simply so that others may simply live. - *Elizabeth Ann Seton*

The Integral Urban House could be considered the grandparent of iPermie. In 1974, the Farrallon Institute purchased a 100 year old Victorian house in Berkeley, California. They converted it to be a model for a more sustainable way of urban living.

The house featured a vegetable garden, chickens, rabbits, a compost toilet, fish pond, beehives, and solar power. The size of the lot was only 1/8 acre. The residents recycled 90% of their wastes. You can read an article about the house from a 1976 Mother Earth News at http://www.motherearthnews.com/modern-homesteading/urban-homesteading-zmaz76ndztak.aspx.

They got a lot right about what we need to do to create more sustainable urban living systems.

Before permaculture developed as a design discipline, the Integral Urban House experiment showed the productivity possible by integrating beneficial connections even in such a small space as the Berkeley House.

Going forward, we have much to learn from them. You can probably find the book at your local library or via inter-library loan or at a used book store.

The Integral Urban House in the 21st Century.

Located on a small lot in a densely populated neighborhood, the 21st Century Integral Urban house, like the original model, is a retrofitted house. It is not new construction.

The 21st Century Integral Urban House is an energy conservative dwelling. There is no dishwasher, dryer, clothes washer, disposal, electric can opener, trash compactor, central air conditioner, central heating system, big screen television, motorized lawn mower, leaf blower, garage, garage opener, nor are there incandescent lights. The refrigerator and freezer are appropriate scale for the household.

The house has about 250 – 300 square feet per occupant.

It has a passive solar heating system, solar water heater, solar food dehydrator, solar oven, biogas digester, biogas stove, outdoor summer kitchen, ceiling fans, whole house ventilation fan, double hung double pane argon-filled low-e coated windows, insulated doors, storm security doors with locks, interior insulated shutters for windows and doors, exterior insulated storm shutters for windows and doors.

The house has insulation in all four walls, the attic, and the floor to the high range amount recommended for the attic in its climate. There are buffer zones around the outer walls (vegetation or screened porches). The doors feature air-locks (that is, all doorways have two doors, connected by a short hallway/entrance). The porches have screens in the summer

and during the winter, storm windows and doors.

The house has extensive edible landscaping. Deciduous trees shade the roof in the summer except for the location of the solar water heater. Depending on the climate, there may be one or two small window AC units. The house has at least two interior house plants for every 100 square feet of space. The roof overhangs shade the walls during the summer. The attic ventilates with soffit vents and passive turbines. The roof is white or is a “green roof” planted with vegetation.

They cook outside during the summer.

The gutters pour rainwater into large cisterns shaped like jugs which provide water for the edible landscaping. The house harvests grey water for use on its landscape.

Earthworks sculpt the yard so that it catches water running off the sidewalks and the driveway, plus other rain falling on the yards, to keep it from running into the storm sewers. They allow the rainwater to infiltrate into the ground on the property.

If the residents are meat eaters, they keep rabbits and guinea pigs for meat. They raise chickens for eggs and meat. They raise fish in an aquaponics system on their solar sun porch, which serves as a winter greenhouse.

There is no flush toilet. They use a compost toilet instead. The household vermicomposts, has hot and cool compost piles, and brews compost tea. They make biogas (methane) from biomass they grow on site. All the fertility for their property originates on site. They do not bring in any off-site fertility materials. About 40% of their growing area grows biomass for compost. Some of this goes through the biogas digester before ending up in the compost piles.

The residents work about 20 hours/week at jobs off-site. They own their property free and clear, buying it without a mortgage after several years of working full time jobs and saving money to buy the house and make the necessary improvements. With eight people living in the house, everyone does about a half hour each day of work around the house or the yards on the various energy and food producing projects.

The house does not have a freezer. Instead, the family has a locker in a neighborhood service center, which also has washing machines. They have a small efficient chest refrigerator in their kitchen-, with a small freezer for ice, ice cream, and other small items. If they need frozen items, someone stops by the service center and gets what the family needs out of the locker. The service center freezers operate via a solar-driven process. Neighbors wash their clothes at the center and take them home to dry on an outdoor clothes line (or on an indoor line in the solar porch. The service center has a large commercial kitchen. The service center organizes processing days during the garden harvest seasons, where neighbors get together and put up food for winter eating.

No one in the house owns a personal automobile. Everyone has a bicycle and a bus pass.

The Integral Urban Apartment in the 21st Century.

The integral urban apartment in the 21st century may be located in any size apartment building including complexes with hundreds of units. It is typically an older building that a housing cooperative retrofitted for sustainability. The cooperative may or may not actually own the building. It may have a long-term lease instead of actual ownership.

The apartments are energy conservative. None of them have a dishwasher, dryer, clothes washer, disposal, trash compactor, incandescent lights, central air conditioning, big screen television, or vacuum cleaner. There is no parking for

individual vehicles but the building has a bicycle garage.

Every exterior wall and the roof and floor have insulation to the amount recommended for roofs in that climate. The windows are double hung, double pane, argon-filled, low-e coated. They have interior insulated shutters and exterior insulated storm shutters. The building features include insulated and sound-proofed walls, floors, and ceilings between apartments.

Every apartment has a porch or a balcony. The building owners added them as part of the reskinning of the building during its extreme green retrofit. Most residents cook on their balconies during the summer, to keep the heat out of their apartments. They do a considerable amount of container gardening on the balconies too. Vertical growing systems are popular. During the winter, storm windows enclose the balconies creating buffer zones.

All the humanure and urine from the toilets goes into biogas digesters in the building's basement which produce methane. This provides cooking gas to the apartments and heats hot water boilers that provide steam heat during the winter. There is a green roof system that grows vegetables and greens in containers during the growing seasons. The roof has solar hot water heaters that provide hot water to the apartments. During the winter, additional rooftop solar water heaters replace the container garden to produce hot water that, together with the basement methane-fueled boilers, provide steam heat and hot water supplies for the apartments.

Greywater from the building cycles through a wetlands system on the property that cleans and purifies it naturally. Rainwater runoff from the building fills cisterns which provide water for the landscape, whose berms and swales retain water so most of it infiltrates into the ground onsite.

The building contains a meeting room of sufficient size to hold most of the members of the housing cooperative. It is often in use for coop meetings and social events. Members can schedule it, or one of the other smaller common areas, for events too large for their individual apartments. The size of the apartments ranges between 450 to 750 square feet. If a larger household needs more space, the management installs doors between two apartments to unite them as one unit.

The apartments feature LED lighting. There are washing machines in the building's service center and each balcony has retractable clothes lines. The lines run both horizontally and vertically. A pulley system allows people to put their laundry on the line and retrieve it when dry. Each bathroom has a retractable clothes line for use during times of rain or extra cold.

Several farms and food coops deliver groceries to the building. The building has a large commercial kitchen that residents use for food processing and preservation. People usually do such activities in groups. They make deals with farmers for meats, produce, or fruit and spend part of a day processing it with their neighbors. Besides the typical jams, jellies, and pickles, people make and can a large variety of soups for convenience "heat and serve" eating. Everyone goes home with food. Each apartment has a locker in the building freezer for frozen foods. The locker works on a highly efficient solar-driven process. The apartments have chest (or drawer) refrigerators with a freezer compartment big enough for ice trays, ice cream, and a few small items. The neighborhood service centers provide extra climate controlled space for non-refrigerated food storage.

The building's grounds are landscaped with a forest garden and each household can, at its option, have a plot in a community garden located on a former parking lot. Biomass harvested from the grounds supplements biogas production.

No one in the building owns a car. Everyone has a bicycle and a bus pass. There is a neighborhood car rental system if somebody needs a car for some reason.

A portion of the former indoor parking garage for the building is now a bicycle garage. All of the outdoor parking lots are gardens.

The 21st Century Integral Urban Duplex, Triplex, and Fourplex.

Between the single family home and the apartment building or complex, the city has a considerable number of units accommodating two, three, and four households. While many of these are rentals, occupants own an equal number of the units. Their features and amenities are similar to those listed for the Integral Urban House. Instead of having common facilities like the larger apartment buildings, they will use the neighborhood service center for activities like washing, frozen food storage, space for entertaining, food preservation, etc.

A thought experiment based on the Integral Urban House and Apartment.

How many beneficial connections can you find in the descriptions of the features of the Integral Urban House and Integral Urban Apartment? What elements have multiple functions? How are important functions supported by multiple elements?

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04081 Shelter Design Challenge

Have nothing in your houses that you do not know to be useful or believe to be beautiful. - *William Morris*

We learn design by doing design. These small design projects will give you practice in thinking about whole systems design.

Sleeping Areas

A primary issue in designing spaces to be occupied by multiple persons is privacy.

Design a sleeping room to be occupied by two persons. Then, redesign it to be occupied by four persons.

Keeping in mind the need to live in smaller spaces . . .

Is it better to use one room for two or four persons, or to have small private bedrooms? Such small rooms could perhaps be big enough for a single bed (if one person) or a double bed (if two), a dresser, bedside table, and a clothes closet. How small can such a room be and still work for its occupant(s)?

If multiple people sleep in one room, what privacy amenities could be included? How big does it need to be to work in each version? Bonus points for setting a room up like this and finding friends to test occupy it for a few days to see how it works.

What about using sleeping alcoves, enclosed for privacy?

Make a list of the beneficial connections between these “sleeping systems” and the rest of the housing unit.

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04091 Shelter Inventory

You know you have reached perfection of design not when you have nothing more to add,
but when you have nothing more to take away. - *Antoine de Saint-Exupéry*

Your existing shelter.

If you live in housing with multiple units (apartment building, dormitory, etc.) answer for your particular living space. If in a dormitory or other form of group living, try to get the energy and water use figures for your building and calculate your per capita portion of that.

-- Address

-- Own free and clear, own with a mortgage or rent?

-- Monthly mortgage or rental payment (if any)

-- Total square feet

-- Number of occupants

-- Square feet per occupant

-- Annual energy cost.

-- Annual energy cost per occupant.

-- Total water consumption for the dwelling.

-- Water consumption per occupant.

-- List all the systems operating within your dwelling.

-- Calculate the greenhouse emissions of your dwelling, as a total, and per occupant. Use this calculator or another one of your choosing: http://coolcongregations.org/calculator-login/

-- List the rooms and their use.

-- List any problems with the dwelling (rooms that are too cold, too hot, leaks, mold, etc.)

-- List any renewable energies used in the dwelling (active or passive solar, hydro, etc.)

-- List any sustainability features of the dwelling (edible landscaping, rainwater harvesting, adequate insulation, etc.)

-- List any beneficial connections among the various dwelling systems, and between the dwelling, its occupants, and the surrounding community and geography.

-- List any negative connections among the various dwelling systems, and between the dwelling, its occupants, and the surrounding community and geography.

-- What problems does your present dwelling have?

-- What hazards are risks at your dwelling?

-- Do you work or study at home? Is there a dedicated place for that? If not, do you need a dedicated work space?

-- Is any food produced at your dwelling? Does the household participant in any communal food production at another location, like a community garden? How does your dwelling relate to the geographies of your food supply?

Your future *needs*.

-- What are your goals for your future dwelling?

-- How long do you plan to stay at this dwelling?

-- Will the number of occupants change in the future?

-- If the number in the household changes, how will this change the present use of the rooms of the dwelling?

-- When (if) you leave this dwelling, will you move to another dwelling in the area or migrate to another area?

-- What sustainable features do you need in your dwelling that you don't have now?

-- Does the geography of your dwelling work for you over the long term? If not, what geography would work better for you?

-- Are there functions not satisfied well in your present dwelling that you want to accommodate in your dwelling in the future?

-- How much reduction do you aim for with your household energy use?

-- How much reduction do you aim for with your household carbon emissions?

-- Prioritize your needs and goals.

-- What best practices are available for use in your design?

Your future *wants.*

Wants are different from needs. They are more optional.

-- Are there aesthetic changes you'd like to make to your property?

-- Changes to your furniture?

-- Anything else not mentioned in the inventory?

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04101 Shelter Additional Resources

As you simplify your life, the laws of the universe will be simpler; solitude will not be solitude, poverty will not be poverty, nor weakness weakness. -*Henry David Thoreau*

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Section 5: Water

You never know the worth of water until the well runs dry. – *Traditional saying.*

Today, 36% of the global population — approximately 2.4 billion people — already live in water-scarce regions. Nearly a quarter of the world's GDP ($9.4 trillion at 2000 prices) comes from water-short areas. Moreover, 39% of current global grain production depends on unsustainable water use. According to IFPRI's analysis, current "business as usual" water management practices and levels of water productivity will put at risk approximately $63 trillion, or 45 percent of the projected 2050 global GDP (at 2000 prices), equivalent to 1.5 times the size of today's entire global economy. Moreover, 4.8 billion people (52 percent of the world population) will be exposed to severe water scarcity by 2050.
– *International Food Policy Research Institute*

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05011 The hydrological cycle
Water is life! A basic description of the water cycle and why it is so important.

05021 Bioregional water issues
I don't know the bioregional water issues for your particular geography, but I think you should know them. In detail.

05031 Urban Water Issues
Where does it come from? Where does it go? How much do you use? How to radically reduce your contribution to bioregional water pollution issues.

05041 Rainwater Harvesting
Free water from the skies! Not a nuisance, but a gift! How to take advantage of this opportunity.

05051 Strategies, Techniques, and Tools for Water Conservation
Ideas for becoming more water conservative.

05061 Greywater
Getting full value for your water.

05071 Water in your lifestyle design
Areas of design that need attention.

05081 Water inventory
Questions that must be asked.

05091 Water Design Challenges
Small scale designs that develop your skills.

05101 Additional Water Resources
Books for more research and knowledge.

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05011 The Hydrological Cycle

My fake plants died because I did not pretend to water them. – *Mitch Hedberg*

While a person doesn't have to become a scientist to practice permaculture design, it helps if folks understand some basic scientific concepts. This document gives a basic lay person's discussion of the hydrological cycle.

Seventy percent of the surface of planet Earth is water, but 97.5% of those waters are salty. **Only 2.5% of the planet's water is fresh water.** Most of the planet's fresh water – 67.8% – **is ice and permanent snow** in the Arctic, Antarctic, and mountainous regions. This is one of the reasons why the melting of ice and permanent snow in these regions is a critical problem.

About 30% of our fresh water is ground water, located under the surface of the Earth.

Only 1/4th of 1% of the planet's fresh water is in lakes, streams, ponds, and rivers. That is the water we can most easily access for human purposes. Note that this is not 1/4 of 1% of 100% of the water endowment of the earth. It is 1/4 of 1% of the 2.5% of the planet's water that is fresh water.

Despite its apparent abundance, from the viewpoint of "water available for human uses," **water is a scarce resource.**

Water exists in three forms –

-- liquid,

-- solid (ice, snow, sleet, hail),

-- vapor.

While the total amount of water in, on, and around the planet (this is known as the hydrosphere) remains the same, the water is constantly in motion. It changes phases between liquid, solid, and vapor. It moves by winds through the air, currents in bodies of water and rivers/creeks/streams, and by human intervention.

The **hydrological cycle** is the process that moves water around the planet and among its various phases.

It is powered by solar energy.

As the sun shines upon water, it warms up and changes phase from liquid to vapor via evaporation. About 80% of evaporation is from oceans, and 20% from lakes, rivers, creeks, streams, etc.

Water can go directly from the solid state (ice) to vapor. We refer to this as **sublimation.**

Plants evaporate water directly into the atmosphere. We know this as **transpiration.**

The water vapor rises, carried upward by air currents. As it rises, the temperature cools, and the water vapor begins to condense back into droplets of solid water. These droplets transport around in the atmosphere by the winds. We often see this process in the form of clouds. Most of the water vapor, however, is invisible to us. Water vapor is the third most abundant gas in the atmosphere.

The droplets collide with each other, grow bigger, and eventually fall back to the Earth's surface as **precipitation.** This can be rain, snow, sleet, or hail, depending on local conditions. Some precipitation

evaporates as it falls and never makes it to the ground.

When the water hits the ground, one of two things happens:

Some of the water is run-off. It does not soak into the ground. It instead flows into lakes, streams, rivers, creeks, wetlands, etc. This water eventually finds its way into the ocean, some of it evaporating or soaking into the ground as it flows.

Precipitation that soaks into the ground, if not taken up and used by plants, becomes **groundwater**. Groundwater is the primary source for surface waters like lakes and springs. Water will soak into the ground until it reaches an impermeable layer of rock or clay. It will travel laterally along the surface of the barrier. We refer to these areas as aquifers. Aquifers feed lakes and ponds on the surface and come to the surface as natural springs and wells drilled by humans.

Underground aquifers have a **recharge rate.** This refers to the balance between water being withdrawn into lakes and springs by natural processes, water withdrawn by pumping for human uses, and precipitation soaking into the ground and refilling the aquifers. In many areas of the planet, **we deplete underground aquifers much faster than they are being recharged**. In effect, we mine ancient waters that cannot be replenished as fast as we use them.

The hydrological cycle is important for **purifying water and thus making it available to life.** Water evaporates as pure water with a neutral pH (pH is a measure of acidity or alkalinity of a substance). Once into the atmosphere, it reacts with carbon dioxide in the atmosphere and develops a slightly acid pH of about 5.7. Lightening discharges may react with water vapor to form nitric acid. These are natural processes and the Earth's biosphere evolved in conjunction with these processes. In fact, the nitric acid that results from lightening strikes in water vapor is an important source of nitrogen for plant life on the ground.

With the beginning of the Industrial Revolution, additional pollutants began to be released in huge quantities into the atmosphere. People reported the effects of acid rain on the stone of buildings and outdoor statuary in the British Isles as early as the 17th century. In the 1850s, scientists established the connection between acid rain and atmospheric pollution in England. In the 1960s, as the effects of acid rain became more widely reported in the press, more science was brought to bear on the subject. Dead lakes and forests killed by acid rain were the subjects of extensive research.

The major contributor to acid rain is **sulfur dioxide emissions from coal-burning power plants.** The United States began controlling such emissions in the 1990s.

As a result of these controls, sulfur dioxide emissions fell by 40%, and acid rain decreased 65% in the United States.

But it has not been eliminated.

Part of the problem is that sulfur dioxide comes natural sources, not controllable by humans, such as volcanoes. Emissions driven by human activity, however, make the problem much worse.

Acid rain causes major problems for aquatic and plant life. At a pH of less than 5, most fish eggs will not hatch. Even lower pH levels can kill adult fish, thus greatly reducing biodiversity. As biodiversity reduces, resilience declines.

Acid rain harms forests and plant life by changing the pH of soil, which hurts the micro fauna and micro flora in the soils upon which life depends.

Understanding the hydrological cycle is basic to an understanding of the importance of water for all life on the planet. Humanity has been entirely too reckless with the hydrological cycle in the past. Going forward, we must better learn how to care for the planet so that we can care for people.

Scientific literacy is important for those of us who plan to care for people, care for the planet, and have a care for the future.

Going forward into the future, water issues will become as critical and problematic as energy is in the present.

The catastrophic effects on Earth's biosphere due to human activities since the inception of the industrial era now imperil all life. Conservation of resources and environmentalism alone are not adequate to the task.

A transformation of fundamental aspects of consciousness that will drive actual changes in our behaviors and ways and manners of living is urgently required to halt and reverse this destructive process.

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05021 Bioregional Water Issues

The concepts of a bioregion as the basic location where people live, and the practice of reinhabitation of that life-place by its residents, are necessary to rejoin human beings into the overall web of life. Harmonizing with the natural systems of each bioregion is a necessary step toward preserving the whole biosphere. We define a bioregion by the unique overall pattern of natural characteristics we find in a specific place. The main features that we find throughout a continuous geographic terrain include a particular climate, local aspects of seasons, landforms, watersheds, soils, and native plants and animals. People are an integral aspect of a place's life, as can be seen in the ecologically adaptive cultures of early inhabitants, and in the activities of present day reinhabitants who attempt to harmonize in a sustainable way with the place where they live. – *Peter Berg*

This document will make better sense if you skip ahead and read 06011 "Where are you?" before reading this document.

I don't know what the bioregional water issues are in your life. I certainly think that you need to know what they are.

Three Necessary Understandings.

One: What is your bioregion? You need to know and understand this as well as you know and understand your particular address and neighborhood.

Two: What are the watersheds of your bioregion? Depending on where you live, the question may be "bioregions in the watershed." Your watershed is one of the definitions of your home. You don't just live in a dorm room or an apartment, you live in a dwelling located within a watershed.

Three: Watersheds, when operating properly, provide both goods and services to their inhabitants – human, animals, birds, aquatic, plant life, from the micro level on up. When we damage watersheds by pollution and over-utilization so that they do not operate properly, everyone suffers.

Discovery of your bioregional water issues involves questions like –

Where does your water come from?

Where does it go after being used for human purposes?

What are the threats to your bioregional watershed?

What are the patterns of drought for your bioregion?

How many people depend upon the water in your watershed?

Are there proposals on the table to move water from your bioregion to other bioregions?

Is your bioregion or watershed dependent upon water from other areas?

What is the pollution burden of your bioregion's watersheds?

What pollution do you personally contribute to your watershed?

What invisible structures govern your watershed?

The issues are so important that we can't stop with these somewhat technical questions. Let's push the envelope a bit more and ask –

What is the meaning of water for you?

How does your commitment to the permaculture ethics reflect your understanding of your place in the watershed where you "live, move, and have your being"?

Many people live their lives as if their place in the geography of the planet was irrelevant. I hope you can come to an understanding of where you are in your watershed and bioregion. Empowered by this knowledge, you can be part of the process that will heal and restore a healthy bioregional watershed. This is a primary way station in the journey of your urban area toward resilience, persistence, and constancy in the face of the challenges of tomorrow.

Pop quiz: how many times thus far have I mentioned some version of resilient, persistent, constant? What does that suggest about the importance of persistence, constancy, and resilience?.

Noted explorer John Wesley Powell wrote that a watershed is –

> "that area of land, a bounded hydrological system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."

Here is a map – http://www.aqueousadvisors.com/blog/?p=301 – drawn by Powell in 1890 of the watersheds of the arid western United States. He testified before Congress that these watersheds should be the units of government for the area. Alas for the future, while Congress showed some interest, parochial interests prevailed and thus we have the map we have today, with the problems it has created..

If you look around, you can find a watershed map of your area. Look at it and examine the patterns of human settlement that overlay the watershed.

Water is fundamental to life. Don't take it for granted. Don't assume that someone else is going to take care of water for you. Everyone has a personal duty to be accountable for his or her use – and abuse – of the watershed in which they live, move, and have their being. We begin the process of healing when we come to understand that we are not separate from, nor in opposition to, the watersheds of our geographies. We are people of place, wherever that may be. As we understand that, we stop being the problem and start becoming the solution.

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05031 Urban Water Issues

Bioregionalists show a primary concern for their own local areas. There are a surprisingly large number of opportunities to address everyday living conditions for the benefit of local sustainability; as wide-ranging as resident-based reforestation projects in rural areas and community gardens in cities. Their influence is felt most strongly on county and city levels because this is where they take place and are most visible. Watershed-based organizations with bioregional priorities for basins as small as a creek or as large as the Great Lakes are a steadily growing phenomenon. Their recommendations to boards, councils, and other agencies aren't limited to creek restoration, water conservation, and other obvious issues, but may also include redrawing political borders to fit watershed lines and adopting ecological urban plans. – *Peter Berg*

Three big water issues constitute 800 pound gorillas contending for space in our urban living rooms:

-- Adequate supplies of drinking water.

-- Storm water

-- Abuse of watersheds with pollution and waste and excessive appropriation of resources for human consumption..

Many urban water systems are triumphs of political, ecological, and economic irrationality.

We bring water to cities, often from remote areas, via long and expensive runs of pipe, pumping stations, and water treatment facilities.

We expend vast resources to make the water safe for drinking.

Then we defecate and urinate in a considerable portion of that water, making it useless for human consumption.

We use the toilet as a convenient disposal, and thoughtlessly flush considerable amounts of non-biodegradable solids such as cigarette butts, condoms, unwanted pharmaceutical drugs, and feminine hygiene products into the regional watershed. Households and businesses thoughtlessly pour toxic chemicals down the drains with little practical restraint. We think "out of sight, out of mind" is an expression of reality but it is a delusion fostered by structures of greed, gluttony, and selfishness that encourage us to consume and waste without a single thought for the consequences of our actions.

Because of these imprudent practices with our water, we must invest vast resources in cleaning the water before sending it downstream to its next users. We don't always do a good job with that. It's becoming apparent that even our best urban systems do not get all the pollution. Micropollutants, including powerful pharmaceuticals and toxic criminals, are found everywhere. The government assures us the water is safe. Should we believe them? How many times has the government lied to us for its own corrupt reasons? How many times has industry corrupted government in order to control information?

While doing all these expensive manipulations/pollutions with our drinking water, our storm water systems collect the free water sent to us by the hydrological cycle. The systems discharge

this free water, as quickly as possible, polluted with petrochemicals, lawn chemicals, bits of asphalt roofs, and the other polluted accouterments of city life, often without any treatment whatsoever, into the surrounding watershed.

It's a mess – that's the most charitable thing I can say about our system. It wastes and pollutes precious scarce fresh water as though it were the most abundant resource on -earth, instead of being only a small fraction of the total water on the planet. While it's possible to purify salt water, that embodies an unsustainable energy cost.

The scale of the problem is such that it is hard to see what any one individual urban resident or household can do in the face of such waste. Our governments designed our systems to waste and pollute. It takes effort to not waste and not pollute.

We got into the present disastrous situation one bad decision at a time, made by millions of people over long periods of time. The beginning of a better relationship with our water and the watersheds where we live begins with individual people and their households who accept personal responsibility for their use of water. As people stop abusing their watersheds, it will become possible to develop more rational water systems that care for people, care for the planet, and have a care for the future.

The Necessary Elements of an Ethical Personal Water Use Plan

Everyone who wants to care for people, care for the planet, and have a care to the future needs to make water issues a high priority in their lives. Everyone can practice these water conservation principles in accordance with their circumstances.

Practice good water discipline. Take short showers. Don't run water while you shave, brush your teeth, clean your dentures or your contact lenses.

Never pour anything toxic down a drain. This includes most conventional cleaning products. Use natural cleaners like vinegar, ammonia, soap, baking soda, and peroxide to clean sinks, bath tubs, and toilets. Don't use bleach or products containing bleach such as the popular powdered cleansers. Research resources like the Environmental Working Group's database on household chemicals and products to make informed decisions. http://www.ewg.org/guides/cleaners

Never flush anything down a toilet other than human waste and toilet paper. No cigarette buts, no condoms, no tampons, no pharmaceutical drugs that you no longer need or are out of date. Only use natural cleaning products like vinegar, baking soda, and borax to clean your toilet. Clean it more often and it will be less work to do so.

If you must own a car, and if you must wash it, always wash it at a commercial car wash. Never wash your car in your driveway where the water runs into the storm sewer system.

Never pour anything other than water down the storm sewer system. Fix any fluid leaks from your car so the leaks don't pollute the storm water run-off.

Don't flush urine. Put a sign over your toilet that reads – "If it's yellow it's mellow; if it's brown, flush it down."

Don't drink bottled water unless there is a problem with your municipal water supply or there is no other source (such as after a major disaster).

If your situation allows for it, **compost your humanure and fertilize your plants with diluted urine** (one part urine to ten parts water).

If you own a home with a lawn, **do not use any chemical pesticides, herbicides, or fertilizers**. Use only natural products like compost and compost teas for fertilizer. Sculpt the lawn area so that it contains rainwater within your yard where it soaks into the ground around your plants. Harvest as much rainwater as is possible for your circumstances.

Encourage your workplace, school, place of worship, and public buildings to harvest rainwater and to manage their grounds organically in order to prevent pollution of the watershed. Churches should especially be encouraged to care for the planet, care for people, and have a care for the future.

Going beyond individual action.

The actions listed above are the important first steps. Besides doing and being good in and of themselves (and doing good is always the right thing to do), they give you Authenticity and authority in your work with invisible structures to change local watershed policies,

They are not the entire task at hand.

An opportunity to teach others better water habits,

As you study the issues of your watershed – preferably in conjunction with others – over time you will develop ideas about what needs to happen in your watershed (or watersheds, depending on the size of your urban area, there may be more than one watershed involved).

If you aren't sure where to start when you look at the larger picture, begin with **harm reduction or elimination**. Develop structures and systems that reduce or eliminate sources of water pollution. Work on small and big issues. For example, smokers are notorious for just tossing cigarette butts anywhere. A public information campaign to discourage this would benefit the watershed, as would enhanced penalties for littering cigarette butts and proactive enforcement.

Protect all wildlife – fish, birds, animals. They are essential actors in all watersheds.

Encourage **broadscale water conservation.**

Study the problem of industrial pollution of your watershed, including water pollution incident to any energy production activities (like fracking of oil and gas wells). The beneficial solution is to work with industrial and commercial polluters to end their pollution of the watershed. Pollution is waste. Better design of their processes will eliminate waste. Industries and commercial enterprises that create pollution are waste possibly valuable assets that should be used for the benefit of the enterprise, its owners, workers, and other stakeholders. If the polluters are publicly owned corporations, there are opportunities for stockholders resolutions and lawsuits. **Encourage customer boycotts of products that are egregious polluters of watersheds.**

Observe, study, evaluate, design a response, and **take action to save your watershed from pollution and waste.** Our children, to the seventieth generation, will thank or curse us, depending upon our response to the needs of these times.

Personal behavior first!

Invisible structures next!

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05041 Rainwater Harvesting

Show the flow. Cycle it. Celebrate it. Know it. And as you do, show others the way.
– *Brad Lancaster*

Rainwater harvesting involves catching, conservation, and responsible use of the free gift of rainwater.

In most urban areas, municipal authorities consider rainwater to be a nuisance. They channel it into underground storm sewers and discharge it as quickly as possible into the watershed, together with the load of toxic chemicals that it picks up during its journey.

If you are a renter or resident in a college dormitory, you have a limited ability to take direct advantage of rainwater. You may be able to catch some rainwater in totes or other containers and use it to water plants or even flush toilets. Your real influence however will be **in the area of invisible structures.**

If you live on campus, your campus has extensive, and expensive, systems to funnel rainwater into storm sewers. Campuses would benefit from using rainwater harvesting to divert rainwater from storm sewers into their landscapes. Every gallon of rainwater used to water the school landscape is a gallon that the school does not have to buy from its water utility and thus a price it does not have to collect from its students.

If you are not a student, and if you rent, work with friends and family and neighbors to develop more rational water use policies for your watershed. Speak with your landlord about the advantages of rainwater harvesting.

If you own a condominium, you can work with your condo association to harvest rainwater and put it to use to benefit the association.

If you own a house with a yard, there is a considerable amount of work you can do to harvest rainwater.

There are two primary ways of harvesting rainwater **– earth works and active systems.**

Earth works refers to swales, berms, spill-a-ways, terraces, and other systems that passively channel rainwater into a landscape. An active system collects rain from rooftops and channels it via gutters into storage containers for use later. Active systems cost more than passive. Passive systems can be done simply, with a shovel and hard work. As with anything, you must first study the lay of your land. Get your umbrella and wander around when it rains and see where the rain goes naturally. This will help you to plan how to develop your swales, berms, and retention basins.

The potential of rainwater harvest should not be dismissed as negligible.

> One inch of rain equals 633 gallons per 1,000 square feet (2.54 centimeters of rain equals 2,396 liters per 93 square meters of roof).
>
> 12 inches of rain equals 7,480 gallons per 1,000 square feet (30.5 centimeters equals 28,315 per 93 square meters of roof).

36 inches of rain equals 22,400 gallons of water, per 1,000 square feet. (.9 meters of rain equals 84,793 liters per 93 square meters of roof)

Google says that the average size of a college campus in the United States is 440 acres (178 hectares), with each acre equal to 43,560 sq feet (4,047 square meters).

For every acre (.4 hectare) on a college campus, and for every foot (30.5 centimeters) of annual rainfall, the potential rainwater harvest is 325,829 gallons (1,233,397 liters). That amount of rain would be representative for a college in a desert area.

For an area with more rainfall, say 36 inches or 3 feet (.9 meters), the amount of rainwater per acre is 977,476 gallons (3,700,149 liters).

If we think about our "average campus" of 440 acres (178 hectares), if it's in a desert where its only getting 12 inches (30.5 centimeters) of rain per year, that amounts to 143,364,672 gallons (542,694,350 liters).

In a better watered state, with say 36 inches (.9 meter)of rain, we're talking 430,094,016 gallons (1.6 billion liters). Yes, that's correct, four hundred thirty MILLION ninety-four THOUSAND sixteen gallons on 440 acres in a 36-inch rain year.

Whether you are a college student or not . . . the point here is to **stop seeing rainwater as a nuisance and an expense, and start thinking about it as this incredible free gift** that the hydrological cycle gives us every year.

The best introduction to rainwater harvesting, at whatever scale you contemplate, is Rainwater Harvesting for Drylands and Beyond, whose website is www.rainwaterharvesting.com.

Study these books to learn about the opportunities and options of rainwater harvesting.

As you develop your design for your life, look for opportunities to integrate rainwater harvesting and to encourage invisible structures such as schools, businesses, houses of worship, and governments to collect and responsibly use the water before sending it further downstream.

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05051 Strategies, Techniques, and Tools for Water Conservation

Water is essential for all dimensions of life. Over the past few decades, use of water has increased, and in many places water availability has fallen to crisis levels. More than eighty countries, with forty percent of the world's population, already face water shortages, while by year 2020 the world's population will double. The costs of water infrastructure have risen dramatically. The quality of water in rivers and underground has deteriorated, due to pollution by waste and contaminants from cities, industry and agriculture. These water issues destroy ecosystems, sometimes permanently. Over one billion people lack safe water, and three billion lack sanitation; eighty per cent of infectious diseases are waterborne, killing millions of children each year. World Bank

This chapter is a "tip jar" of ideas for conserving water. Using less water is a critical behavioral change for all who take the permaculture ethics seriously.

If it's yellow, it's mellow. If it's brown, flush it down. This is one of the most simple methods of water conservation that attacks one of the more egregious wastes of water – using several gallons of water to flush a few ounces of urine into the sewer.

Do not use the garbage disposal. Garbage disposals are Type 1 errors in the first place. If your dwelling has one, installed by a previous owner or the landlord, don't use it. Just because it's there doesn't mean it needs to be used.

Keep a pitcher of water in the refrigerator. This prevents the common practice of running the tap water for a while to get cool water. Or keep a cooler of iced water on a counter and avoid opening the refrigerator every time you want a cool drink.

Take short showers, not baths. Use the button, which many shower faucets have, that stops the water while you soap up and scrub a bit. Then rinse off. Showers use less water than baths. Only use the bath if you need to soak in hot water because of a body ailment or stress. Put a tote into the shower and use your shower water to water plants or the landscape.

Don't waste water while brushing teeth, cleaning contacts, or shaving.

If you **have to run water in the shower to get to the hot water, catch that water in a bucket**. Use it to water plants or to flush toilets.

Wash dishes by hand. Don't use a dishwasher. Don't rinse with running water. Fill a basin or the second division of the sink with clear water and use that to rinse. Wipe dry with a towel.

If you have lawn to water, **water it only during the cooler parts of the day or at night to minimize evaporation.** Don't water the street or sidewalks. Don't over-water your lawn or landscape plants.

Mulch around trees or plants. Put mulch in the containers of your container plants.

Don't buy a new car. It takes about 39,000 gallons of water to make a new car.

Make sure all **faucets have aerators.**

If a toilet runs, or a faucet leaks, fix them! They won't get better all by themselves and until fixed, they will waste water and energy. You might as well get a cigarette lighter and start burning dollar bills.

Install a low flow showerhead. This is easy to do yourself and they are inexpensive. Your landlord will not ever notice. You won't notice much difference in the feel of the shower either. Take it with you when you move and reinstall the original full flow showerhead. Or leave it in place, and donate it to the cause of using less water. Buy another and install another one at your new location.

Don't buy bottled water. Get a reusable water bottle and carry that with you.

Drive less. A gallon of gasoline takes about 13 gallons of water to produce.

Recycling a pound of paper saves about 3.5 gallons of water.

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05061 Greywater

I was living in a big home with seven other people, and we were starting to garden. My housemate Cleo and I realized that our household was using an incredible amount of water. The average American uses 50 to 70 gallons of water per day, just inside the home. If you include the yard and lawn, it's almost double. It seems crazy how much we waste.

So I wondered if there was a way to reuse our sink water to irrigate. Through trial and error, we figured out how to create a gray-water system, which means taking the water from your sinks, showers, or washing machine and directing it into your yard. I took a plumbing class, and we set up a little wetland in a bathtub in the yard to filter the water. We were able to cut our water use in half. Some people have the misconception that gray-water systems are dangerous or unhealthy. There has never been a documented case of anyone getting sick from them, as long as you don't drink the water or spray it on food crops that will be eaten raw.
They're easy to set up and only cost around $100 for a basic system, not including labor.
—Laura Allen, co-founder of Greywater Guerrillas, in the Nov/Dec 2007 issue of Sierra.

About greywater, Wikipedia has this to say --

> Greywater is wastewater generated from domestic activities such as laundry, dishwashing, and bathing, which can be recycled on-site for uses such as landscape irrigation and constructed wetlands. Greywater differs from water from the toilets which is designated sewage or blackwater to indicate it contains human waste.

There are important reasons for reusing greywater –

-- Use less water.

-- Use less energy.

-- Helps your plants.

-- Recharges groundwater.

-- Less strain on sewage treatment plants.

-- Reclamation of nutrients.

Greywater design is an integral aspect of designing a whole systems approach to your life. Because we take a whole systems approach, context is everything. Indeed, you could summarize the process as “do what’s appropriate for the context,” within the three ethics of permaculture.

Given the present situations of your life, you may have little or no ability to use grey water. If you live in a college dormitory, you probably can't use their grey water. In those situations, you are better off working with your school administration to incorporate greywater systems into their existing landscapes.

But if you own or rent your home, and have some yard, you can take advantage of this resource that most people just simply let run down the drain.

The Most Basic Grey Water System:

One: **A tote that fits into your shower stall or tub** in which you can stand while

you shower. The tote catches most of the water.

Two: **Two basins** that fit into your sinks or sit on your counter – one for washing dishes, one for rinsing.

Operating Instructions for the Most Basic Grey Water System.

When you want a shower, put the tote into the shower.

Stand in the tote while enjoying your shower. The tote catches most of the water.

After you finish, take the tote outside and pour it somewhere on the landscape. Pick a different place each time.

When you wash dishes, use one of your basins for the dish washing and one for the dish rinsing. When you finish, take the basins outside and pour onto the landscape.

It's a minor amount of manual labor. Your plants will love it. Yes, you can water container garden plants with grey water. Every week or so give them a good dose of clean water to leach out any salts that might accumulate in the potting soil from the shower and dish water.

If it is freezing cold outside, suspend your greywater system until the weather warms up and the snow or ice melts.

If you get beyond this Most Basic Grey Water System, careful design is important. It must be designed to handle the expected amounts of grey water produced by your household. The go-to place on the internet for information about grey water system design is Oasis Design, online at http://oasisdesign.net/. Properly designed grey water systems are simple to use and are safe when operated as designed. They are not expensive.

Never store greywater. While a surge tank that empties rapidly is OK, storing greywater to use a few days later is never a good idea. It will get fetid and begin to smell badly very rapidly.

Keep it simple. Don't install something that costs hundreds of dollars to flush your toilet with shower water. Use a bucket to flush the toilet by pouring it into the bowl (never pour grey water into the tank of a toilet).

Don't try to design a greywater system **without reading the Oasis Design** books on the subject. They are pretty much the first and last word on the subject.

Besides grey water, most households produce a certain amount of clear water. This is water used to rinse or wash vegetables, or water that runs from a water faucet while you wait for the hot water. It includes condensation from air conditioner units. This can be caught in basins and bowls and used to water container plants, vegetables, flush toilets, whatever you want to do with it.

Living Machines

One of the leading-edge future of waste-water treatment is the Living Machine concept, which treats waste water via a system of plants, pools, and micro-organisms. The goal is to mimic natural water purification processes as much as possible. Wikipedia on Living Machines.

These will be useful for institutions, apartment buildings, and even neighborhoods.

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05071 Water in your lifestyle design

The great ecosystems are like complex tapestries – a million complicated threads, interwoven, make up the whole picture. Nature can cope with small rents in the fabric; it can even, after a time, cope with major disasters like floods, fires, and earthquakes. What nature cannot cope with is the steady undermining of its fabric by the activities of man. -- *Gerald Durrell*

Water is essential for life. Without water, in only three days you die. In the United States and other developed countries, pure water is so easily available that we take it for granted. Yet, the handwriting is already on the wall for our casual approach to this most vital resource.

One of the purposes of permaculture design is to help you maintain and increase the quality of your life while lessening the burden that your life is on your ecosystem and its watershed. Your lifestyle design needs a holistic approach to water.

At minimum, your lifestyle design should address these issues.

Stop doing harm to the watershed. Look for all the ways that you voluntarily pollute and damage your watershed and design a path to eliminate or greatly reduce the harm you do to your watershed.

Use less water. Your lifestyle design will consider how you can live your life and use less water. This will be a mixture of behavioral issues and invisible structure work, so that you participate in creating human systems that are water conservative.

Stop others from doing harm to the watershed. This is mostly work with invisible structures. Here your community must address larger scale issues of pollution of its watershed by human activities. Your participation in such work is part of your lifestyle design. It's not an optional activity. You live in a community and thus you share responsibility with others for the activities of your community. You can't just sit back, work on your own behavior, and abandon the community to its own devices. Permaculture is, among many things, about leadership to implement human systems that care for people, care for the planet, and have a care for the future through our mutual awareness of limits and the responsible circulation of surplus resources through the communities.

What beneficial connections link these water issues and the other aspects of your life? How can you increase the beneficial connections among your water issues and the rest of your life? Are there any negative connections? Can you eliminate those?

Resilience, Persistence, Constancy. What is your back-up to your municipal water supply? If it goes down for a shorter or longer time, what should you do? Essential services should be met by multiple methods.

Stacked functions. What other functions can be stacked on your water work?

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05081 Water Design Challenges

This we know… the earth does not belong to man, man belongs to earth. All things are connected, like the blood which connects one family. Whatever befalls the earth befalls the children of the earth. Man did not weave the web of life – he is merely a strand in it. Whatever he does to the web, he does to himself. – *Chief Seattle*

Practice learning design with these small design problems.

Design an invisible structure campaign to discourage the use of bottled water.

Design an invisible structure campaign to discourage flushing urine and to encourage using urine as a fertilizer, or at least, “if it’s yellow it’s mellow, if it’s brown, flush it down.”

What? No long list of suggestions about how to go about solving these design challenges? Nope. By this point, you should know something about how you can do these small designs. If you need suggestions, go back to the Basics section and look at the other design challenge documents in the other sections.

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05091 Water Inventory

The future belongs to those who understand that doing more with less is compassionate, prosperous, and enduring, and thus more intelligent, even competitive. – *Paul Hawken*

Chapter 05021 has a long list of questions that amounts to a thorough inventory of your water situation.

The critical questions are –

How much water do you use?

Where does your water come from?

How much do you pollute your watershed?

How much water?

Measure your water consumption during any convenient interval which in most cases is a month, since water systems bill on a monthly basis and this is the smallest unit for which total consumption figures are available.

If you live in a situation where you get a water bill, this will be easy. Look at your water bills and get some historic info and plug the numbers into the spreadsheet. If you live in a dormitory, or an apartment building where the landlord pays the bill, it becomes more complicated.

You could try to get someone to tell you what the monthly consumption for the building is. You could divide that number by the number of residents for a rough average. Or you could measure your water use by timing your showers, counting the flushes, doing something to measure other water uses (drinking, cooking, hand and dish washing, etc.) but that is likely to be rather tedious.

As with all resource use, our goal over time is to reduce our resource footprint. The purpose of this inventory is to develop your base line. Do the best you can, with the information you have available. If you err, err on the side of "more" rather than "less," since the systems have lots of inefficiencies built into them.

Where does your water come from?

Next, you need to know something about where your water comes from.

What is the watershed for your area?

How is the water delivered to you? The answer to this question will typically be a water service of some sort, either private or publicly operated, unless you are on a private well.

Since we need to understand our ecosystem in its totality, where does your local water service get its water within your watershed? Does it bring water in from other watershed areas?

What challenges are present in your area for water? Has your area overshot its water resources? Is it over-pumping wells, draining lakes, importing water, desalinating sea water?

If your water utility imports water, where does your water system get its water? Are you downhill from those water resources?

What are the major water uses of your area? Do industries consume large amounts of water? If so, list them and their estimated annual consumption.

Where does your waste water end up? Where are the discharges from your city's sewer systems? What are you sending downstream?

What water comes your way from upstream sources? How many sewer systems discharge into the upstream area of your water shed?

Your personal water behavior.

Do you buy bottled water and drink it? If so, how much bottled water do you buy and drink every month? What does that cost you over a year's time? What do you do with the bottles after you drink the bought water? Are you a member of organizations that serve bottled water at events? How much does your organization spend on bottled water?

What noxious substances do you dump down your drains? Motor oil? Harsh household cleaning chemicals? List them and their ingredients.

Do you always flush urine?

Do you flush non-biodegradable solids down the toilet like condoms or cigarette butts?

Do you let the water run while you brush your teeth, clean your contacts, and/or shave? How long does it take for you to do these tasks? How much water runs down the drain while you do these tasks? Measure the water flow of your sink faucet.

Do you wash your vehicle away from a commercial car wash and let the water drain into the storm sewers?

Do you use toxic chemical non-organic fertilizers, pesticides, and herbicides on your landscape? What about the landscapes of your place of work, your place of worship, your school, the places you shop, your city's public parks?

Do you harvest any rainwater? Are there any rain water harvesting strategies used at the place you live?

What other bad water habits do you have?

What good water habits do you have?

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05101 Additional Water Resources

The best [man] is like water. Water is good; it benefits all things and does not compete with them. It dwells in [lowly] places that all disdain. This is why it is so near to Tao. – *Lao-Tzu*

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Section 6: Geography, Access, Transportation

Geography is destiny. -- *Abraham Verghese, Cutting for Stone*

Geography is important, because it opens our eyes; a landscape is no longer a static feature, but a complex battleground of physical and human interactions. Local is no longer local, but a collision point for the interaction of many 'locals' drawn from a global stage. With technology increasingly drawing the world closer together, it is important that the role of Geography in helping the public in understanding this complex and unpredictable world is championed! -- *Tony Cassidy*

Geography helps us think more intelligently about ourselves, how to live and the futures that we may need to face. It succeeds in doing this because as a subject it holds things together, in place, across the physical and human domains. It helps us understand the significance of scale and connectedness. -- *David Lambert*

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06011 Where are you? Geography and Community
A most basic question, the ways of finding the answer, and the implications for permaculture design.

06021 There and Back Again: Geography & Transportation
The destinations of your life will make or break your movement towards sustainability. Here there be very hard questions.

06031 Urban Transit
Alternatives to personal automobiles. Design as if geography and frugality were important. Taking advantage of spontaneous economic order.

06041 Selecting a place to live
Not a simple task.

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06011 Where are you? Geography and Community.

Geography is the what of where. It is vitally important for understanding the world around us. Geographers question the world and seek to understand it, they explain why things are where they are. No other subject at school links so many factors together as one. Geographers learn vital skills like map reading, problem solving, decision making. They learn to link scientific factors alongside sociological, psychological and historical reasons for why the world is as it is. Geography is on the news everyday, from war in the middle east, to closing of factories in the midlands, to farming subsidy arguments in Brussels, to global climate change the list in endless. -- *Francesca Carter*

People like to define, categorize, and classify. We develop maps and systems of description to help us understand, conserve, expand, and convey knowledge.

The map is never actually the territory. We've talked about that already. More than once. A map is a description of the territory from the viewpoint of the map-maker. Maps and systems of description are useful as long as we remember that the map is not the actual territory. Instead it is an interpretation of the territory.

Looking at our planet from an orbit in outer space, we can see some large forms – continents and oceans.

If we want to define things in further detail, and we do, we can speak of . . .

Biogeographical provinces are large forms that divide the continents, such as the Great Plains of central North America that stretch from the interior of Canada down into Texas. Land and water forms and patterns of life and climate activity define these provinces.

Bioregions are the primary subdivisions of the bio-geographical provinces. To continue our use of the Great Plains of North America example, within the Plains we can see the Red River Valley, Tall Grass Prairie, and Texas Blackland Prairie bioregions, among many which could be mentioned. Like the larger province form, land and water forms and patterns of life and climate define bioregions.

Bio-regions divide into **Watersheds.** Land and water forms, and patterns of life and climate define their boundaries.

Within the watersheds, we find **ecosystems** – lakes, swamps, forests, grasslands.

Within the ecosystems are the **works of nature and of humanity** – cities, suburbs, villages, forests, prairies, lake, creeks, and rivers.

It appears neat and tidy. The reality is that people don't always agree about the outlines and territories involved with the descriptions listed above. It isn't the way people talk. In general, we often use the word "ecosystem" to apply to "everything", a holistic viewpoint of where we are.

The scale of the descriptors varies.

The watershed of the Mississippi River incorporates many different bioregions on its route to the Gulf of Mexico. The primary Mississippi River watershed itself contains smaller watersheds, such as the Red River Valley watershed. In turn, the Red River Valley watershed has its own tributary watersheds, such as Deep Red Creek watershed which runs east of my home town of Frederick Oklahoma on its way to the Red River.

The question now becomes – **where are you?** Where is your community? Step

outside of the conventions of urban street address systems and observe and learn something about where you live, in the language of geography and ecosystems. It's not a casual question. The disconnection of so many from nature led us to our present catastrophic ecological situation.

You have a Place.

It is within an ecosystem, a watershed, a bio-region, and a bio-geographical province.

My house has a conventional street address on the Oklahoma City. It is on the north side of a hill, which runs alongside the North Canadian River, within the Canadian River Watershed, at the transition between the Northern Cross Timbers and the Central Great Plains bio-regions, within the Great Plains of North America biogeographical province.

That's where I live. There's a tree on my property that almost certainly predates the founding of Oklahoma City in 1889. It shades my house and we really like that during our hot summers.

As we implement the ethics of permaculture in our lives, we come to a renewed appreciation of nature and our place in it. No longer dominators, we become lovers. Never more a looter or taker, we seek to always be responsible and frugal stewards.

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06021 There and Back Again: Geography and Transportation

Who decides what is margin and what is text? Who decides where the borders of the homeland run?
Absences and silences are potent. It is the eloquent margins which frame the official history of the land.
As for geography, there are divisions and boundary lines that fissure any state more deeply than
the moat it digs around the nationhood. In every country there are gaping holes. People fall through
them and disappear. Yet on every side there are doors to a wider place,
a covert geography under sleep where all the waters meet. – *Janet Turner Hospital*

Where you live is the beginning.

It is the origin of your movements.

Each trip that you make has its origin and an ultimate destination. It may have some intermediate destinations and stops.

Your trips have an essence, or nature, or to use a more prosaic word – a reason.

For example, you go to work. You may do some shopping on the way to and from work, but the trip is primarily a job commute. You may go to church, or to school, or out for dinner and drinks with friends. Each of those trips has a meaning within your life.

All this activity costs energy and resources and produces climate-forcing emissions.

Transportation networks prescribe your ability to travel.

These are complex and expensive in every way possible – money, resources, and energy. They are so interwoven with our lives that they are practically invisible. We get in our cars and drive and we don't notice the wires and systems that connect the stop lights. We are oblivious to the repair and maintenance infrastructure that fixes the roads and paints lines to direct traffic and indicate parking. We don't see the pipelines that bring liquid fuels to our region nor the tanker trucks that fill the underground (and thus invisible) tanks at gasoline stations and convenience stores. There are the financial systems that pay the bills and make the system possible. Governments and corporations involve themselves at every transaction in the transportation process.

This is only the beginning of the deep trouble we are in thanks to the inefficiencies of our transportation systems, the primitive nature of our accounting systems, and the quick-fix/pro-gluttony mentality of our politicians and the electorates who give them power.

Transportation systems consist of methods and infrastructure that link trip origins and trip destinations. The purpose is to move people, freight, and information from one place to another.

Transportation overcomes space.

I am here at my home in one space, I desire to go to another space – my job. There is geography between here and there. Distance, time, the lay of the land, government, the condition and extent of the infrastructure, and your personal economic circumstances influence your journey to a destination. Each of these issues, to a greater or lesser extent, regulates the amount, type, rapidity, and cost of transportation.

Factors that influence the flow of transportation include --

Geography. Places are either close to each other, or they are not close, or an intermediate situation is the case.

Physical. There is an excellent infrastructure linking particular origins and destinations, or there isn't, or a medium or intermediate case at play.

Transaction Costs. Transportation does not flow automatically. There are transaction costs at every step of the journey. There are ports of entry, administrative costs, taxes and fees to pay, maintenance and capital costs.

Distribution. There may be many routes to choose from or not so many. There may be only one way to get there. It may not be possible to get there from here, depending on your access to transportation. If you don't own a car, and can't afford a cab, a substantial amount of territory is off limits to you.

Transportation is of vital importance to all human settlements and cultures. Without the transportation of goods, services, people, and information, billions of people would die of starvation.

Transport facilitates access to education, health care, and all other goods and services. It links inextricably with economic development. This connection can be seen in virtually every human settlement.

Transportation has enormous environmental impacts and consequences. It may be invisible, but it embeds in almost all social, economic, and personal transactions. For these reasons and more, it is a primary target of government regulation and activity.

The physical environment is a primary definer of transportation systems. This includes the climate, the hydrology (water systems) of the area, and the topography (the shape and lay of the land)

Transportation involves the expenditure of energy, in copious quantities, to overcome these physical constraints.

We move along through a blizzard in automobiles whose industrial designers perfectly condition their interiors for our environment. In the winter, snow plows and sanding trucks make travel possible by continually working against the precipitation of snow and ice. We build roads with an understanding of the climate conditions that can be expected during their lifetimes. Political interpretations of transportation needs dictate the routes of our roads.

All locations connected by transportation have a site and a situation. The site refers to the actual physical location, such as the address of my house. The situation refers to the relationships between that particular location and other locations. The situation is a composite of the variables of –

Cost. What is the economic cost of moving to or from the location?

Access. Depending on your transportation situation, all locations can be accessed, but all access is not equal. Some sites are much more accessible than others. Access is desirable and the economic costs of sites reflects the desirability of their access compared to other places with less desirable access.

Co-location. The more desirable a location, the more activities will be located there. Consider how fast food restaurants and convenience stores selling gasoline accumulate at the exits of interstate highways.

Time. One of the primary issues with transportation is how much time it takes to move from one location to the other. In the modern world, we trade money for time – we spend money to reduce the time of our transit. The available methods of transit and the extent of the connecting infrastructures are primary influencers of transit times.

One curious bit of data is that in both the United States and the United Kingdom,

people travel about 1 hour a day – 30 minutes to work and 30 minutes to return home. As people's affluence grows, they continue to travel 30 minutes a day, but they travel further and faster. There's some indication that this holds true for previous eras too. Walking about 5 kilometers an hour (3 MPH), for a half hour outbound, gives you a territory radius of 2.5 km (1.5 miles), which defines a territory of about 20 square kilometers (8 square miles). This is the area associated with Greek villages to this day. People refer to this tendency towards 30 minute commute times as Marchetti's Constant.

Transportation networks consist of individual routes that connect locations. Networks are both spontaneous and designed. They often reflect heritage methods of transportation. People tell a story of the game trail that became a cattle trail, that became a route for wagons. Ultimately it became a gravel road, then a paved highway, and finally an interstate highway.

There are three kinds of geographic distribution of transportation networks –

Centralized – all routes lead to a central point.

Decentralized – while the center point still has high accessibility, there are lateral routes that connect other nodes in the system with each other without going through the center.

Distributed – there is no center of focus for the network.

The bottom line is that ACCESS – determined by geography, energy, invisible structures, and economics – is a major issue in your life and in the life of the planet. How we care for people, care for the planet, and care for the future can be seen in our access decisions.

"Driving less" is one of the essentials of a beneficial future.

"Driving more" is a prescription for collapse and calamity.

To drive less requires careful attention to Access issues – geography, energy, invisible structures, economics.

Besides driving less, we need to travel less. People living in the developed world have a generous sense of entitlement to travel. Many of us seem to consider the ability to travel anywhere, at any time, without any regard whatsoever for the ecological consequences of our travel, to be an inalienable right.

It's a complex issue, but there is a clear and unambiguous bottom line –

Driving more and traveling more are lifestyle practices that drive us toward the ash heap of history.

There is no way to sugar-coat that message. It is a stark reality that we must adapt to or the future is catastrophic collapse and die-off.

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06031 Urban Transit

Any intelligent fool can make things bigger, more complex, and more violent. It takes a touch of genius – and a lot of courage – to move in the opposite direction. *-E.F. Schumacher*

The dominant transportation form in urban situations in the United States is the street grid, a method of city organization that goes all the way back to the Romans. It's been so durable for a simple reason: it maximizes access to the available real estate,

The primary method of transportation in almost all urban areas of the United States is the personal automobile. As a result, over the past 50 years American cities decentralized. Most urban areas have several regional clusters where activities (economic, social, entertainment) co-locate. There usually is a central business district. Zoning, building code, and economic regulatory activities facilitate and often actively encourage sprawl.

And so it comes to pass that most people, whatever their method of travel or location, move about 30-40 minutes in one direction when commuting to work. That adds up to more than 350 hours per year – the equivalent of nearly 9 40-hour work-weeks, more than TWO FULL MONTHS OF WORK dedicated to commuting to work or school.

The space required for transportation systems has three components –

--the roads and routes,

-- parking areas,

-- terminals (bus stations, airports, etc.)

In most areas there are about four parking places for every automobile, two off-street and two on-street. In North America, roads and parking areas account for between **THIRTY and SIXTY percent** of the surface area in cities.

Depending on the area, the street grid may be overlaid with mass transit systems for buses, street cars, light and heavy rail systems.

Critics of mass transit systems often say that general taxes subsidize transit. They claim that the automobile pays its own way via fuel taxes. This is not true, because governments at all levels use general tax funds collected from the population at large, or from subgroups of the population, to support automobile transportation. **Forty-three percent of the funds spent in the United States to build and maintain roads come from non-transit related sources (general taxes, property taxes, bond issues, etc.)**

When we take into consideration all subsidies and externalities, some say the price of gasoline is actually $15/gallon. The difference between the pump price and this calculated price is the subsidy.

The intensity of your use of transportation is a calculation that involves the --

-- methods of urban transportation you use,

-- the frequency of your travels,

-- the distance of your journeys.

The "more intense" transportation uses are (1) commuting and driving one person in an automobile that doesn't get good

miles per gallon and (2) traveling by airplane.

Less intense transportation uses are (1) not owning a car and riding a bus and (2) rarely making use of air travel.

The two months/year commuting time estimated above could be considered as two months of time invested in polluting the planet and forcing climate change. That's a lot of work for not very good ends.

The critical design questions that we derive from this discussion are:

The location of your dwelling relative to the locations and situations of your travel has enormous impacts (for good and for ill.) on the environment and the quality of your life. The total amount of travel you do counts for life or for death for people, the planet, and the future.

The method of travel (automobile, public transit, walking, bicycle, air travel, intercity bus, train, etc.) has enormous impacts (for good and for ill) on the environment and the quality of your life. The methods of travel you use count for life or for death for people, the planet, and the future.

This will be true at every stage of your life and at every place that you live, for the rest of your life. At the end of your life, you will have a history of healing or of destroying. Your transportation choices will make a difference, for good or for ill, for yourself, for the planet, and for the future.

The **primary problem with urban transit is that the government dominates our transportation system.** The criteria for transportation decisions is not necessarily the actual transportation needs of a given locality but instead reflects the politics of the moment. He who has the gold makes the rules.

The toxic transportation decisions that our system of political criminality creates make the task of developing a society where it is easier to make good choices much more difficult.

For example, in most areas, it is almost impossible for an entrepreneur to wake up one morning and decide to go into business hauling people around for money. It sounds like a simple and beneficial act. That's not the way the system works. Perhaps our hypothetical transit entrepreneur is actually a worker cooperative that wants to start a bus line that only operates along one particular highly traveled route.

In many areas, governments limit the number of licenses to transport people for hire. The first problem is the permit and that may cost a lot of money, since the only way to get a permit may be to buy an existing permit from someone else.

Sometimes governments require a "certificate of convenience and necessity." Issuing such a certificate is a political hoop that our worker cooperators may not be able to approach because the purpose of that requirement is to restrict entry to a particular transportation marketplace.

There will be a long list of other miscellaneous duties, fees, licenses, obligations, requirements, etc. ad nauseam involved with launching a transit enterprise. One would think that these would-be transit worker cooperators wanted to do evil instead of something beneficial like create jobs and haul people around so they can get where they need to go.

This is not an argument against government involvement in transit. It is a statement that the issue is too important to just accept the status quo and the "Transit Is Too Expensive" mantra without seriously questioning that so-called authority. **When the cost of entry declines to the point that anybody with a used van and some time** on their hands can haul people around for money, then we'll know that we're getting somewhere in transit policy.

One reason transit is too expensive for private entrepreneurs is because the government levies to many transaction costs on the transportation marketplace. If we remove those politicized transaction costs and eliminate the unnecessary burdens the costs will go down. We need to allow for more spontaneous economic order in this critical space of human action. As we do that, we can then make sensible decisions about allocating government resources for mass transit. Once we see what the market will move on, government can fill in the gaps and provide necessary connections to make the system even more efficient and valuable.

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06041 Selecting a place to live.

Can we actually suppose that we are wasting, polluting, and making ugly this beautiful land for the sake of patriotism and the love of God? Perhaps some of us would like to think so, but in fact this destruction is taking place because we have allowed ourselves to believe, and to live, a mated pair of economic lies: that nothing has a value that is not assigned to it by the market; and that the economic life of our communities can safely be handed over to the great corporations. *Wendell Berry, from 'Compromise, Hell!' published in the November/December 2004 issue of ORION magazine.*

Geography and transportation have enormous impact on lifestyle design issues.

To date, we've used **money and energy to overcome distance.** This allows us to live wherever we think we want to live, while working wherever we think we want to work (or attend school). We don't think about either of those locations relative to other destinations in our life like shopping or entertainment. We just please ourselves about where we live relative to where we work and if we can pay the bill, we figure that's all that's required of us.

Alas, the money and energy we spend on transportation do not account for all of the costs that result from our lifestyle desires to live and work and play anywhere that pleases us, irrespective of the geography and access issues.

The problem is that those costs haven't gone away. Other people pay them. The ecology pays them. The future pays them. Our circumstances increasingly constrain our ability to evade the accounting of our own personal responsibility for these externalized costs. My first tank of gasoline cost me twenty-five cents a gallon. Those days are gone forever.

Should we decide to take the permaculture ethics seriously, we must be more prudent when it comes to using money and energy to overcome distance. As we design our lifestyle for a world of peak oil, climate instability, political criminality, and economic irrationality, we seek patterns of sufficiency that will support our good life strategies. We leave behind gluttony and arrogance. The utility of those patterns is long past.

When the time comes to choose a place to live and work, begin by developing a list of all the places you go. For each destination, you need this information:

How often do you go there?

Why do you go there? (Think big classifications, like work, entertainment, shopping, education, worship, school, recreation, etc.)

Rank the importance or desirability of the location in the greater scheme of your life.

Plot the locations of these destinations on a map.

Compare this network of your destinations with the local transportation infrastructure – streets, bus routes, light rail systems, streets and highways, whatever is there.

Look for the sweet spot – a place to live with great access to the destinations and geographies of your life. If travel is not

avoidable, look for good public transportation connections with your destinations. If no public transportation is available (which is all too common these days), make your best choice. It may not be the perfect choice. It may be the best of a series of bad choices. You shouldn't blunder into a bad situation by accident or inattention.

You will have maximum freedom in matters of geography if you rent instead of buy. Renting is one way to finesse a series of bad choices among the geographies of your life. If you rent, you can continue to look for a place to live that is a better fit for your life's geographical destinations. Or you could look for a job that is closer to your home. Or you can do both at the same time – change your job and change your dwelling when the right situation comes up. In general, my advice is to not buy until you've found the sweet spot in the geographies of your life.

In your design plans don't forget that one way to finesse the "work location" issue is to start your own business, either by yourself or in conjunction with others as a partnership, limited liability company, or worker-owned cooperative.

These are important and critical decisions. At stake is two whole months of work every year (cf. the calculation in 06021 regarding commuting times) and your personal responsibility to care for people, care for the planet, and care for the future.

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06051 Urban Zones

I will say that growing up as a kid in an urban environment and having lived in cities all my life, the one achievement that everyone can look forward to is getting the perfect parking spot.
– *Saul Perlmutter*

Permaculture uses zones and sectors as tools to analyze, evaluate, and design. While the concept originally developed for application to homestead properties, the principles can be applied to any situation of any scale where we do permaculture design work.

Your life does not happen in one place. If you are a hermit, I guess you are an exception. For most of us, organizing the sites and geographies of our lives to conserve energy is a primary purpose of zone analysis.

It should not be a surprise to discover that zones in urban designs look different from zones used to do design in suburban, peri-urban, and rural areas.

Permaculture teacher Bart Anderson developed an interesting take on the permaculture zone concept that uses transportation as the defining characteristic. In an essay published online at the Permaculture Activist website (http://www.permacultureactivist.net/articles/urbnzonsectr.htm), he defines six zones –

Zone 0: Home.

Zone 1: Walking distance (pedosphere).

Zone 2: Bicycling distance (cyclosphere).

Zone 3: Reachable by public transportation or by a short drive.

Zone 4: Driving distance.

Zone 5: Reachable only by plane or other long-distance transport.

This definition of zones primarily references the amount of energy required to access the zone.

This analysis of location and access in urban areas in this way suggests looking for places to live and work that are within zones 0 through 3 and minimizing our interactions with zones 4 and 5. This doesn't meant that we have nothing to do in zones 4 and 5. It suggests that we should be more prudent in our zone 4 and 5 choices.

Here is a reminder of the Permaculture Design Manual's criteria for zones:

1. How often the element needs intervention from people, and

2. How often the people need to visit the element.

Using this criteria to develop a geographic zone system for the activities of your life, the areas of most frequent "visits" and "needs for intervention" are your **home and your workplace, or school** if you are not working and are a student. That's your **Zone 1**. If you are a working student, your zone 1 is your home, workplace, and school. If these three areas are widely separated by geography, that's an issue. These are daily, or "most days" activities (the 40 hour, 5 day work week seems likely to qualify as "most days."

The next most frequent "need to visit" and "need for intervention," would likely be

shopping, which occurs a few times a week. It could be less, but for most people at this stage of the design process, let's say they go shopping three to four days/week. We'll call that **Zone 2.**

Weekly activities, which could be entertainment or religious worship or meetings, are **Zone 3**.

Irregularly scheduled activities, which could include things ranging from doctor's appointments to visits to friends and relatives, could constitute a **Zone 4.**

Zone 5 would be annual events, or things that maybe go on three or four times a year. **This could be meetings or vacations.**

You can picture your zones as concentric circles or as areas that relate to geography and transit routes. Within those zones, plot the locations you visit.

As with traditional permaculture design, you pay the most attention – and do the most detailed design work – for the areas close to you the person. This starts with your home and life, Zone 1, and would include the zones of more intensive use.

But if you spend most of your time in Anderson's urban transportation Zone 4 – where everything requires a lot of driving – you are living – or working – or living AND working -- in the wrong locations. That's a Type 1 error, just as surely as planting a kitchen herb garden a mile from your kitchen in the midst of a dense wild forest would be. If you come to this method of analysis after you've made a major commitment by buying a house or apartment in one area and committed to a life-work elsewhere, you have hard choices to make. You'll need to sort through all of your alternatives to find the best resolution of your situation.

Design is always contextual. It relates to you in the specific situations where you live. The geographies and schedules of these destinations and events may not be entirely within your control. Your work may be located in a very upscale area where you could not afford to live.

Your area may not have public transportation or it may have a LOT of public transportation. You may be an expert cyclist and not think twice about traveling 10 miles on your bicycle. Or the last time you were on a bicycle was when you were in grade school. Whatever the case may be, use the context of your life as it is to define your urban transportation zones. Then work towards the optimum solution given the actual real-life circumstances, that will show care for people, care for the planet, and care for the future.

Zone analysis can help you design a rational approach to the geographies of your life. There are difficult choices ahead of you. The more information, ethics, and informed analysis you can bring into a decision, the better your ultimate decisions will be.

You may decide to stick with your present geographies and find ways to reduce your footprint substantially elsewhere in your life. It's your life and your plan. iPermie is here to help you make decisions, not to dictate them.

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06061 Migration and Stability

Human beings are the only animal that thinks they change who they are simply by moving to a different place. Birds migrate, but it's not quite the same thing. – *Doug Coupland*

Migration is a feature of modern life.

It may be voluntary or it may be forced.

People migrate in search of better economic opportunities. They migrate in search of education, love, or simply because they don't like their present geography and want something new. We may migrate for religious or ideological reasons.

Extreme weather events driven by climate changes force people to migrate. A quarter million of the people who left the Gulf Coast area after Hurricane Katrina did not return. They are the largest group of climate refugees in the United States since the Okies of the Dust Bowl days of the 1930s.

Violence, war, and crime are three more drivers of violence in the modern world. People often move away from high crime areas looking for safety. Elsewhere in the world, tens of millions of people are on the run from war and ethnic violence.

Voluntary Migration

In my own 60 years of life, I have lived in 17 different cities in eight different states and provinces in two different nations. My migrations were all voluntary and mine is not an unusual story.

If an event is about to happen in your life, permaculture says "design your approach to the happening, whatever it may be."

Voluntary migration is a **major life event**. It should never be approached casually.

Migration changes the **relationships and networks and geographies** you have in your present place and brings in new relationships, networks, and geographies to your life. Some of your old connections and relationships may be lost or abandoned, either intentionally or simply because it is more difficult than you expected to maintain a long distance relationship.

Migration involves risk. An appropriate design for migration will determine all of the risks and the advantages for a migration and weigh those pro's and con's in making the decision.

One reason for migrating is that your government (local, regional, state/provincial, nation) may be so toxic that it may be better to get out from under its domination than to try to adapt in place. Voting with your feet has a long and honorable history as a way of dealing with oppressive regimes.

Some places should probably be abandoned because of the risky or particularly fragile nature of their regional ecologies.

Involuntary Migration

Involuntary migration is a major life event driven by upheavals and calamities, either in your personal life and household or in the community in which you live. These crises can cause post traumatic stress

syndrome and other physical and mental issues that may aggravate the general problem and negativity of the situation.

Involuntary migration can rarely be planned when it occurs. It is most often a rapid and sometimes panicked response to a situation that spirals out of control. The best that one can do is to make a general plan for the hazard of involuntary migration, as part of your design for resiliency. See section 9 for more information on preparations for evacuations and "bug-outs."

Migration Lifestyle (Nomadic)

Some people choose migration as a lifestyle. They plan to move at regular intervals. They may or may not rent a home when migrating to a new place. They may have a mobile home (RV, boat, van, bus), or a set of camping equipment, or they may use networks such as World Wide Opportunities on Organic Farms – http://www.wwoof.org/ – or Couchsurfing – http://www.couchsurfing.org – to find casual temporary housing while in an area. Some strategies that people use in such lifestyles include –

-- Minimal personal possessions,

-- Seasonal activities

-- Shared resources

-- Regional networks of support

Voluntary nomads often have a trade that is easy to practice on-the-road, as a way of earning living.

Stability

When faced with trouble, the American frontier ethos was always to "pull up your stakes, pack up your stuff, and move somewhere else."

The grass would be greener there. The climate would be better. There will be more money. There will be more stuff. It will be better stuff. The people there will be more interesting, beautiful, and handsome. I will be more interesting, beautiful, and handsome if I go there.

At one point in my life I thought I felt trapped in a small town in rural Oklahoma that was halfway to nowhere. The land was flat. It wasn't interesting. It wasn't fun or exciting. I had to go somewhere else, again, and again, and again, only to eventually come to the realization that fun, excitement, happiness – life! – is not a matter of the exact geography of my life. Instead what's important are the flows from my own interior disposition and my attitudes about the where's and what's of my life.

Drawing on that frontier ethos, we all-too-often believe that if only we were in a different situation, THEN we would be able to truly live in a way that cares for people, cares for the planet, and has a care for the future. In our fantasies this is in an idyllic utopian setting where we live in an earth-sheltered straw bale home on five acres in a rural area, planted with orchards and perennial vegetables, where we can nurture bees and worms and rabbits and goats and all kinds of fun critters.

But if we want to live the earth-friendly life – now is the time to do so. Tomorrow will never actually get here and yesterday is gone and done with. All that any of us have is the present day. To constantly live in the tomorrow is to avoid the realities of the present.

The real counterculture choice these days that happens to be the choice that cares for people, cares for the planet, and has a care for the future, is to stay put where you are.

Bloom where you are planted, as they say.

Find a place that works for you. Put down some roots and live there. Become part of the ecology. Be your place. Don't live in the future or the past. Live in the present wherever that geography may be.

We live the permacultured life right here, right now, not in some future utopia that will never see the light of day.

This is a matter of doing what we can, with what we have, where we are – and doing it intentionally, as a matter of

design, not as a matter of being wafted this way or that way by the current winds of fashion. Permaculture design allows you to break free of the slavery of high velocity and move at your own speed, in your own time, to the places you choose, by paths you decide to take.

Consider these common synonyms of stability –

> adherence, assurance, backbone, balance, cohesion, constancy, dependability, determination, durability, endurance, firmness, maturity, permanence, security and steadfastness.

The people who are most notorious for their rape of the earth, who are guilty of the worst abuses against people, animals, birds, and communities, are those who have no sense of place. They rush unceasingly from one airport to another. Their lives are blurs of zip codes and hotels and airports. They ignore the unpaid costs of their lifestyles.

To become intimately connected with a particular place, to know it and love it and care for it does not mean that you can't appreciate the beauty and diversity of other places and other peoples. Indeed, being rooted in a geography seems to me to be a prerequisite of the ability to appreciate other places and peoples and cultures.

The velocity of modern life is extreme and it seems unlikely that we will get out of the present situation without slowing things down a bit. That isn't the kind of thing that can be legislated, though. It can only be achieved as the ethics of permaculture become the conventional wisdom of millions. This isn't an impossible task. It is merely difficult.

An embrace of stability as a lifestyle does not suggest that one will never move in a lifetime, but rather that if migration must occur in a life, it will be for reasons that care for people, care for the planet, and have a care for the future. It will not be founded in the existential angst that seems to be driving so much of the modern rootless migration and random travel.

Migration and travel seem so common that those who travel less, who avoid occasions for long journeys, are notable exceptions.

There is no such thing as a "Travel All You Want Without Ecological Consequences" card. However entitled any of us feel to unlimited travel with our only constraint being our personal economic circumstances, flying and driving personal automobiles have enormous negative ecological consequences.

The sad truth of the modern era is that even people with commitments to ecological lifestyles do not model stability. The world is full of "green leaders" who flit unceasingly from one airport to another, justifying their travel because, you know, they are important and special and the movement needs them! People want them to come and personally see them and satisfy their emotional needs for someone important to pay attention to them and tickle their ears with the things they want to hear. The number of leaders in the sustainability movement who travel by sustainable methods (bus, boat, and rail) is, alas, nothing that we can brag about.

I have no objection in principle to traveling to give presentations and speeches, I just think we should praxis what we preach when we do so. That means going by bus or train when traveling between cities and avoiding air travel. If you are so important you have to use an airplane because you are so busy, you are too important to travel and should stay home where you are needed. Foreign travel? Most of us should just stay home.

The "least damaging path" is the right choice for a world that possibly approaches tipping points in climate forcing emissions and declining energy supplies.

It's past time to stop deluding ourselves with lies concocted by corporation greed merchants who encourage us to spend

more money and who care nothing for people, nothing for the planet, and nothing for the future.

So contemplate the concept of "staying put" right where you are. Or, perhaps, make one more migration to find a place where you can put down some roots. If you will migrate during your life, as part of your life permaculture plan, describe the rational reasons for said migration(s).

Country or City

For a long time, "back to the land" was the mantra for the sustainability movement. It is not a new concept. It goes back to the days of Thoreau and the Transcendentalists. The data, however, does not support the notion that rural living is more ecological than city living. The residents of Manhattan, one of the most densely populated parcels of real estate on the planet, live much lower carbon and energy foot print lifestyles than residents of rural Oklahoma and Texas.

While this is a complex subject, it seems to me there are four drivers of interest in rural living.

Farm to market entrepreneurs. There are a growing number of people interested in growing food for direct sale to a local marketplace. This group is often more interested in small plots of land conveniently located to cities where they will market their food.

Desire for rural life. Some people just don't like the busy-ness of the city. They want something more peaceful, quiet, closer to nature. They see that in rural life. They may have close friends and family in a particular rural area where they want to relocate.

Fear. There is a growing concern that our system is not stable and it will collapse. This fear is completely justified. Our system is unsustainable. Unsustainable systems eventually collapse. We hope to manage that collapse but that may not be possible. People think they will be safer in rural areas where they can grow all of their own food and energy.

Desire to live more sustainably. The interest in rural living is often driven by a desire to grow all the food and energy the household needs. People thinking that "growing your own" is the ultimate in sustainability.

I think the first two reasons – desire for rural life and farm to market entrepreneurship – are fine reasons for moving to rural areas. The last two, however, are not good reasons for moving to rural areas.

I have discussed the comparative carbon and energy footprints of rural versus city living in 00131 so I won't repeat that here. The evidence is clear that both have their pluses and minuses. Because of that, absent a desire for rural living or farm to market entrepreneurship, imagining a duty to move to rural areas so they can raise their own food seems not such a good reason for a major life migration.

A household can be at risk of just as much violence in a rural area as they are in a city. If the entire system collapses, it's impact in rural areas will be as severe as in the cities. Rural areas may be overwhelmed by refugees from the city.

Anywhere you go, community is the issue that makes or breaks the safety of a situation. Participation in a local community of care and support is an important factor in developing stability in an area. If you have many beneficial connections in your place of life, it is easier to develop stability than if you are in an area where you know few people and few people are interested in knowing you. It's easy to say "we all need a community of care and support.' I will be the first to admit that that is not always an easy thing to develop in one's life. That's

why iPermie devotes an entire section to that topic.

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06071 Transportation and Access Inventory

The city as a center where, any day in any year, there may be a fresh encounter with a new talent, a keen mind or a gifted specialist-this is essential to the life of a country. To play this role in our lives a city must have a soul-a university, a great art or music school, a cathedral or a great mosque or temple, a great laboratory or scientific center, as well as the libraries and museums and galleries that bring past and present together. A city must be a place where groups of women and men are seeking and developing the highest things they know. ---*Margaret Mead*

You need an accurate vision of your transportation situation to do good design work. How you get to that is up to you. As with all of our inventory commentary, these are questions to help you observe your transportation and geographic situation. Use them if they are helpful. Do something else if you don't find them helpful.

Personal Automobile Transportation

How many automobiles do you own and operate? List them by make, model, year, amount owed and the interest rate if not paid for, the amount of miles driven per year, and the purposes of your driving. If you don't know how many miles you drive per year, or the purposes of your driving, estimate for now, but start keeping track of your trips and the purposes of your goings and comings. With this information, you understand your baseline so you know, over time, if you do better or worse than your history.

How much money does automobile habit cost you each year? Add up the gasoline, taxes, insurance, repairs, capital cost. If you don't have this information, start collecting it.

If you don't own a vehicle, GOOD FOR YOU. This is a significant sustainability accomplishment. Describe how you get around to the various geographies of your life.

Include cab rides in personal automobile transportation. Report them separately from the expenses and miles of your personal vehicle, or in place of a personal vehicle if you do not own a car.

Public Transportation

What access do you have to mass transit? Which of the routine destinations of your life can you reach by public transit? How often do you use mass transit?

Estimate the miles ridden per year on public transportation within your city or metropolitan area. If there are multiple forms of public transportation, quantify your travel by mode of travel.

How much money do you spend on public transportation in the year?

Travel

List your trips outside of your city or metropolitan area, by mode of travel, mileage, and expense. Total the miles and expenses for each mode of travel.

Non-fossil Fuel Travel

List miles ridden and expenses related to non-fossil fuel travel (bicycle, tricycle, electric vehicle, roller skates).

Personal Geographies

Make a list of the routine destinations of your life. List their distance from your dwelling. List their distance from each other if there are any that you travel to from a starting point other than your house.

Classify these destinations by their purposes, the frequency of your visits to them, and the method you use to reach them (walk, ride a bus, drive a car, etc.)

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06081 Access/Transportation Design Challenges

You have got to connect your land use decisions with transportation decisions. – *Tim Caine*

In permaculture, we learn design by actually doing design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has some small projects that you can work that will help you to develop design skills. Never forget that none of these challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

Design a way to get to work or school by walking, public transportation, bicycle, or a combination methods that do not require the use of a personal car. Assume that using a car is simply not an option, either because you can't afford to own and drive a car, or because fossil fuels are not available for private use.

Note that for the purpose of this exercise it doesn't matter if the end result is practical for daily use outside of a fossil fuel emergency, although of course there are always bonus points for practicality. The point of this design exercise is to jump start your mind to think about transportation in ways other than "get in the car and drive." This process starts with "open the door and walk down the sidewalk" and goes from there.

Design a way to get to the other aspects of your life (shopping, entertainment, friends, family), by non-automobile transportation.

If the only way to get there is by walking, go ahead and design this, as it should give you some good perspectives about the geographies of your life. NB: Google Maps will figure a walking path for you between two destinations on its map system.

If as you work through these design problems, you find no practical result for regular use, **design a different geographic relationship between the place you live, and the places you work, study, shop, worship, play**. Where is the sweet spot in the geographic destinations of your life for your Zone 1.

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06091 Access/Transportation Additional Resources

The environmental crisis arises from a fundamental fault: our systems of production -
in industry, agriculture, energy and transportation - essential as they are, make people sick and die. – *Barry Commoner*

Hanson, Susan. The Geography of Urban Transportation. ISBN1593850557. Guilford Press, New York. 2004.

Puncher, John. City Cycling. ISBN 9780262517812. Massachusetts Institute for Technology. 2012.

Sullivan, Bill. "Dime on the Dollar Bicycle Trailer". Mother Earth News, July 1, 1981. Ogden Publications, 1503 SW 42nd, Topeka, KS 66609.

Tumbling, Jeffrey. Sustainable Transportation Planning: Tools for creating vibrant, healthy, and resilient communities. ISBN 0470540931. John Wiley and Sons, Hoboken, New Jersey. 2012.

Wray, J. Harry. Pedal Power: The quiet rise of the bicycle in American public life. ISBN 1594514631. Paradigm Publishers, Boulder, Colorado. 2008.

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Section 7: Community

I alone cannot change the world, but I can cast a stone across the waters to create many ripples. -- *Mother Teresa*

Heroes didn't leap tall buildings or stop bullets with an outstretched hand; they didn't wear boots and capes. They bled, and they bruised, and their superpowers were as simple as listening, or loving. Heroes were ordinary people who knew that even if their own lives were impossibly knotted, they could untangle someone else's. And maybe that one act could lead someone to rescue you right back. -- *Jodi Picot, Second Glance*

What should young people do with their lives today? Many things, obviously. But the most daring thing is to create stable communities in which the terrible disease of loneliness can be cured. -- *Kurt Vonnegut*

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07011 The Importance of Community
Lions and tigers and bears, oh my! Without community, everything is more difficult, expensive, and troublesome. Our secret weapon revealed.

07021 Architecture of Community
Four levels of cooperation.

07031 Civil Society
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07041 Constant, Persistent, and Resilience Communities
Characteristics of communities that sustain themselves over time, resist damage, and recover quickly when attached.

07051 Community Organizing
Best practices for building beneficial connections in neighborhoods.

07061 The Precinct Community Assembly
Starting the equivalent of a New England town meeting in your own neighborhood.

07071 Community Inventory
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07081 Community Design Challenges
Learn design by doing small designs.

07091 Additional Community Resources

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07011 The Importance of Community

No man is an island, entire of itself; every man is a piece of the continent, a part of the main.
If a clod be washed away by the sea, Europe is the less, as well as if a promontory were,
as well as if a manor of thy friend's or of thine own were: any man's death
diminishes me, because I am involved in mankind, and therefore never
send to know for whom the bell tolls; it tolls for thee. -- *John Donne, No Man Is An Island*

Human beings are social creatures. We live in communities composed of intricate patterns of invisible structures and systems that tessellate (fit together like a jigsaw puzzle), annidate (nestle in each other, like a stack of bowls), and superimpose (lay over like a map overlay) on each other. See 00241 for a review of these concepts. Our communities grow from the relationships of human beings in a particular ecological geographic place.

There is a dense and unfortunately strong and active network of invisible structures and their resulting systems that drive the ecological devastation of the planet as well as supporting injustice, violence, and war. We face catastrophes because too many of us make bad decisions formed and driven by the evil influences of invisible structures that make it easy to do harm to our ecologies and hard to do good.

That is not the whole story though.

We have a growing system of invisible structures of support for the ethics of caring for people, caring for the planet, and having a care for the future. Some of us now grow structures of beauty, wisdom, prudence, and stewardship in the midst of the collapsing ruins of the old and failed systems that cause such trauma for the environment and for people. Some estimates suggest as much as 1/3 of the population practices sustainable activities. The young lead the way. This great work goes forward, one decision at a time, by one person at a time, all over the planet.

The more dense and diverse these sustainable invisible structures, systems, and the networks that connect them and transfer information and resources are, the more resilient, persistent, and constant a given community or society will be.

No man or woman is an island. That is an ecological truth. We will not get to a better future as a series of individual solo attempts.

We will either all get there together or we won't get there at all.

So right now at the beginning of your permaculture journey, look for your community.

It doesn't have to be a geographical community, although it may become a community with a place in the geography. You may meet and be formed as a community on the internet and later become actual neighbors.

It doesn't have to be your biological family, but it could be your family.

It doesn't have to be permanent. It can be contingent, temporary, localized to a particular time and place. Later, under the pressure of change in your life, migration, marriage, childbirth, graduation, etc., you

may find a new permaculture community where you can participate.

It can take a traditional form or be something new, invented by its community members.

The take-away is that you need a community in which you can learn and praxis permaculture.

It is easier to learn permaculture in community.

It is easier to implement permaculture in a community.

It is better to live as part of some kind of community. It doesn't have to be a residential community in your neighborhood, especially at the beginning. It could be a virtual cyber-community.

Invisible structures are an integral aspect of your permaculture design for your good life. As long as it is hard to live permaculturally, as long as the system of power and domination holds sway, we remain at risk of collapse and failure. The collapse could be so catastrophic that it could become a generalized die-off of the human species. If this happens, we will take many more of our companion species down with us and the earth's ecologies will be devastated for millennia.

Organizing to advance beauty, wisdom, prudence, and ecological rationality is every bit as important as insulating our dwellings, harvesting rainwater, supporting a food cooperative, etc. The work with invisible structures is not "more important" because this is not a hierarchy of values here. Permaculture is about whole systems thinking. Working with the invisible structures in your life to make it easier for people to live permaculturally is an integral aspect of holistic permaculture design and implementation.

The structures driving unsustainability may appear to be strong and powerful. Yet they are also brittle. They are houses built without firm foundations, on shifting sands. They are unsustainable. Their own internal contradictions and the success of their plans are their own points of failure and collapse. Their end on the ash heap of history is not in doubt. The only question is how much they will take down with them as they collapse and fail. Our job is to minimize and manage that descent so that we allow that which is structurally evil in our societies to fade into the sunset while we preserve the good, the beautiful, and the wise.

Here's hope: They fight with money. We resist with time. They will run out of money before we run out of time.

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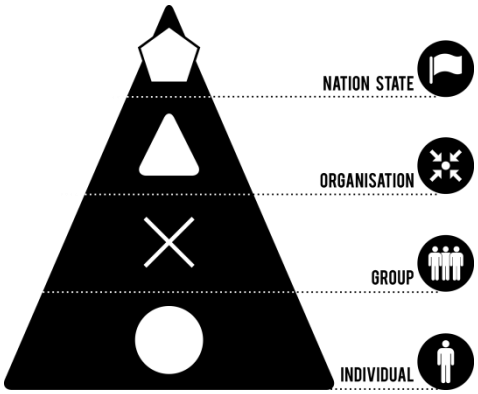
07021 The Architecture of Community

Lovers must not, like usurers, live for themselves alone. They must finally turn from their gaze at one another back toward the community. If they had only themselves to consider, lovers would not need to marry, but they must think of others and of other things. They say their vows to the community as much as to one another, and the community gathers around them to hear and to wish them well, on their behalf and its own. It gathers around them because it understands how necessary, how joyful, and how fearful this joining is.

These lovers, pledging themselves to one another "until death," are giving themselves away, and they are joined by this as no law or contract could join them. Lovers, then, "die" into their union with one another as a soul "dies" into its union with God. And so here, at the very heart of community life, we find not something to sell as in the public market but this momentous giving. If the community cannot protect this giving, it can protect nothing.
– *Wendell Berry, Sex, Economy, Freedom, and Community*

Community is a mixture of both spontaneous and directed order.

Some interesting work on the actual practicalities of organizing structures comes from permaculture thinker and resilience expert Vinay Gupta. The rest of this document derives from his analysis, which can be read in his original presentation online at http://butteredsidedown.co.uk/scim.html.



Levels of Cooperation.

Vinay counts four levels of cooperation. Each level has its own characteristics and requirements for infrastructure. Each depends upon the levels or tiers that it rests upon.

Individual/family

The fundamental units of all societies are individuals and their biological or adoptive families or households.

Groups

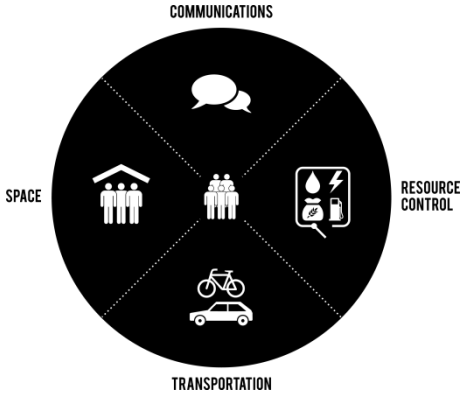
People and families or households form groups to achieve mutual purposes. Each group requires:

-- Communications
-- Space
-- Boundaries
-- Transportation

Boundaries may be literal as in fences or geographies or they may exist in the

realm of ideas and invisible structures. To be a group involves common identification together with an understanding that there are those who are not in the group. This creates boundary conditions. Boundaries and edges are fertile places for action and development.

Groups may not have any leadership. Many people, for example, identify with an ethnic or racial group. But there are no recognized governments of races. We don't find a "governor" of the white people group nor a president for the people of African descent group. Leaderless groups are a common aspect of invisible structures.



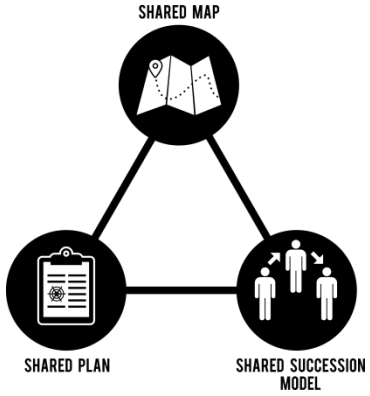
Organizations

Organizations are complex forms of groups with purposes and goals that are more than the simple sum of the purposes of its members. All organizations are groups – all groups are not organizations.

Besides the four common requirements of groups, organizations need:

-- a shared Map
-- a shared Plan
-- a shared Plan of Succession

Organizations are more structured than simple groups. They will have written rules for their governance and an identified leadership group and/or methods of leadership and decision-making.



State

Vinay identifies the State as the fourth level of cooperation. A state has five requirements:

-- Territory
-- Jurisdiction
-- Citizens
-- Effective organizations
-- International recognition

"Effective organizations" refers to systems and structures of governance – a civil service bureaucracy plus systems of protection and safety (police, fire, ambulance, military defense, etc.)

"Effective organizations" includes a system of civil society organizations that explicitly and implicitly supports the system of power and domination that characterizes a particular nation state. Among other purposes that could be cited, they give individuals and groups a sense of empowerment and engagement with the process of governance in their society. That may be real and effective or it may be faux and thus part of the domination system.

In our modern world, we don't recognize a state that does not have a geographical territory as its base, where it exercises jurisdiction. That may not always be the case in the future.

Vinay's work on these issues is in the context of resilience and disaster response. It is useful for our purposes too.

As we look with "permaculture eyes" at the present modern system of nation states, we can see many Type 1 errors. Nuclear bombs, subsidies of environmental destruction, and political criminality run rampant top that list. Alas for us all, nation states are among the most powerful structures driving ecological devastation and injustice in the modern world.

But there is much hope. A modern nation state cannot maintain its legitimacy without the support of civil society organizations and structures. It cannot govern effectively without those systems. The patterns established in the mid-level civil society organizations flow in a multitude of directions. They receive information and resources from grassroots groups, individuals, households, from lateral groups and organizations and from governance organizations. They send information and resources upwards to the realm of actual governance and laterally to other civil society organizations. Without their mediating services, states fail.

Permaculture –

-- Starts at our doorsteps,

-- Uses small and slow solutions,

-- Prefers biological systems,

-- Utilizes natural succession.

In most circumstances our interventions begin at the individual and household level. We combine into groups and then unite to form organizations, through which we can impact the modern nation state.

This is the way we change the State, one individual and family, one group and organization, at a time. It is slow and small and biological. It uses natural selection. It works.

How do we speed things up? We work harder and smarter to develop communities of support and structures of beauty, wisdom, and ecological sanity.

They fight with money. We resist with time. They will run out of money before we run out of time.

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07031 Civil Society

"People use drugs, legal and illegal, because their lives are intolerably painful or dull.
They hate their work and find no rest in their leisure. They are estranged from their families and their neighbors.
It should tell us something that in healthy societies drug use is celebrative, convivial, and occasional,
whereas among us it is lonely, shameful, and addictive. We need drugs, apparently,
because we have lost each other.
– *Wendell Berry, The Art of the Commonplace: The Agrarian Essays*

Civil society is the area of human endeavor that is outside of the family, state, and the market, where people freely associate with each other in groups and organizations to advance mutual interests.

The purposes of civil society organizations can be good or bad from the viewpoint of permaculture ethics.

Civil society organizations may be repositories of **social capital, mutual aid, and solidarity.** By participation in such organizations, individuals magnify their voices and unite with others of like mind. Thus, civil society organizations can be important mediating institutions, that may protect individuals from the power of the state and the market, and that help individuals to communicate with the state and the market.

Civil society organizations may be instruments of **social control and domination.** They can enable people to oppress themselves and assist rent-seeking elites in plundering the common good for private enrichment. They can support systems of injustice and violence and drive nations toward war.

As we develop the ability to think more permaculturally, one of the processes we go through is an examination of conscience regarding our voluntary participation in civil society organizations.

Do our organizations and groups support the permaculture ethics? Or are they integral components of the system of domination, destruction, and greed which drives us toward the ash heap of history?

Is our participation consistent with the permaculture ethics?

Do we give aid and assistance to institutions that support political criminality and economic irrationality and drive environmental catastrophe?

Living in accordance with permaculture ethics is as much a matter of what we don't do as it is what we do.

Refuse to participate – or change your participation – in civil society organizations which support the domination and destruction system.

Involve yourself with civil society organizations that act in accordance with the permaculture ethics.

Cultivate your discernment abilities to understand which is which. "By their fruits you shall know them."

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07041 Constant, Persistent, and Resilient Communities

And the real name of our connection to this everywhere different and differently named earth is "work." We are connected by work even to the places where we don't work, for all places are connected; it is clear by now that we cannot exempt one place from our ruin of another. The name of our proper connection to the earth is "good work," for good work involves much giving of honor. It honors the source of its materials; it honors the place where it is done; it honors the art by which it is done; it honors the thing that it makes and the user of the made thing. Good work is always modestly scaled, for it cannot ignore either the nature of individual places or the differences between places, and it always involves a sort of religious humility, for not everything is known. Good work can be defined only in particularity, for it must be defined a little differently for every one of the places and every one of the workers on the earth.

The name of our present society's connection to the earth is "bad work" – work that is only generally and crudely defined, that enacts a dependence that is ill understood, that enacts no affection and gives no honor. Every one of us is to some extent guilty of this bad work. This guilt does not mean that we must indulge in a lot of breast-beating and confession; it means only that there is much good work to be done by every one of us and that we must begin to do it. – *Wendell Berry*

First a quick review:

-- Constancy: the ability of a system to sustain and support itself.
-- Persistence: the ability of a system to defend itself from attacks and damage.
-- Resilience: the ability of a system to recover after attacks and damage.

A constant, persistent, and resilient community is like a forest. Multiple elements support every important function. Everything is part of a whole. Many beneficial connections unite the community in all of its diversity. It has persistence – it can defend itself from damage – and constancy – it supports itself going forward into the future.

Solutions grow from place. We rarely do anything for only one reason. We do what is necessary. We design and act on a scale appropriate to the circumstances. The community promotes bio-diversity. It takes advantage of the edge effect. Everyone understands that everything, including doing nothing, has consequence(s).

Energy follows patterns set for it and everything works both ways. The community and its households have energy storages appropriate for their needs. All seek a harmony between giving and receiving. They make the least change for the greatest effect. They design from patterns to details. Everything cycles. The community prefers biological solutions. They probe

problems to find solutions. The perfect never becomes the enemy of the good.

People understand first things first and second things second and third things third. The system enables all to participate in their own lives. Thinking and designing outside of the box is the order of the day. No one is afraid of manual labor.

Everything in the community incorporates personal, household, and community responsibility.

They leave no one behind for the wolves to devour. The community cares for people, cares for the planet, and has a care for the future. Cooperation is more important than competition. They do not seek good ends with immoral means.

In other words, this is a community where people incorporate permaculture design and thinking into their everyday activities.

There are structures and systems that support good decisions and that make it easy to live lightly upon the land. While we may be a long way from this destination our journey begins with one simple step, followed by another, and another and so on and so forth in accordance with the journey you design in the permaculture design for your good life.

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07051 Community Organizing

Learn from the people.
Plan with the people.
Begin with what they have.
Build on what they know.
Of the best leaders.
When the task is accomplished.
The people all remark.
We have done it ourselves.
– *Lao-Tzu Tao Te Ching*

The grand-daddy of community organizing was Saul Alinsky, whose career made him famous – or infamous – depending on which side you take. His books *Rules for Radicals* and *Reveille for Radicals* inspired generations of community organizers to make a difference for truth, justice, beauty, and wisdom.

His work continues through the organization he began, the Industrial Areas Foundation, known as the IAF. The IAF provides expert trained organizers to help communities organize to achieve their goals. The methods they use have evolved over time from the original tactics of Alinsky, whose tactics developed in earlier times with different circumstances. The fundamental principle of relational organizing remains a common thread through the group's history.

One way to do this kind of community organizing is to raise the funds to contract with the IAF to send a full-time organizer to jump start the group. If this isn't possible, here is a basic summary of the technique which can be used in any community to achieve its goals.

Identify stakeholder organizations and develop a Coordinating Council.

In most areas, there will be a variety of organizations interested in uniting around a common platform to save and improve their neighborhood. This list may include churches, schools, unions, health care groups (hospitals, clinics, etc.), other kinds of clubs (ethnic groups, athletic groups, etc.) Leaders of these organizations meet together and discuss their problems. We'll call this group the coordinating council.

House Meeting Listening Sessions

The coordinating council arranges for a series of house meeting listening sessions. Each organization commits to holding a certain number of these sessions, however many they think they can schedule. Each meeting has a facilitator trained by the coordinating council. The training doesn't have to be fancy or extended. It involves a basic meeting process that encourages people to share what their greatest problems and issue are in their own lives in the community. Most or all of the coordinating council can be meeting facilitators.

Listening Sessions Agenda

The agenda for the meetings is to listen to people tell their stories. From those stories, the group hopes to understand more about grievances, problems, opportunities, and strengths of the area. We look for the next tier of leadership – the grassroots. Most people get involved because someone asked them to get involved so the coordinating council has to look for people willing to ask their friends, families, neighbors, and co-workers to do something. We'll call those kind of people our neighborhood leaders, although they may not be a geographical neighborhood. They could be a faith-based "neighborhood" found in a religious organization.

Avoiding problems that kill local organizations.

The program for the group is relentlessly local, non-sectarian, and nonpartisan. The only way that can work is if each of the constituent organizations has an absolute veto on each plank in the group's eventual program of action. This forces the group to concentrate on issues that unite the various groups and to literally ignore the issues that divide the various groups. A local community group, with a variety of religious people involved, will not take up the issue of abortion, because of religious divisions on that issue. That exclusion doesn't mean that the group will be bored and lacking for things to do. In every area there are a multitude of issues that people of good faith can agree to work on for the common good of all.

Organizations are accountable for their participation.

Each of the involved organizations delivers on group goals. In the beginning, that will mostly be the process of organizing the house meeting listening sessions, training the facilitators for those meetings, and identifying the next tier of leadership – neighborhood leaders. The process is the result of negotiations among the stakeholders in the developmental meetings of the coordinating council, before they start to hold listening session meetings and schedule other activities. The council does not assign goal. Each individual group in the coalition decides on its goals.

Stories and leadership recruitment.

At these listening session meetings, people tell their stories. Afterwards, somebody writes down notes about the conversations. Besides listening and keeping the meeting going, the meeting facilitator is on the lookout for potential grass-roots leaders. As many of the primary leaders of the stakeholder organizations as is possible should be involved either facilitating or at least attending the listening session house meetings.

Information goes to the coordinating council.

The information developed at these meetings – in the form of meeting notes, attendance records (with names and contact info), and information on potential leaders goes to the coordinating council who sort through and organize the information. This sifting is mostly a judgment call. It is primarily a matter of "how many people mentioned this" and what kind of relevance/importance does the coordinating council – and the individual groups – believe that a given issue has to the larger issue of the deterioration of their community.

Coordinating Council makes a presentation to the organizations.

The coordinating council sends a document summarizing the findings of the listening sessions to the stakeholder organizations. They respond back to the coordinating council. There may be another round of listening sessions perhaps focused on a proposed platform developed from the first round. This goes on until there is a good commitment of all to set of program "planks" – areas of activity that the group wants to work on. Each of these should be accompanied with a short paragraph explaining the

problem and what we want to see happen. (The platform of VOICE – Voices Organized In Civic Engagement, which is an IAF affiliate in Oklahoma City, is at the end of this chapter as an example. It took two years for the group to develop this program.)

The group adopts the platform.

The coordinating council can then schedule a large group meeting, where each stakeholder organization works to maximize attendance. At that time, the group votes to accept the program platform. Any vetoes that any of the member groups want to use should already have been exercised so at this point, the stakeholder organizations have broad agreement as to the suitability of the platform.

Looking for grassroots leadership

Who are good potential leaders? According to the Industrial Areas Foundation, they look for (1) a sense of self-interest in getting involved, (2) the willingness to act, (3) a sense of "cold" or "controlled" anger. "They also look for a sense of humor, imagination, maturity, risk-taking, responsibility, aggressiveness, integrity, and a healthy ego."

Relationship organizing.

This form of community organizing is relentlessly relational. It is about people developing trusting relationships outside of individual groups and neighborhoods with other people.

The group takes action.

The coordinating council organizes task forces for each of the program planks, who in turn propose actions to the coordinating council and the constituent groups.

Praxis is critical for the long term success and development of the organization.

Praxis is "action grounded in knowledge combined with reflection and evaluation." Immediately after an action, leaders meet and discuss what has just happened. As a result of this process, over time personal self interest comes into line with group objectives.

House meetings continue.

The coordinating council will organize additional rounds of house meetings about specific issues the group works on.

More info.

You can read more about this kind of IAF organizing at http://www.citizenshandbook.org/iaf.pdf.

Most IAF affiliate organizations have a budget of about $150,000, which covers the salary of a full time organizer and other expenses. Member organizations pay dues, often a percent of their revenues.

The key to their success.

It seems to me that the keys to the IAF success are –

-- The agreement to concentrate on issues that unite rather than issues that divide.

-- A combination of grassroots involvement with effective leadership.

-- Relational organizing.

-- An emphasis on praxis, not just doing stuff.

-- The use of stories and deep listening.

Any kind of community organizing will benefit from these principles.

The Three Radical Truths of Community Organizing:

1. Heart work is hard work.

2. You have to keep dancing even when you can't hear the music.

3. The path that makes you afraid is the path to take. (FACE)

VOICES ORGANIZED IN CIVIC ENGAGEMENT FRAMEWORK OF ISSUES

Author's Note: This is the platform of the Oklahoma City IAF affiliated organization, Voices Organized in Civic Engagement. It was developed during a two year period of organizing and listening.

These are the areas to which our work is limited. They have come from the stories of people in our member congregations and have been shaped by the religious traditions that call us to seek justice.

SENIOR CARE/RETIREMENT. Our religious traditions call us to "honor your father and mother," not throw them away when they are no longer economically viable. Our seniors need adequate food, shelter, and access to dependable transportation. Programs that serve these needs must be funded adequately and demonstrate accountability to the well-being of their charges.

INFRASTRUCTURE. Our neighborhoods must be safe places for children, their families, and our seniors. We need sidewalks and safety.

IMMIGRATION. As our nation struggles to come up with an immigration policy that protects our borders and addresses current needs, our Metro-area focus will be protecting immigrants from local abuses.

TRANSPORTATION. Public transportation must work for families, especially children going to and from school, adults who rely on it as their sole means to and from employment, and seniors who become isolated once they are no longer able to drive. Improved schedules and routes are essential.

HEALTH CARE. We seek better access and more affordable health care, both physical and mental. We are committed to educating ourselves about ever-changing health care policies and understanding and implementing strategies that will work more effectively for families on the local community level.

ECONOMIC JUSTICE. Our families want to identify the best opportunities for jobs that will support them without assistance. We want to make existing jobs better and work to improve job training programs.

FAMILY SUPPORT. Families have taken on increasing levels of risk and responsibility; when extraordinary circumstances occur, they must have support. We need adequate programs for mental health, domestic violence, drug rehabilitation, special needs, and support for families of returning military personnel.

PUBLIC SCHOOL EDUCATION. Our children must receive high-quality education in a safe environment; our teachers must be supported, made to feel safe, and provided with optimum classroom environments.

PRISON JUSTICE. We propose to examine the laws and structures that make our state the number one incarcerator of women and act together so that we can reclaim women and men and reintegrate them back into our families and the greater community.

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07061 The Precinct Community Assembly

The only way ... for our community to be a better place to live is for the people of the community to understand and accept their personal responsibility for what happens. – *Davis Merritt, Jr.*

In the United States, the smallest level of political organization in most states is a "precinct" or "election district." They usually do not have their own government organization, but are subunits of larger governments like cities or counties. According to Wikipedia, the average number of voters in a precinct ranges from a low of 437 in Kansas to a high of 2,704 in the District of Columbia. The average voters per precinct is 1,100. In 2004, the nation had about 174,000 precincts in the states and territories of the United States.

Political parties often have organized representation at the precinct level. In some states, political parties hold meetings in precincts that elect delegates to county conventions.

A Precinct Community Assembly is a meeting of people who live in an election precinct. It's a "town meeting" of the people who live in a particular geographic area. Most areas outside of New England do not have an organized system of town meetings rooted in place.

No one needs any authority from anyone to start a Precinct Community Assembly. All you need is –

-- a place to meet,

-- a map or description of the boundaries of the precinct,

-- a way to get the word out that a meeting of the residents of a the precinct will held at a certain time and place.

This makes it an excellent strategy to use to build grassroots support for sustainability initiatives and direct democracy. Such meetings could talk about issues important to that neighborhood and about other issues affecting the larger community.

It could evolve over time into a regular meeting, the equivalent of your own Town Hall Meeting. You could work with other Precinct Assemblies in your area.

A quarterly schedule would work well in the beginning, as you get things going, but this could evolve over time into a monthly event. The group could start committees and task forces and debate and pass resolutions to be forwarded to the government representatives responsible for the area.

Use the Precinct Community Assembly technique to build a grassroots organization that will become a building block in a movement that will eventually create governments that care for people, care for the planet, and have a care for the common good.

It is one of the early steps towards overturning the system of political criminality which makes all our other problems so much worse.

In other words, the Revolution starts at your own doorstep.

If you get something going, email me at pca@ipermie.net and register your Precinct Community Assembly. As this

catches on, there will be some networking opportunities and resource directories made available.

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07071 Community Inventory

Our real freedom comes from being aware that we do not have to save the world,
merely make a difference in the place where we live. –*Parker Palmer*

Here are some questions to help you develop your community inventory. The Invisible Structure inventory anticipates some of these structures. The redundancy indicates the critical nature of these observations.

What is your community? Alternatively, what communities do you affiliate with? Some may be based on geography, others on politics, ideology, or religion. You may belong to communities whose only existence is in cyberspace. Observe this in your life and write it down on paper so you can study it.

What strengths does your community (communities) have?

What problems are found in your community (communities)?

What groups do you identify and/or affiliate with? List by name and sort by activity, purpose, or characteristic that you identify with. This is not quite the same question as the question on your community affiliations.

Identify organizations where you affiliate located within your immediate geographic community. E.g., neighborhood or building association, school, fraternity or sorority, lodge, religious, economic, civic? List by name and group by activity or purpose.

What organizations do you affiliate with that are regional, national or international in scope, or that relate to your profession, religion, or education? Group by purpose.

Are there any patterns of connection between/among these groups?

What needs in your life are not presently being met by your community?

What new structures or systems does your community require so that your needs could be met locally? Do your organizations and groups support the permaculture ethics?

Or are they integral components of the system of domination, destruction, and greed which drives us toward the ash heap of history?

Is your participation consistent with the permaculture ethics?

Do you give aid and assistance to institutions that support political criminality and economic irrationality and drive environmental catastrophe? If so, what organizations are those and what do you do with them?

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07081 Community Design Challenges

When we cast our bread upon the waters, we can presume that someone downstream
whose face we will never know will benefit from our action,
as we who are downstream from another will profit from that grantor's gift. *–Maya Angelou*

Very great change starts from very small conversations,
held among people who care. *–Margaret Wheatley*

In permaculture, we learn design by actually doing design. The purpose of the Design Challenges document in each of the sections is to give you practice doing design. Each challenge document has some small projects that you can work that will help you to develop design skills. Never forget that none of these challenges exists in isolation. Each is an aspect of the holistic design for your life that is the iPermie goal!

Design a community permaculture organization. What are its characteristics? What is its scope? How does it help people? What is the minimum number of people needed to make it operational? How will it be governed? How will it be financed? Or will you need financing? If not, how are its operations maintained? What groups would be interested in such an organization?

Design new community structures or systems to meet human needs.

As part of your observation, you identified needs that are not presently met by other members/organizations/businesses/systems of your community. What organizations, businesses, and/or systems does your community need to meet the needs of its inhabitants from the productive work of that community? Prepare a summary of the organizational process that would bring into being the organizations and/or systems you need to meet your basic human needs from your own community. In permaculture, we refer to a summary like this as a "predesign." It hits the high points of the journey. It does not flesh out all the details.

Repeat this as necessary until you can meet as many needs locally as is practical within the resources of the local community and its territory.

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07091 Additional Community Resources

If you bring the appropriate people together in constructive ways with good information, they will generate authentic visions and strategies for addressing the shared concerns of the organization or community. – *David Chrislip & Carl Larson*

There's something I know about you that you may not know about yourself. You have within you more resources of energy than have ever been tapped; more talent than has ever been exploited; more strength than has ever been tested; and more to give than you have ever given.
–John Gardner

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Section 8: Economics

Community is a sign that love is possible in a materialistic world where people so often either ignore or fight each other. It is a sign that we don't need a lot of money to be happy--in fact, the opposite. -- *Jean Vanier, Community And Growth*

A proper community, we should remember also, is a commonwealth: a place, a resource, an economy. It answers the needs, practical as well as social and spiritual, of its members - among them the need to need one another. The answer to the present alignment of political power with wealth is the restoration of the identity of community and economy. -- *Racism and the Economy, Wendell Berry, The Art of the Commonplace: The Agrarian Essays*

There's class warfare, all right, but it's my class, the rich class, that's making war, and we're winning. -- *Warren Buffett*

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08011 The Money Games
Unit of account, store of value, medium of exchange, method of theft, measure of energy flow, system of oppression, driver of environmental degradation, measure of criminality, invisible structure. Money encompasses many games.

08021 Financial Permaculture & Slow Money
8 forms of capital, new concepts of wealth and investing, how to get there from here.

08031 The Essentials of Economic Sustainability
Sustainable economies grow from nature and society. Living systems, holistic, dynamic, individualistic, context specific, purposeful, resourceful, regenerative, constant, persistent, resilient.

08041 Alternative Economic Systems
Planting and cultivating seeds of a new economic future.

08051 Cooperatives
The number one economic "pioneer plant" available for colonizing the damaged and disturbed economic ecologies of our era.

08061 Economic Survival Strategies
Defending yourself and all you love against the predatory politics and economics of our corrupt elites.

08071 Frugality Fundamentals
Frugality is the strategy associated with weaning us away from this perpetual cycle of consumption, waste, excretion, and more consumption. It closes the door on the economy of scarcity and plants the seeds of the good-life living of an economy of abundance.

08081 Design for Abundance and Economy
Resourcefulness. Regeneration. Money pits and traps. You get what you design. Managing wants, greeds, needs.

08091 Alternative Currencies and Investment Structures
From Ithaca Hours to Time Banks, and on to Crowd-sourced Finance. A quick overview of non-traditional alternatives for capital formation.

08101 Job and Career
The perils of putting the cart before the horse, which always annoys the horse and gets you nowhere fast. How much work do you need to do anyway?

08111 Why student loans and other debts are dangerous
The borrower is the slave of the lender. Why it is best to pay cash. The most dangerous debts? Student loans and credit cards.

08121 Design for Regeneration
Keeping surplus in circulation so that over time prosperity increases and decentralizes.

08131 Macroeconomics and the subjugation of peoples
How to live a good life that isn't subsidized by wholesale death and destruction elsewhere.

08141 The Unplugged
"A society is just individuals and families, and sometimes families of families, all the way up to States and Governments and the International Agencies and so on. If you solve the problem for a single family, and it's something which can compete in the evolutionary marketplace of ideas, then eventually you can solve the entire problem."

08151 Unplugging as a Lifestyle Strategy
Turning fiction into reality.

08161 Tools for Economic Sustainability
Open Source Ecology and why it is so important.

08171 Economic Inventory
Understanding where you are with your economics is the first step towards a better situation.

08181 Design your household economics
Areas of important design for your personal economic system.

08191 Additional Economic Resources

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08011 The Money Games

Seven Deadly Sins:
Wealth without work
Pleasure without conscience
Science without humanity
Knowledge without character
Politics without principle
Commerce without morality
Worship without sacrifice.
-- *Mahatma Gandhi*

Money is an invisible structure. It is first and foremost a matter of **what people believe to be money.**

A traditional economic textbook defines three components of money –

-- It is a **unit of account**, a way to keep track of values expressed in monetary units.

-- It is a **store of value** that can be created/acquired in the present and spent in the future.

-- It is a **medium of exchange,** facilitating commerce and trade.

A less traditional textbook might add these additional features –

-- It is a **method of theft**. By politically manipulating the value of money (or even the definition of money), value can be stolen by people with access to political influence.

-- It is a **measure of energy flow.** People, institutions, and businesses who spend more money use more energy.

-- It is a **system of oppression**. In a society based on money, throughout history the have-nots have been oppressed by the have's.

-- It is a **driver of environmental degradation**. By pretending that the only unit of accounting that matters is money, we exclude all other values and issues from consideration.

-- It can be a **measure of criminality**. In kleptocracies (societies ruled by criminals and thieves), wealth is a measure of the criminal activities of the wealthy.

Traditionally, we identify three kinds of money:

-- Commodity money recognizes certain items or substances as money. Gold, silver, and copper come readily to mind, but other commodity items used as money over the years include decorated belts, large stones, tobacco, salt, and peppercorns.

-- Representative money is a system where people use paper receipts for commodity money as if they were the commodity money. Older people in the United States may recall that our currency

used to have an inscription – *"Redeemable in lawful money of the United States."* Instead of handing over 10 silver dollars, we spent a ten-dollar warehouse receipt. Somewhere there were ten silver dollars in a vault making that paper worth ten silver dollars. Or at least, the government claimed they had one silver dollar in a vault for every paper silver dollar note in circulation.

-- Fiat money is money that a recognized authority declares to be money. United States currency notes today carry this inscription: *"This note is legal tender for all debts, public and private."* People recognize US currency and coins as money, even thought the notes and coins have no commodity money value, so the US dollar is valuable. Fiat money has no relationship to any commodity money. I remember my grandfather saying that no good would come from the switch from commodity (and its corollary, representative money) money to fiat money and it looks like history has proven him correct. For one thing, war is expensive. If money had remained limited to gold and silver, governments would not have been to able to afford the large military expenditures of the second half of the 20th century. The military expenditures and wars of the first half of the 20th century clearly bankrupted the gold and silver money system that prevailed at the time.

Depending on the amount of oppression and injustice in a society, the value of money may be in the eye of the beholder – or in the eye of the holder – or in the eyes of both.

During times of inflation of the money supply (more money circulating), the value of money decreases. More money is available so people pay more for the items. The price rise is not the inflation. It reports the previous inflation of the money supply.

During times of deflation, the value of money increases. Less money is available, so people do not pay as much for what they need or want. The price decrease is not the deflation. It reports the deflation of the money supply.

The destruction and creation of credit is the same as creating or destroying actual money. Credit works the same as money when it comes to inflation and deflation because you can spend or save it immediately.

The history of civilization is a history of changes in the value of money – and in what is considered to be money.

Fiat money systems – which depend entirely upon due process and manufactured consent – can be brittle when placed under stress.

One day green notes of a certain design are legal tender – but with a stroke of a pen, the issuing authority can make all of the green notes of a certain design worth nothing, and issue new notes, with a different design and color, as money. This happens frequently in the history of money, especially during times when its value falls quickly to low levels (known as hyperinflation).

I have some stamps from Germany after World War I that cost one billion marks each. Before the war, four German marks bought one US dollar and twenty US dollars bought one ounce of gold. If someone had sold US dollars and bought German marks, during and after World War I they lost all their money. They would still have paper notes in the form of marks, but their value would be effectively zero.

Before the war, one billion marks would have bought 12,500,000 ounces of gold. After the war, it could mail a letter.

Psychologies of Money and their Consequences

In the modern world, money has come to be an all-encompassing god.

Everything revolves around money – getting it, spending it, investing it, earning it, losing it, stealing it. We look up to the wealthy and we scorn the poor.

But as the importance of money increased, so did the problems of money.

Lifestyles of gluttony and excessive consumption of material goods, fueled and financed by money, rape and ruin the natural environment.

As our society moves closer to collapse, there is a growing centralization of wealth, with the top 1% of households making out like Phat Rat while the rest of society experiences a rapid decline in purchasing power and household wealth.

Money is the prime mover and controller of our political system, with billions of dollars spent on campaigns. Those without money have little or no voice in political affairs.

Wealthy elites manipulate the political system to transfer wealth to the top of our economic pyramid at the expense of everyone else. As just one example among many that could be listed . . . The Federal Reserve manipulates interest rates, holding them at excessively low rates for a long period of time. This subsidizes debt. It penalizes those who defer pleasure for future gain and save their money rather than wasting it.

Elites own the banks and profit from this **transfer of wealth from the productive to the financial class**. They prefer that we borrow money and pay them interest.

When we make them loans by depositing money in their banks, they don't pay much interest to depositors. Why should they worry about paying us a just price for our money when the Federal Reserve loans them money at nearly zero interest rates? Since the Federal Reserve does the bidding of the economic aristocracy, it obediently keeps the interest rate low. In other words, the Federal Reserve and the banks conspire to subsidize the grasshoppers at the expense of the ants.

Money is the primary driver of environmental degradation. When considering whether to clear cut a forest or harvest it in a more sustainable method, the only calculations that corporations use are profit and cost. How much money will they make by clear cutting versus sustainable harvesting? Accountants do not record the value of the forest, as a natural system, and its constituent creatures and plants. Nature has no value in and of itself in the modern world of finance.

As we gain control over our lives by implementing permaculture design principles, we reduce the power of money. By withdrawing your consent, one small step at a time, from the money system, we help build a better future no longer dependent upon big money and big banks.

Here are some practical money tools to help you care for people, care for the planet, and have a care for the future.

Never bank at a big national bank. Use a locally owned credit union, or a locally owned bank, for your financial needs.

Never use a credit card. If you have any, cut them up, pay them off, close the accounts. Minimize your use of debit cards to transactions where you can't pay cash or write a check. Every time you use a card, the financial elite gets a cut of the transaction. Over time, this transaction cost siphons money out of the real economy and into the accounts of the economic elites.

For online transactions, **consider signing up for Dwoll**a – http://www.dwolla.com – through which you can do online business via checking account transfers, without the use of credit or debit cards. Their fees are low.

If at all possible, **work for your living in a local or regional economy** and avoid the national and transnational economies.

Shop and produce as much as possible in your local real-person economy. Avoid franchises and corporation chain stores.

Spend your money intentionally. Every dollar spent is a vote. Be wise in your voting.

Never willingly invest in the stock market. Invest in real activities with real people. If your work has a retirement plan invested in the national stock markets, lobby your employer to provide an alternative in the form of a local account at a credit union or local bank.

Explore alternative investment structures that can benefit your local economy.

Save money for emergencies, life changes, big purchases, and retirement. Use a credit union or locally owned bank. Aim for at least a full year's of expenses for your "money storage." Keep some cash hidden outside of a bank in case of a "bank holiday" due to an extreme financial crisis.

Keep some of your savings **in the form of food storage** and some of your savings **in the form of gold and silver** as a hedge against seriously hard times.

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08021 Financial Permaculture, Slow Money, and Eight Forms of Capital

Too many people spend money they don't have . . . to buy things they don't want . . .
to impress people that they don't like. – *Will Rogers*

A primary characteristic of the mainstream economy is the extreme velocity of its financial transactions. Stock markets move so fast that computer programs execute many trades – no human intervention required or even wanted.

One of the most radical things that we can do with our money is slow it down and localize it. Instead of sending it to New York and Chicago and Los Angeles, we should endeavor to keep it at home, close at hand, for as long as possible. This starts when we keep our money in credit unions and locally owned banks who invest in the local community.

Permaculture author and consultant Eric Toensmeier defines financial permaculture as –

> . . . the design and management of business and monetary systems that increase ecological health while meeting human needs. Financial Permaculture thinking can be applied to many different economic and business models, suited to specific circumstances and designed accordingly. More at http://www.financialpermaculture.com/cms/aggregator?page=1

The Financial Permaculture Institute is a group of people in Lewis County, Tennessee who have been exploring these ideas in their community for several years. About their work, they say –

> The FPI's primary finding have been that the most viable steps in our bioregion are towards creating more, healthier, and more regenerative local businesses, and empowering people to become regenerative investors. The task at hand, as we see it in our region, is the creation of businesses that turn a profit in the existing (and for the most part broken) financial system, and re-invest that profit into more regenerative projects and businesses in the local community. This strategy puts power back into the hands of local people, and has demonstrated the capacity to build a movement slowly and surely while still keeping an eye on the bigger picture of opportunities for whole-systems regeneration. Instead of focusing on policy change we seek to engender change on the personal scale to empower individuals, friends, family and communities to invest in projects that matter to them, to buy and bank locally, or within a clear ethical and strategic framework, and to concentrate on building businesses that build local and multi-local resilience. http://www.financialpermaculture.com/cms/aggregator?page=1

They identify **four financial permaculture design principles:**

Decentralization is better than centralization. The current financial system is linear and centralized, and is designed to continually further centralize power and wealth. We must find ways to decentralize power and wealth so that people within a given community can make well informed, well resourced, and locally appropriate decisions.

Participatory design is true democracy. By empowering people with the process and tools needed to take decision-making into their own hands, we tap into the wisdom and fresh thinking of previously unheard voices.

Land based businesses that use permaculture as a foundation of their design; production and distribution processes are the best investments and form the foundation of any viable long-term economy.

Financial Intimacy creates closely knit and resilience communities. Invest in local enterprise. Invest in the dreams you share with friends, family and community. Become a stakeholder in your vision for a better world.

They use two primary processes in creating successful businesses by permaculture design:

-- Participatory design, and

-- Holistic management.

Participatory design utilizes group processes to involve the stakeholders in the design and birth of businesses. The Hohenwald Financial Permaculture team developed nine steps in this process:

-- Framing the discussion and design
-- Building community cohesion
-- Mapping the financial ecosystem (or other context)
-- Brainstorming
-- Narrowing the options
-- Digging into the details
-- Presenting the final projects to each other
-- Articulating achievable next steps and generating responsibility for those next steps.
-- Celebrating success.

Holistic Management includes both holistic goal setting and holistic financial management created by Allen Savory. More information about it is available at http://holisticmanagement.org.

While financial permaculture is a big tent, those involved thus far believe that the entire conversation can be simplified into two questions:

What are the most successful strategies for creating profitable right livelihood?

What are the most successful and accessible strategies for reinvesting profit back into the community?

The answers to these questions will vary based on context. They frame the parameters of a future of just and sustainable opportunity that cares for people, cares for the planet, and has a care for the future.

See http://www.perennialsolutions.org/financial-permaculture-organizing-communities-to-manage-resources-with-perennial-objectives-ends.html for more information on financial permaculture.

Eight Forms of Capital

Ethan Roland is one of the originators of the financial permaculture concept. He helped facilitate the first two Financial Permaculture summits in Hohenwald, Tennessee. Later, in conjunction with Catherine Austin Fitts, another of the financial permaculture leaders, he

formulated the concept of “Eight Forms of Capital” which he identifies as:

-- Social capital
-- Material capital
-- Financial capital
-- Living capital
-- Intellectual capital
-- Experiential capital
-- Spiritual capital
-- Cultural capital

Read more about this concept at http://appleseedpermaculture.com/8-forms-of-capital/.

Slow Money

The Slow Money movement could be summarized as “investing as if food, farms, and fertility mattered.” These are its principles:

The Preamble of its principles says: –

In order to enhance food security, food safety and food access; improve nutrition and health; promote cultural, ecological and economic diversity; and accelerate the transition from an economy based on extraction and consumption to an economy based on preservation and restoration, we do hereby affirm the following Slow Money Principles:

I. We must bring money back down to earth.

II. There is such a thing as money that is too fast, companies that are too big, finance that is too complex. Therefore, we must slow our money down -- not all of it, of course, but enough to matter.

III. The 20th Century was the era of Buy Low/Sell High and Wealth Now/Philanthropy Later—what one venture capitalist called “the largest legal accumulation of wealth in history.” The 21st Century will be the era of nurture capital, built around principles of carrying capacity, care of the commons, sense of place and non-violence.

IV. We must learn to invest as if food, farms and fertility mattered. We must connect investors to the places where they live, creating vital relationships and new sources of capital for small food enterprises.

V. Let us celebrate the new generation of entrepreneurs, consumers and investors who are showing the way from Making A Killing to Making a Living.

VI. Paul Newman said, "I just happen to think that in life we need to be a little like the farmer who puts back into the soil what he takes out." Recognizing the wisdom of these words, let us begin rebuilding our economy from the ground up, asking:

What would the world be like if we invested 50% of our assets within 50 miles of where we live? What if there were a new generation of companies that gave away 50% of their profits? What if there were 50% more organic matter in our soil 50 years from now?

http://www.slowmoney.org/principles

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08031 The Essentials of Economic Sustainability

Wealth consists not in having great possessions, but in having few wants. – *Epictetus*

iPermie is not an economics textbook. It is a discussion of using permaculture to hack a good life design that works for you. In doing that we touch on some big issues and one of them is economics. This is necessary because you need a **personal economic plan** for your good life design. It will inform your work with invisible structures as you become the process of change and reform to pull us back from the precipice of sudden collapse. A true understanding of ecological economics helps you manage the great forces of change coming at you. The world needs big changes. those large events begin in your own life and household. As you model sustainability by the way you live, you make it possible for our entire society to become more sustainable.

This chapter draws heavily on the work of Dr. John Ikerd, professor emeritus of economics at the University of Missouri at Columbia and his book "The Essentials of Economic Sustainability." Those who want to explore these concepts in greater depth should read the book cover to cover.

All economic value comes from nature and society.

There are no other possible sources of wealth. Nature and society are it! The economy creates nothing without nature and society. It is an artifact of nature and society. The economy facilitates productive work. It cannot create anything that does not have its origin in nature.

As it currently manifests, economic activity everywhere degrades the productivity of nature by destruction and pollution. It punishes our society with corrupt values.

And so it comes to pass that our economy is in deep trouble. By allowing our economic activities to attack and damage the foundations of our economy – nature and society – we dig our grave. We sow the seeds of our own demise. We drive ourselves towards the ash heap of history.

There is a d**irect relationship** between **the corruption of our natural ecologies and our societies values** and the present precipitous worldwide **declines in our economies**.

As we degrade nature and society, we degrade the capacity of our money economy.

Most economists believe that imagination and creativity can find something to substitute for any depleting resource. We think we can find a solution for every problem with the right economic incentives. Thus, mainstream economics assume that economic sustainability is a matter of assigning monetary values to those assets and public goods contributed by nature and society.

The problem is that no investment that pays off outside of the lifetime of the investor makes any economic sense in the present order of things. The longer the payoff timeline, the lower the present value of the investment in monetary terms. An investment with a payoff one thousand years in the future has an effective current value of zero.

Yet, a sustainable future requires long-term social and ethical value investments. We must protect and promote the common good of society and the planet.

That idea does not have a place on the balance sheets of modern corporations and governments.

That's a big problem.

Sustainable economics is a holistic discipline. It cannot be understood as parts. It must be embraced as a whole.

Change is a constant in human society. It appears that every few hundred years human societies experience times of great transformation. We may be approaching such a time right now.

An economy that does not meet the needs of its people is unsustainable and prone to collapse. Even a cursory examination of our present economic arrangements shows they are inadequate for the requirements of these times.

-- They do not meet the needs of all people.

-- They do not meet the needs of nature.

-- They do not meet the needs of the future. Indeed, the economic transactions facilitated by our present system come at the expense of the needs of the future.

Sustainability is not a matter of everyone having everything that they want. It is a matter of ensuring that the economic system meets the basic physical and mental needs of the population. In doing so, we must not steal present prosperity from the future.

All physical things that we need require energy, so **economic sustainability requires sustainability in our use of energy.** The problem is that pesky Second Law of Thermodynamics, which dictates that every time we do something useful, a little something of that usefulness is lost. In popular terms, we formulate those laws as – (1) You can't make a profit, (2) You can't break even, (3) You can't get out of the game.

POP QUIZ! How many references does this make to the Laws of Thermodynamics in iPermie? What does that suggest about the importance of the Laws of Thermodynamics for permaculture design and your own personal future?

That's why our fossil fuel based economy is inherently unsustainable. We power the present by mining the past and shifting significant costs into the future.

Solar energy and biology are the only strategies we have that can finesse the inevitable loss of energy due to the Second Law of Thermodynamics.

Economic productivity happens when people transform the energy and resources available to them from nature into stuff that is useful to them. What and how much we get depends on the people, their education and organization and the systems that facilitate trade and economic activities.

But no amount of ingenuity, creativity, and work can create something out of nothing. We can't create energy. We can only harvest or mine it and use it for our purposes.

Besides fossil fuels, social energy powers power our economic transactions. This refers to the time, resources, and work spent to maintain positive, productive human relationships. We constantly deplete our social energy and it must be regenerated and renewed. Nothing happens for nothing. **Families, communities, and societies all require work, resources, and time.**

Economic values and relationships are **individual, instrumental, and impersonal.** An economy is a collection of individuals and individual collective organizations. All economic value ultimately accrues somewhere to some one (or some collective).

Economic values are instrumental because they are means to ends. In this case, we want something in return for our economic action. Thus, we defer value in a transaction until we receive something of value. This suggests a problem if the value to be received is one hundred years

in the future but we expect payment in the present.

Economic relationships are impersonal because one person's dollar is the same as every other dollar in existence, no matter who owns it or its geography. A = B and B = C so A = C.

Social values are not impersonal. They are individual and instrumental. Reciprocal might be a slightly better word than instrumental, because social relationships go "both ways." A social relationship won't be as well defined as an economic contract. These relationships are not economic because they are self-evidently personal, not impersonal. Our social relationships vary, based on who our social relationships are connected to. They are context-specific. They don't produce any marketable stuff that we can sell or trade. It is not possible to assign an economic value to a personal relationship.

Now we come to ethics, which are different from both economic and social relationships. **Ethical relationships are noninstrumental but they are impersonal.** The permaculture ethics of caring for people and caring for the planet are the same for everyone, irrespective of any personal or economic relationship we may have with the person or entity.

Behavior driven by ethics does not expect an economic reward. It's not a means to an end. Ethical relationships do not produce economic value. Even if we expect to go to heaven when we die, because we lived in accordance with our ethical values, we don't expect to be paid in this life for what we do that is good and beautiful and true.

The claim of modern classical, a/k/a unsustainable economics, is that every person attempts to maximize his or her "individual, impersonal, instrumental economic self-interests."

Unsustainability economists will admit that people "appear" to do things that are not directly related to their economic self-interest. They will claim that these are economic actions anyway since they somehow benefit the individual. An extreme example of this is the philosophy of objectivism, as developed by Ayn Rand, which argues that there is no such thing as altruism, that all actions by individuals are fundamentally selfish in their nature. Thus, the unsustainability economists reject the concept of non-economic action by human persons.

On the other hand, it is obvious to ordinary people that we do things for non-economic reasons all the time. Social and ethical motivations are common in our personal behaviors.

We can say, however, that groups of people that are dedicated to economic values have no ability to act on anything other than their own economic self-interest. The charters of corporations and the laws of the incorporating states require them to advance the economic interests of their stockholders. Corporations, which are not human persons (although they have some of that status before the law), are an unsustainability economist's perfect dream come true: an allegedly truly rational economic actor.

Alas for us all, our unsustainable market system allocates no economic value to investments that solely benefit someone else or which benefit humanity as a whole or nature. **There is no economic incentive to meet the needs of all in a society.** The market only supports meeting the needs of those who have sufficient value to trade for what they need. Since future generations have nothing to offer in the present, anything that benefits them is of no interest to the present marketplace.

We prefer investments that pay off sooner rather than later. The longer the payoff is in the future, the less we will pay for it now. At 7% interest, the present value of money is worth only 50% of what it will be in 10 years. An investment that pays off in 1000 years is worth – right now – 1/1000th of the expected payoff in that future millennium.

In other words, **our system structurally encourages short-term investment and structurally discourages and disadvantages long-term (post my current lifetime) investment.**

This is why our present market economy will **never become an instrument of sustainability.** It is why our present economy drives us towards the ash heap of history. Observe what happens across the world right now, absent the blinders freely provided by market propagandists, to find the truth of this statement.

This is not an argument that markets are evil per se. It is simply an accurate observation of the limitations of our the present market system. The market does what it does. It can't do what it can't do – such as organize the sustained action of individuals and collective organizations to make long term investments in the future on behalf of people and our natural ecologies.

We need investments in economic activities and we need investments in social relationships and ethical values. Meeting human needs is obviously important. Meeting human greeds isn't. Satisfying the gluttony of those who already have more isn't important. Economic action is of no greater importance than work for social and ethical values in our journey towards long term sustainability.

Permaculture design reminds us that we need a surplus.

We need to store surplus as a hedge against the future.

We need surplus to share into the community around us.

A sustainable economic activity makes a profit that enables investment in economic and ethical values and other noneconomic investments for the common good of humanity and the planet.

The money economy cannot sustain itself, by, of, and for itself. Social and ethical values and relationships are absolutely necessary for the proper functioning of a money economy.

Essential Characteristics of Sustainable Economies

Economies are living systems. Economies exist within both nature and society. Since nature and society are living systems, so is an economy.

Sustainable economies are holistic. Unsustainable economists are reductionists. They attempt to reduce everything to individual parts and analyze them. In reality, everything connects. Wholes have properties that are not present in individual parts. If you take something out, the whole system loses integrity. Consider the forest. . .

POP QUIZ! How many references is this to the principle of the forest? Why is this important to permaculture design for your life?

Sustainable economies are dynamic. Economic systems are constantly changing. This limits the utility of statistical data which is effectively a snapshot of events at a specific time and place.

Sustainable economies are individualistic and context specific. No two people or communities or organizations are identical. This limits the ability to make economic generalizations. Unsustainability economists do this all the time. Most egregiously, they apply non-living economic models developed by observation of resource extraction and exploitation to manage the activities of human beings in living ecosystems. People are not the same as machines or factories and should not be treated as such.

Sustainable economies are purposeful. The purpose of an economy should be defined by the living people who participate in the economy, since the purpose of the community economy is to benefit all of the people in the economy.

Principles guide sustainable economies. While economies need efficiency, they also need guiding principles. For

sustainable economics, this means principles like holism, diversity, and interdependence, together with the permaculture ethics of caring for people, caring for the planet, and having a care for the future.

Resourcefulness (Reduce, Reuse, Recycle), Regeneration (Renew, Reproduce, Reorganize), Resilience (Resist, Responsive, Redundant). While it is important to reduce, reuse, and recycle, every time we do this we lose a bit of energy and usefulness. Sustainable systems therefore rely on solar energy and biology to provide regeneration – renewal, reproduction, reorganization. This derives from observations of nature. Consider how much effort a plant puts into developing the seeds of its next generation. The same thing happens with animals.

Human systems evolve towards increasing complexity over time. We gain efficiency by specialization and the division of labor and the growth of coordination and transaction structures and systems. At some point, however, we start to lose our resilience to disruption. We need to maintain our diversity, because diverse system are persistent and resilient while complex systems are brittle. If we maintain diversity and interdependence, we stay responsive and constant. If something happens, we repair it quickly. If we lose the interdependence, we become brittle. In the quest for efficiency, human organizations frequently remove redundancies. What's the problem with that? It makes great economic sense? Maybe so. It also makes us vulnerable to collapse.

So a sustainable economy must support Resourcefulness, Regeneration, and Resilience. Resourcefulness – the reduce, reuse, and recycle mantra – by itself is not enough and may even result in less sustainability if not immediately followed on by programs of regeneration and resilience.

The Fetish for Growth

Modern government and economic policy has a fetish for growth. The economy does not meet everybody's needs, because it focuses too much on meeting human greeds. The rich and powerful corrupt the system so they can pick our pockets and steal our productivity by various non-market mechanisms. This political criminality drives the centralization of wealth.

The economic elites have to do something to distract people's attention lest we become discontented and start thinking about things like revolution or starting new political parties dedicated to the common good. Thus the popular media fetish of focusing our attention on the size of the pie. We studiously ignore the way they slice the pie and the size of our own slice. Indeed, to even raise the question of how big the slices are for some and how small they are for others is sure to elicit savage screaming accusations of COMMUNISM and SOCIALISM! This tactic works well to stop rational thought and finesse any nascent revolutions.

Our rapid growth during the industrial era was made possible by fossil fuels. A sustainable economy is not only concerned about the size of the pie, it is interested in how the pie is sliced and the relative sizes of the various pieces of the pie. No slice should be so small that human needs cannot be met. We can grow big. We can grow small and we can grow in justice and diversity. The perpetual call for "growth in bigness" is only one of the growth possibilities open to us. Going forward, it is likely to be the least interesting and least useful.

Human Well Being

The sustainable economy operates based on the value of the productivity it can derive from the solar energy that falls freely upon the planet.

An economy like this will leave behind the primitive concepts of greed and gluttony that animate so much economy activity today in favor of satisfying basic human needs, enhancing the quality of life, and the pursuit of happiness.

There has been no increase overall in human well being in the developed countries since the 1950s. Once we meet basic needs, it is the quality of relationships that are critical to happiness. People must have some sense of meaning and purpose. Sustainability economies seek prosperity for all. This is a concept that incorporates as much social and ethical value as it does economics. It does not require continual growth.

In his book, The Essentials of Economic Sustainability, Dr. Ikerd says:

> A sustainable economy must provide permanent sustenance for the individual, social and ethical well-being of all, including those in the future. It must enhance the physical and mental health of individuals. It must promote the economic and social health of families, communities, and societies. It must sustain the productivity and ecological health of nature. And it must provide each generation with the means of fulfilling its ethical responsibilities for the future of humanity. Questions of how to balance the economic, social, and ethical incentives needed to create such economies are the essential questions of economic sustainability.

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08041 Alternative Economic Systems

This focus on money and power may do wonders in the marketplace, but it creates a tremendous crisis in our society. People who have spent all day learning how to sell themselves and to manipulate others are in no position to form lasting friendships or intimate relationships... Many Americans hunger for a different kind of society -- one based on principles of caring, ethical and spiritual sensitivity, and communal solidarity. Their need for meaning is just as intense as their need for economic security. -- *Michael Lerner*

Given the predatory nature of the modern economics of unsustainability, there is considerable interest in how to devise alternative economic systems that could help fulfill the permaculture goals of caring for people, caring for the planet, and having a care for the future.

The world doesn't lack for suggestions for alternative economics.

There appear to be some devils in those details however.

The first seems to be that many of these suggestions appear to be designed from the top down rather than the bottom up. If there is anything evident from history, it is that economic systems designed from the top down and imposed by coercion are always disasters. Consider the problems inherent with the corporation form of business organization. A corporation is an organized gang of human beings allowed to take actions in human communities and marketplaces without any of the human owners being personally responsible for the actions of the collective! This is a non-natural pattern imposed by a coercive State onto spontaneously organizing marketplaces. How can that not be a prescription for perpetual trouble?

The second problem seems to me that many suggestions for alternative economic systems are themselves absolutist monocultures. If there is anything evident from ecology, it is that monocultures are always ecological disasters.

The Seeds of the Diverse Economic Systems of a Permaculture Future

I resist the temptation to describe in detail what a "permaculture economic system" looks like now or the future. When you look at the seed of an oak tree, it is not immediately apparent that within the seed lies a tall mature canopy tree. Today we see the seeds of a future of permaculture economics. What the "mature canopy trees" of a permaculture economics look like we cannot know. Sufficient for this time is the knowledge that we have seeds available. Our job is to plant and cultivate them.

I will speculate about the seeds of our future just and sustainable economic systems. The diverse economic systems of the future will grow from some or all of the following characteristics.

Personal commitments to the permaculture ethics of caring for people, caring for the planet, and caring for the future. This is where permaculture design and sustainable living begin and thus where our future just and sustainable economics originate. Economics is not everything. Ethics and society are integral to the design of a permacultured economy.

We start small. Changes in the macro-economy, as we discussed in some detail in 08031, start with our household

economies. If we want a macro economy that cares for people, cares for the planet, and has a care for the future, we organize our own household micro economies in accordance with those ethics. We learn to practice what we preach right at our own doorstep first. Each family, each household, becomes a seed for the future.

A **diversity of systemic beneficial connections** characterize all permaculture designs and this must be true of our future economics.

Stacked functions celebrates economy of investment, as we achieve more than one result from the same investment.

Small and slow and natural biological solutions preferred to fast and large and artificial.

Slow money and financial permaculture concepts. These are the Permaculture 2.0 thoughts on the original economic ideas given by Mollison and Holmgren in the Permaculture Design Manual and other early permaculture works.

Distributive justice. If our economic systems are to be sustainable over the long term, there must be justice in the distribution of the goods of the Earth. Surplus must be fairly shared and circulated.

Respect for nature. Nature has value in and of itself, irrespective of the benefits it gives to human beings. Human beings cannot prosper while nature dies.

Avoid monocultures. Whatever our future economics look like, it will not be a monoculture.

Plan for and benefit from succession. We can't get to permaculture economic systems overnight. We get there one step at a time. We start with the "pioneer plants" and move on to through the succession of forms, structures, elements, and systems until the mature permaculture ecosystems emerge and grow organically from their previous forms.

No rent-seeking. No person or business will be allowed to distort the economic system for personal or corporate profit.

Cooperative forms of business enterprise. The most immediate "pioneer plant" with which we can colonize the damaged economic ecology of modern life is the cooperative form of business enterprise.

Freedom from coercion. In the absence of doing harm to others, future economic systems will not be characterized by coercion.

Identify and prevent criminal harm. An important transition stage in the development of our future permaculture economics is to use structures and systems to identify, restrain, and limit the harm and damage to both people and the environment that results from individual and corporate action. Crime pays in our present system because that's the way the system design works. We need a better design to take the profit out of crime.

New systems of accounting. We're already seeing discussion of new systems of accounting that take non-monetary measures into consideration. This is an important area of "seed work" that needs more resources, time, and smart thinking.

> Total Economic Return = Return to the Worker + Return to the Investor + Return to the Community + Return to the Planet/Ecosystem.

Resourcefulness (Reduce, Reuse, Recycle): We need efficiency, responsibility, and stewardship in our use of the earth's resources. We move beyond the present mentality of extraction and exploitation and seek a partnership with nature. This is the development of constancy, our systems ability to maintain themselves going forward into the future.

Resilience (Regenerate, Renew, Reproduce, Reorganize): Resourcefulness however by itself is not enough. Thanks to the 2nd Law of Thermodynamics, every time we do

something useful we lose some of the energy in the transaction. Over time, we lose it all. The mainstream economy finesses this with exploitation and extraction. We need something better. Thus we seek to strategies of regeneration to renew, reproduce, and reorganize so we keep things going over time. This ability to bounce back from damage is a measure of our resilience.

Persistence (Resist, Responsive, Redundant). In both nature and human societies, the tendency over time is toward more complexity. In the process, we lose important values and strategies. We get more efficient by eliminating redundancies. We become less responsive and less interdependent. We resist all that makes us less resilient/persistent/constant and more brittle. We remain responsive to challenges and redundant in our systems and resources. This permits us to be persistent in the face of the challenges of the future..

Invest in the future. We must invest in non-monetary social and ethical values and in protecting the common good of the present and the future.

Phasing out the corporation. One of the steps towards a more sustainable economy is to phase out the limited liability corporation form of business organization in favor of more natural and free forms of business organization and association.

The first step towards this is to take away the **perpetual nature of corporations**. If corporations want to be humans, they have to embrace one of the most essential aspects of humanity, which is the fact that we die. This can be done by eliminating the perpetual nature of newly organizing corporations. Most state laws allow legislatures to change incorporation laws in ways that affect the charters of corporations organized under specific chapters of state codes. These can be amendment to provide for the "death" of corporations after a specific period of time. A corporation could have a will and the regular inheritance process could be applied to the orderly transfer of the assets and activities of a "deceased corporation" to its heirs. Perpetuity should only be granted to organizations that exist for public and non-profit purposes.

A second necessary reform is to **remove the "corporate shield of liability,"** so that the owners of the corporations become personally responsible for the actions and liabilities of the corporation. This will have beneficial results –

Corporations will get much smaller. How much liability will any individual stockholder be willing to take on?

Stock ownership will be less about speculating and more about ownership, with stockholders becoming much more interested and concerned with the activities of the corporation.

Some corporations **may cease doing business because no one will assume personal responsibility for its actions.** Since the activities of those corporations are among the most damaging to the planet's ecologies, everyone – people, planet, and the future – will benefit from their orderly demise and the transfer of their assets to more productive enterprises where people are willing to take responsibility for their economic actions.

This will constitute **a structural limitation on the "FIRE" (Finance, Insurance, Real Estate) economic activities**, which many consider to be a vampire on the real economy. Money will migrate from the parasitic stock market and other speculative financial instruments into real wealth economic activities.

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08051 Cooperatives

Labor can and will become its own employer through co-operative association.
– Leland Stanford

On December 21, 1844, the Rochdale Equitable Pioneers Society opened the first cooperative store in the cotton mill town of Rochdale in northern England with a membership of 28. They had five items for sale – flour, sugar, oatmeal, butter, and candles. They were open two nights a week. Each member contributed one English pound as their membership share. Within ten years, 1,000 cooperatives operated under the Rochdale Principles in Britain, which became the ideological framework for the modern cooperative movement.

The modern "Statement on the Cooperative Identity," adopted in 1995 by the International Cooperative Alliance, derives from the original "Rochdale Principles" adopted in 1844 by the Rochdale pioneers.

A cooperative is a business owned and democratically managed by its owners to provide a benefit to the owners.

Today, throughout the world we find several kinds of cooperatives. They differ based on who their members are (producers, consumers, workers, depositors, etc.)

Producer cooperatives – owned by producers, organized to market production and/or provide inputs to the producers.

Consumer cooperatives – owned by customers, organized to provide market access to customers.

Worker cooperatives – owned by the workers, organized to provide jobs to the workers.

Hybrid cooperatives – combinations of different kinds of cooperatives.

Housing cooperatives – a cooperative that owns a multiple unit housing complex.

Transportation cooperatives – a cooperative that owns some form of transportation and operates it for the benefit of its members.

Financial cooperatives – credit unions, mutual insurance companies, owned by depositors or policy holders and operating to provide various financial services to members.

All cooperatives require that members make a capital contribution to the cooperative. This buys the member a share in the cooperative. The principle is "one member, one share, one vote." The members of the cooperative elect a board of directors who either hire or otherwise arrange for the management of the cooperative.

Cooperatives provide opportunities to people who may be otherwise excluded from economic participation. For example, students graduating from college in today's uncertain economic environment may find that it is easier to start a new job, in the form of a worker owned cooperative, with friends and contacts they made during their school years, than to compete in the job market for scarce jobs from government and private employers.

The ICA estimates that about 750 million people worldwide are members of cooperatives.

Cooperatives can be an economic structure that can send investments forward into the future. They have perpetual existence (they outlive individual members) and their purpose is to provide a member benefit. This is different from a corporation, which exist to provide return to stockholders. They can invest in non-economic social and economic values.

1995 Statement on the Co-operative Identity

Definition
A co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise.

Values
Co-operatives are values-based organizations that promote self-help, self-responsibility, democracy, equality, equity and solidarity. In the tradition of their founders, co-operative members believe in the ethical values of honesty, openness, social responsibility and caring for others.

Principles
The co-operative principles are guidelines by which co-operatives put their values into practice.

1st Principle: Voluntary and Open Membership
Co-operatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.

2nd Principle: Democratic Member Control
Co-operatives are democratic organizations controlled by their members, who actively participate in setting their policies and making decisions. Men and women serving as elected representatives are accountable to the membership. In primary co-operatives members have equal voting rights (one member, one vote) and co-operatives at other levels are also organized in a democratic manner.

3rd Principle: Member Economic Participation
Members contribute equitably to, and democratically control, the capital of their co-operative. At least part of that capital is the common property of the co-operative. Members usually receive limited compensation, if any, on capital subscribed as a condition of membership. Members allocate surpluses for any or all of the following purposes: developing their co-operative, possibly by setting up reserves, part of which at least would be indivisible; benefitting members in proportion to their transactions with the co-operative; and supporting other activities approved by the membership.

4th Principle: Autonomy and Independence
Co-operatives are autonomous, self-help organizations controlled by their members. If they enter to agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their co-operative autonomy.

5th Principle: Education, Training and Information
Co-operatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their co-operatives. They inform the general public - particularly young people and opinion leaders - about the nature and benefits of co-operation.

6th Principle: Co-operation among Co-operatives
Co-operatives serve their members most effectively and strengthen the co-operative movement by working together through local, national, regional and international structures.

7th Principle: Concern for Community
Co-operatives work for the sustainable

development of their communities through policies approved by their members.

The Mondragon Cooperatives of Spain – an example of economic justice at work!

What has 120 different companies, 80,000 worker-owners, 43 schools, one college, does billions of dollars of business annually in manufacturing, services, retail and wholesale distribution, administers more than $5 billion in financial assets?

Answer: the Mondragon Cooperatives of Spain.

In 1941, a bishop sent a young priest to teach in a vocational school in Spain's "Basque Country." In addition to the technical curriculum, young Father Jose Maria Arizmendiarrieta taught economic justice, the primacy of labor over capital, and solidarity to his students. As a result of his counsel and teaching, some of the students began a small cooperative that built kerosene stoves. In 1959, they started what we would today call a credit union.

Today, the associated Mondragon Cooperatives manufacture automobile parts, electronic components, valves, taps, appliances. They have a full line of retail outlets (small & large) offering consumer products, food, appliances, and a wholesale food business catering to restaurants. Their bank has more than 100 branches. They offer a full range of insurance, and take care of their own social security and health insurance programs.

In most for profit businesses, capitol hires labor. For the Mondragon cooperatives, capital is something they rent to benefit the worker-owners.

To Americans, this sounds like an Employee Stock Ownership Plan, but the Mondragon model is not only about distribution of the profits, it is about the control of the business.

Workers – not the money men – elect the management and the managers are part of the cooperative process in the enterprise. Each enterprise has a social committee that considers issues of health, safety, environment, and the social responsibilities of the enterprise. If they need money they borrow capital. They don't sell stock for financing except for the initial membership share bought by each worker owner. All new employees become worker owners through the purchase of a membership share.

A new cooperative begins with a group of friends. Experience in starting 120 businesses over a 40-year period has taught the Mondragon cooperators that the pre-existing bonds of friendship are a good basis for building a productive working relationship. The Mondragon association provides business and marketing research and assistance; their bank provides capital. The workers themselves must invest some of their own money, either as an upfront contribution or as deductions from wages paid over a 2-year period (about $5,000). Their bank sticks with the new co-op until they can go it alone; if the business gets into trouble, various strategies come into play, including waiving interest, suspending payments, even loan forgiveness. They may assist the group to move into another line of business or work. Because of these economic solidarity activities, since 1956 they have had only one total failure of a cooperative.

Mondragon coops donate ten percent of corporate profits to charity. Forty percent are retained by the cooperative to be used to benefit the "common good" of the cooperative (research, development, job creation, etc.). The balance of the profits goes into capital accounts for the worker owners. These funds may be borrowed against at the cooperative's bank at low interest rates, and are important parts of the social security arrangements.

Democracy in the workplace? Capital at the service of Labor? It all sounds idealistic except for the fact that it is actually working, profitable, and growing. The cooperative business model is not a

stranger in the United Stats, most rural areas have farmers' cooperatives and there are credit unions everywhere. The Mondragon model of worker-owners is a different twist to what we find around here.

If we want --

-- economic development,

-- to help people reach their full development as human persons,

-- benefits for the common good, and

-- to enhance the dignity of the human person,

-- we have to talk about practical ways to implement these ideals. This is what the Mondragon Cooperatives of Spain have done. They have a model that can be implemented everywhere.

Basic Principles of the Mondragon Cooperatives of Spain

Any direct quotes from Mondragon texts are in quotes (in ""). The rest is my summary of the Mondragon text.

I. OPEN ADMISSION
The Cooperatives do not discriminate on the basic of religious, political, ethnic, or sex when it comes to becoming a member of the Cooperative.

II. DEMOCRATIC ORGANIZATION
All authority is vested in the "general assembly," which consists of all the worker owners of the enterprise, one person one vote. The general assembly elects the "Governing Council," which would be like the Board of Directors, which appoints (and removes) the organization's management.

III. SOVEREIGNTY OF LABOR
"In the MCC Co-operatives it is understood that Labor is the main factor for transforming nature, society and human beings themselves. As a result, Labor is granted full sovereignty in the organization of the co-operative enterprise, the wealth created is distributed in terms of the labor provided and there is a firm commitment to the creation of new jobs. As far as the wealth generated by the Co-operative is concerned, this is distributed among the members in proportion to their labor and not on the basis of their holding in Share Capital. The pay policy of MCC's co-operatives takes its inspiration from principles of Solidarity, which are materialized in sufficient remuneration for labor on the basis of solidarity."

Worker owners receive competitive and just salaries and dividends based on the profitability of the co-op.

IV. INSTRUMENTAL AND SUBORDINATE NATURE OF CAPITAL
Generally, a corporation sells shares of ownership and management to raise capital, and then hires labor. The Mondragon Cooperatives do not sell shares in order to raise capital. Here, the workers own the enterprise and the management and rent the capital.

V. PARTICIPATORY MANAGEMENT
"This Principle implies the progressive development of self-management and, consequently, of the participation of the members in business management. This requires: (1) The development of adequate mechanisms and channels for participation. (2) Transparent information with respect to the performance of the basic management variables of the Co-operative. (3) The use of methods of consultation and negotiation with the worker-members and their social representatives in those economic, organizational and labor decisions which affect them. (4) The systematic application of social and professional training plans. (5) The establishment of internal promotion as a basic means of covering positions with greater professional responsibility."

VI. PAYMENT SOLIDARITY
" The Mondragón Co-operative Experience declares sufficient payment based on solidarity to be a basic principle of its management. Solidarity is manifest

both internally and externally, as well as at the Corporate level."

VII. INTERCOOPERATION
The Cooperatives cooperate with each other, with other cooperatives in the area, and with national and international cooperative organizations.

VIII. SOCIAL TRANSFORMATION
The Cooperatives acknowledge a duty to contribute to the common good: (1) by reinvesting a high proportion of their profits, including regular investments in community funds for job creation; (2) 10% of the net profit of the Cooperatives is donated to charitable organizations; (3) taking care of their social security, unemployment, and health insurance requirements (through a cooperative owner by the other cooperatives; and (4) being active in their community.

IX. UNIVERSALITY
"The Mondragón Co-operative Experience, as an expression of its universal vocation, proclaims its solidarity with all those who work for economic democracy in the sphere of the Social Economy and supports the objectives of Peace, Justice and Development, characteristic of the International Co-operative Movement. Likewise, through OTALORA, which is our Business and Co-operative Training Centre, we try and disseminate co-operative culture on the basis of our own social-economic experience, developed over the last 40 years."

X. EDUCATION
"Education and Training have played a decisive role in the creation and development of the Mondragón Co-operative Movement. Its founder and main driving force, the priest José María Arizmendiarrieta, was always quite clear that 'education, understanding as such the complex of ideas and concepts adopted by a man, is the key to the development and progress of a people'. Insisting on this idea, Father Arizmendiarrieta liked to repeat 'that education is the natural and indispensable cornerstone for the promotion of a new humane and just social order' and that 'knowledge has to be socialised to democratise power'.

"Therefore, on the basis of this approach, the first thing he did when he came to Mondragón was to create the Polytechnic School in 1943 (today Mondragón Eskola Politeknikoa), which during all these years has been the main source of managers and skilled workers for our co-operatives."

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08061 Economic Survival strategies.

"If we are looking for insurance against want and oppression, we will find it only in our neighbors' prosperity and goodwill and, beyond that, in the good health of our worldly places, our homelands. If we were sincerely looking for a place of safety, for real security and success, then we would begin to turn to our communities - and not the communities simply of our human neighbors but also of the water, earth, and air, the plants and animals, all the creatures with whom our local life is shared.
-- *Wendell Berry, The Art of the Commonplace: The Agrarian Essays*

It's not news that economic hard times are here. In constant dollars, over the last 30 years the average American worker has LOST 22% of his or her purchasing power. The less money you have, the bigger the impact this has been on you. The median net worth for American households has declined 39%, to the level of the early 1990s.

For anyone who isn't rich and is trying to live a reasonable lifestyle, things go from bad to worse. The bad news is that this process of economic dislocation and centralization of wealth will continue for the foreseeable future. It's the design of the system.

If you think it's been bad thus far, the last few years are only the leading edge of an economic crisis so terrible it will make the Great Depression of the 1930s look like good times. If you want to protect yourself and your family from these economic hard times, **make changes in the way you live now.**

If people are not concerned about this, they simply aren't paying attention to national and world events. Our entire economy is a stack of cards that can be knocked over at any time. Instead of looking out for the common good, powerful political and economic structures make decisions that hurt ordinary people and benefit special interests.

One of the lies of modern life is that politicians will look out for the interests of ordinary people. The truth is that **politicians of both parties watch out for and guard the interests of the wealthy and the powerful.** They could care less what happens to the poor and working and middle class families. If you don't think this is true, just look at how they vote.

Political criminality is one of the four cardinal threats of this era and it is a threat to you and all you love. A second cardinal threat is economic irrationality.

The plain fact is that you have to look out for yourself and those you love and build communities of mutual support as a defense against the predatory politics and economics of our elites. In the near term don't expect the government to do anything other than continue to take from you in order to give to the politically well-connected and to increase the general level of misery and despair within our communities.

The good news is you don't have to play their game. Even in the midst of these hard times, you can develop a more secure quality of life for you and your family or household. These basic survival strategies will help you cope with the future.

1. Learn about the big picture. We aren't experiencing a typical economic recession. We are past our peak. Having squandered our natural capital during decades of economic rationality, now we face the consequences of our gluttony and greed. Some of the big picture issues are:

a. **High oil prices are a big problem for all economies and high oil prices are not going away**. We aren't finding any more cheap oil. The oil we are producing now is expensive, costing ten times more than conventional land-based wells. Deep water wells are even more expensive. While some are proclaiming our oil problem has been solved, that is an "all hat and no cattle" claim. It's oil and gas corporation propaganda, not scientific fact.

b. **Austerity is the name of the game for governments worldwide**. Look for new proposals to cut social safety net programs as political criminals move to protect their friends government revenue streams and punish their enemies by ending the programs that benefit them.

c. High oil prices have the same effect on economies as tax increases. As energy prices rise, people have less money for discretionary purchases. As they reduce those purchases, this has ripple effects all the way through the economy, resulting in more debt, more defaulted debt, lower revenues for government, and increased demands/needs for government services.

d. The impact of these issues will be a decline in economic activity – which will inevitably mean less work and lower wages and profits. This process is already at work. Since 2000, wages (including profits of businesses) have increased at a rate significantly less than the increase in GDP in the US. Most people have not seen a raise, in real, inflation adjust dollars, since the1970s.

e. The debt problem (government, business, and household) is so big it can't be solved without years of excellent economic growth, which we are not likely to see. Government receipts, business profits, and household income is flat, while debt for all (local, state, federal government, personal/household, business) is at 700% of the US national wage business (which is defined as wages, employer contributions for social insurance programs, and business proprietors income).

2. Expect and design for contraction. This big picture description points to a coming time of radical economic contraction. Our experiences 2008 to date are only the beginning of this time of economic sorrows. The economic irrationality of the past decades has to shake out of the system and that will take time. It will be a long grind, probably marked by moments of punctuated equilibrium where we experience a sudden fall. There will be some up times, and when they come, make the most of them, but the general trend over the next few decades will be generally down the economic slope. You need a plan for how you will get through these coming problems. To design for contractions means that you design with the expectation that you will have less income and access to fewer resources in the future than you do now. This is what iPermie is about from page one right to the end. So, as the saying goes, "Make hay while the sun shines."

Characteristics of a design for contraction include:

a. You can't spend your way to happiness. The advertisements and political talk that encourage this are the economic equivalent of a financial methamphetamine addiction. Sure, you feel better for a while. Then you have to spend more money to get "high," and then even more money. Pretty soon you spend your money and you don't get any high at all. As you panic, you spend more money and more money. Then comes the crash as the bills come due and you can no longer escape the consequences of an extravagant lifestyle. Close your ears to the lies of advertising! Turn off your televisions and ignore all advertising. Your life will **not** be better if you buy advertised products. Your kids will **not** be smarter if they wear designer clothes. In fact, **if you buy advertised products, your quality of life will deteriorate**. You will have less money, more stress, and your family will be at risk of the many evils that derive from financial stress.

b. The borrower is the slave of the lender. Lies ride on debt's back. Avoid debt like the plague it is. Never finance frivolous consumption on credit cards. Avoid the payday loan shop. Stay out of pawn shops unless you want to buy something at a cheap price. As long as you have a mortgage, you are not the owner of your house, the bank is the real owner, and a sudden drop in your income could put you out on the street, homeless. You would completely lose your investment. By making extra principle payments with every monthly payment, you pay less interest over the life of the loan.

Never take out a home equity loan for vacations, remodeling, or any kind of consumer spending. Don't consolidate credit card debt as a home equity loan. This puts your house at risk for your frivolous consumption spending decisions! Lower income people must in particular beware of predatory loan schemes. Never take out a loan that has a prepayment penalty. If your property is paid for, do not, under any circumstances, get another mortgage. Debt-free housing is one of the most important survival strategies for the upcoming hard times.

Sometimes we can't avoid debt, especially if we have no financial reserves, no medical insurance, and get sick. In those cases, pay off the debt as quickly as possible and build up financial reserves so you aren't at the mercy of high interest rates when emergencies happen.

If you are only making minimum payments on credit cards and loans, or accumulate large debts you simply can't pay due to medical problems, you should investigate bankruptcy.

If you have financial assets and debts, sell your financial assets and pay off your debts.

c**. Choose co-housing.** This is a fancy name for "more than one family living together in one large household." The day comes when individuals of low and moderate incomes will not be able to live alone as single person households, unless they own their own housing free of debt or are in some kind of government subsidized housing. This is true for single mothers with kids. Two or three smaller families living together can do so for less money than each would

spend operating a separate household. Co-housing works for house purchases too. Three families could go together and buy a triplex.

d. If possible, go car free. This is perhaps the one choice that can save the most money. Operating a car, including the capital cost of the automobile, insurance, taxes, repairs, interest, etc. can easily top $3K - 5K/year. It is much cheaper to take the bus or the occasional taxi, or even to rent a car a few times a year than to own a car. This may require moving to an area with adequate public transportation and access to shopping, as well as changing jobs. Those thoughts would challenge anyone affected by it, but getting the geographies of your life “right” is a major step towards a more sustainable way of living.

e. Stop buying new stuff. Reduce, reuse, recycle, repair, restore, make it over, make do, do without. Shop at flea markets, garage sales, and thrift shops. Never buy new furniture, new appliances, new clothes, new home decoration items. Always look in the "after market" first. If you can't find what you need, then you consider buying something new. If you shop because of emotional needs, get into counseling. Never spend money to cheer yourself up or because you are emotionally upset about something. If you do buy new, buy quality that will last. I use canning jars, a pressure cooker, and cast-iron cookware originally bought by my grandmothers more than 60 years ago. When I die, those who follow me will still have those items to use. Given the trashy quality of many new products, you may find the quality heirloom products at thrift stores and flea markets.

f. Use energy with extreme frugality. The cost of energy over time will be up. There are ups and downs but the general trend is clear. Invest in extra insulation, solar hot water, solar PV, solar air heaters, whatever makes sense for your situation.

g. Develop additional sources of income. Multiple sources for critical functions is an important aspect of permaculture design. Support for your personal income is one of the most important demonstrations of this in permaculture design. With the risky economy continuing, it is not prudent to put all of your income eggs into one basket. You could get a second part-time job. Or you could start a small micro-business, something simple like baking bread or pies from your home, or mowing lawns, or doing laundry and ironing for other people. Buy stuff cheap and resell for a little more at flea markets or swap meets. Clean houses. Grow vegetables to sell to your neighbors. Don't be taken in by schemes that want you to pay money for people to teach you how to make money, or by multi-level pyramid sales scams. Develop an honest business, providing a service or product that people regularly need. Multiply your income streams and protect yourself from future economic hazards.

h. Be frugal with your food. Prepare meals from basic ingredients. Don’t pay for high-priced mixes, boxed, and frozen prepared foods. Bake your own bread. Make your own snacks and fun foods. If you have

access to some land, grow as much food as you can.

i. Save some money each month. Conserve cash! Even if it is only $5 from each paycheck, stash it away. Life is full of surprises, and unexpected expenses that send you to the pawn shop or pay day loan service or run up your credit cards can be real financial problems for you and your family. Work to build your household savings. Keep some of your savings as food, always have at least two or three months of basic food staples on hand (more is better) in your house to insulate yourself from the mood swings of supermarket pricing and the risks of sudden emergencies and crises.

j. Beware of the two income trap. Many families feel they need two incomes to survive, and in some cases this may be true. However, with both parents working outside the home, the family acquires significant additional expenses, including transportation and perhaps child care/babysitting. The family also loses the economic contribution that the stay-at-home parent could make. Do the math on your two incomes. Make sure that both parents working outside the home is a net economic benefit and not a net loss over the long run. *A parent working at home is a net economic asset to the family.* The additional time a parent can devote to in-home activities makes it possible to save money in many areas of life. A "work at home parent" can participate in part-time businesses the family may start. Home schooling becomes a possibility, at least through the elementary grades, and this is a great blessing for families.

k. Watch out for expensive money-pit bad habits. If you smoke, quit. Not only is smoking expensive, it hurts your health and medical care costs big bucks, even if you have insurance. If you must have a bad habit, pick something cheap.

3. Spend your money locally. Support local businesses, eat at local restaurants. If you can get control of your retirement funds, invest them in local enterprises or in accounts in credit unions. If you have other funds to invest, find local food businesses to invest in. This could go as far as actually buying farm land, and renting it to someone to produce with you receiving a share of the crop (usually paid in the form of cash). If you do this, require your renter to manage the land organically. You may need to receive a little less cash rent if you do this, but you will be building your capital – the land – by investing in the organic methods.

4. Don't give in to despair and don't feel sorry for yourself. Sow blessings and kindness and you will reap blessings and kindness. By living more frugally and sustainably, you aren't going second class. You will have a first class, worry-free lifestyle.

The people to feel sorry for are those, of whatever income category, who buy into the super-consumer lifestyle. Their self-image is bound up in how much stuff they have. They are never satisfied. They always must have more stuff, new stuff, better stuff. If they aren't spending money, they feel depressed. While they may have flashy clothes and lots of new possessions, these things enslave them to banks, corporations, and credit card companies. Such people will have real problems adjusting to the realities of life in coming years.

5. Design your life so that you have control over your life. This will make you less vulnerable to crises and emergencies. Now is the time to reduce the amount of stress, risk, and emotional

trouble in your life. Frugality is the doorway to economic security.

6. Leave no one behind for the wolves to devour. Do your part to support the local safety net. Support organizations that help the poor with your time as well as your financial donations.

7. Do your part to design and implement an economy of abundance to replace our economy of scarcity. This will grow from the bottom up, without centralized command and control as people stop participating in the manipulated systems of consciousness that dominate and direct our activities against our own interests and towards the interests of the economic and political elites. We reject the paternalism of the existing system where we assume that others know best and we are simply to do what we are told as we learn to trust and believe in ourselves. The steps described in this chapter are the beginning of that process of economic liberation.

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08071 Fundamentals of Frugal Living

He who does not economize will have to agonize. – *Confucius*

Our life-long exposure to mass media conditions us with more wants and greeds than we could possibly ever achieve, even if we acquire great wealth. This perpetual state of dissatisfaction drives alienation and depression and makes us unhappy.

Frugality is the strategy associated with weaning us away from this perpetual cycle of consumption, waste, excretion, and more consumption. It closes the door on the economy of scarcity and plants the seeds of the good-life living of an economy of abundance.

Here are some of its fundamental techniques.

1. Know how much it costs you to live. Save receipts for purchases and bills and keep a record of your expenditures. If you have expenses that occur at regular intervals, divide those amounts by the number of months to find a monthly amount that you need to set aside each month for those expenses (such as insurance or taxes on a house, repairs, etc.).

2. Be wary of "expert advice" about finance and money. You've noticed that everybody wants your money. Many voices say to you: GIVE ME YOUR MONEY! There is no end to their demands. Be wary of so-called experts who are nothing more than hired guns for people who want your money. Most of us have about five different places to spend each dollar in our pocket. You don't need an expert to advise you to give him or her your money. Use common sense and smart design to make the most of your resources. Experts are fine as resources to consult as you research your options. Never look at them as authorities. Trusting yourself and your own judgment is one of the prerequisites for effective permaculture good-life design.

3. Get out of and avoid debt. "The borrower is the slave of the lender." If you want to buy something like a car or a house, make payments to your savings account until you have enough money and pay cash. You will get a better deal and pay less money than if you borrowed the money and paid it back with interest.

Never carry debt for entertainment or frivolous consumer spending expenses. Don't use credit cards - or even worse, payday loans or pawn shops -- as "phantom income" to increase your expenditures for consumer items or entertainment. Every penny you borrow must be paid back with interest, and as your debt increases so do your payments.

Sometimes debt is unavoidable, often in conjunction with medical expenses. If your debts become a source of financial distress in your life, don't persist in an unsustainable debt repayment system. "Unsustainable debt repayment system" is defined as a situation where you are only making the minimum payments on your debts. Look for a reputable nonprofit credit counseling service affiliated with the National Foundation for Consumer Credit and get into a repayment plan with them or **declare bankruptcy.** If after making monthly payments on your credit cards, you then charge more on your cards, running them back up to your limits, thus wiping out your payments each month, you are in grave financial danger. In that situation, I think a bankruptcy lawyer is your best choice as well as some study as to why you are in the situation and how to avoid it in the future.

See 08111 for a more extended discussion of debt and the advantages of getting out of debt sooner rather than later.

> **POP QUIZ! How many iPermie warnings does this make thus far about debt? What does that suggest about the dangers of debt?**

4. Pay with cash instead of plastic. There's lots of research indicating that people spend more money when they spend on plastic instead of paying cash. This is true for both credit cards *and* debit cards.

5. Question your expenses and live within your means. Save pennies and save dollars. Search for entire categories of spending to eliminate. For example, living without a car (or with one car instead of two) can easily save a family $200 or $300/month or more (gasoline, repairs, insurance, tickets and fines, taxes, licenses, registration, purchase cost of the car, etc.). This may require living close to your work, or close to public transportation, and/or a willingness and ability to ride a bicycle.

6. Increase your savings. As you learn to live better with less, you can save some money every month. Always pay yourself first. Learn to ***defer present gratification for future gain***.

7. Ignore all advertising! Commercial advertising is an enemy of your good life. Advertising is manipulative propaganda that encourages you to spend money you don't have for products you don't need to impress people you don't care about anyway. Your life will not be better if you buy more and more advertised products. It's like a financial methamphetamine addition. You will never be able to get enough stuff. Use advertising only to check availabilities or compare prices. Learn the tricks of advertisers and teach your kids to ignore them.

8. Living better with less does not mean living cheaply or second best. The goal is to live a good life within your means. Whatever our circumstances, accumulating large amounts of material goods is not what the good life is about. The good life is about our relationships - with family, with friends, with our neighbors and community, and the good that we do to them and to others. It is earning an honest living by honest work.

When we pass from this life, nobody's hearse will have a trailer hooked to it piled with junk to be buried with them. The old phrase, "He who dies with the most toys wins," is horse manure. If you find yourself spending money to buy more junk all the time, you need to look within yourself and find and resolve the emptiness and hurts that you try to heal by consumption.

9. Teach your children well. Your children will face grave challenges in their futures. Anyone who teaches their children to embrace instant gratification, spend money frivolously, to find the meaning of their lives in the right clothes or the perfect car gives them a serious disadvantage in the years and decades to come. Teaching your kids these bad habits lays a curse on them that will plague them all of their lives.

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08081 Design for Abundance and Economy

"I have three precious things which I hold fast and prize. The first is gentleness; the second is frugality; the third is humility, which keeps me from putting myself before others. Be gentle and you can be bold; be frugal and you can be liberal; avoid putting yourself before others and you can become a leader among men. --*Lao Tzu*

One of the first steps of breaking free of the subjugation of the economy of scarcity, the default economic design of this era, is to develop frugality with your money. Frugalities practice **temperance** in the acquisition and use of material goods. We creatively use things we already own or can access so that we avoid spending money for more stuff and services. It is a strategy that lays the foundation for the growth of an economy of abundance. In large part, it is a matter of understanding the differences between necessities, wants, and greeds, and managing how and what you provide for yourself and your household. So when we design for economy, we also design for abundance. Economy is not a response to scarcity. It is the foundation of abundance.

In permaculture, we get what we design. Keep this in mind when it comes to your economic thinking.

A virtue is a "habit of doing good."

The purpose of permaculture design is to design and implement patterns so that it is easier for you to do good – systems and structures that help you to care for people, care for the planet, and have a care for the future.

When it comes to stacking functions, designing for economy is a function stacked on many elements in your permaculture design for your life.

Bob tells the pickle jar story. Again. And not for the last time either.
One time in days of yore I was at my grandparent's house, and as we washed dishes after lunch, I picked up an empty pickle jar, emptied the juice, and dropped it in the trash can. My grandfather reached down into the trash, pulled out the jar, wiped it with a rag, and said to me, "Bobby Max, we already paid for that jar. Why would you want to throw it away?"

And so it came to pass that I learned about recycling years before the concept came into common circulation.

My grandfather's attitude is, of course, utterly foreign to the way many people do things today. It sure made an impression on me at the time, so much so that fifty years later, I remember it.

Why should anyone care about an empty cheap pickle jar?

Note my grandfather's action in carefully wiping the jar, as though it were a fine vase. It had no more apparent utility for the family, or so I thought in my juvenile understanding of such things.

The answer was "No, Bobby Max, your answer is not correct." The wisdom of my grandfather, born on a farm in rural Oklahoma early in the 20th century, taught that the jar, which once held pickles, could hold other things. Buttons, nails, ribbons, pins, flour - there is a long list of tasks this jar could serve for the household. My grandfather was a young married father at the beginning of the Depression. He knew the meaning of

poverty from the bitter experience of those days.

While he wouldn't consciously have thought in this way – the manufacture of that jar embodied energy and resources. Now empty, it can easily be repurposed to hold something else. Today, my kitchen shelves are loaded with former pickle jars. They hold pasta, rice, dried hot peppers, and other miscellaneous dried ingredients for cooking. In the utility room, there are more "used" jars, holding nuts and bolts and the other small accouterments that accumulate in utility rooms.

The "throw-away" mentality that is so popular these daze is one of the fundamental issues of our unsustainable culture. We can't design our way into the future without a rebirth in frugality. If we don't get with the frugality program, we will pay a bitter price for our failure to understand and adapt to the needs of these times.

When it comes to designing for abundance and economy –

-- Resources

-- Money

-- Energy (fossil fuels and alternative)

-- Human energy and effort

are critical to our success, because we need to --

-- Use less resources!

-- Use less money!

-- Use less energy!

-- Use less human effort!

so there is more abundance for all.

The most desirable economic patterns are those that –

-- stack functions,

-- provide redundancy,

-- offer many beneficial connections,

-- use natural methods, featuring the biological, the small, and the slow,

-- are conservative of all forms of stuff (resources, energy, money, etc.),

-- are conservative in their demands on people

-- are regenerative of systems and supplies.

Techniques for Economy

Here are some of the more important techniques of frugality:

Resourcefulness: Reduce, reuse, rot, repurpose, return, repair, recycle, refuse, make it over, make do, make it over, do without.

This could more simply be known as the "use less stuff" technique --

--the less stuff you use and need –

--the less money you spend,

-- the less resources you use,

-- the less energy you consume

This is a roadmap of how we can care for people, care for the planet, and care for the future by demonstrating voluntary restraint in the use of material goods.

It's not just a mantra to repeat. It is a technique you can use to increase the quality of your life and the resilience of your household systems.

For example – In the kitchen, we may decide that we need additional equipment or changes to things like storage areas, cabinets, etc. If you need to replace or add kitchen cabinets, look for used options or make new ones from recycled materials. If you need a stand mixer, shop at flea markets, garage sales, pawn shops and buy one used. I have an excellent quality stand mixer that cost me $2 at a garage sale. It's old but it has served me well.

If you buy new, look for quality.

If I needed an item, and I couldn't find it in the aftermarket, I would not necessarily buy the cheapest new item on the shelf. I would look for quality, and buy new only after doing consumer research to determine which option would serve the best over the long haul. I use canning jars every year that were bought more than 60 years ago by my grandmother.

Regeneration: Renew, Reproduce, Reorganize

Thanks to the laws of thermodynamics, every time we do some useful work, we lose a little bit of it. While we must economize and be resourceful (reuse, recycle, etc.) we need to regenerate. The "Three R's" of regeneration are Renew, Reproduce, and Reorganize. We may find that something we do is inefficient and wasteful and a better method would help us use our available resources more wisely. So we reorganize what we do. When we plant gardens and grow food, we reproduce. When we develop and expand friendships and networks of mutual help and support, that's reproduction. When we reinvent old things, that's renewal.

Resilience: Resist, Responsive, Redundant.

Resilience is an important design principle for all of our economic design. If something collapses or breaks, it can be hard to repair and replace, especially if it is something complex like an economy. The Three R's of Resilience are Resist, Respond, and Redundant. When faced with economic irrationality, we find a duty to resist. Elsewhere in iPermie is this referred to as "persistence." If there is a problem, prompt response of repair, protection, and resistance is critical. Redundancy is one of the basic permaculture design principles. Critical functions should be supported by many elements and systems.

Learn the difference between needs, wants, and greeds. When it comes to wants, learn to discern between "nice but not necessary" and "frivolous waste." Scrutinize your budget and take action as necessary.

This is a way of evaluating your expenditures in order to free up funds for savings and investing in your future. Instead of buying new clothes, you could shop at thrift stores. Instead of going to a move theater, you could use a service to download it from the internet or rent a CD from a local shop. Etc.

Avoid money traps and pits.

Debt is a money pit. Don't borrow money to implement your permaculture designs. Keep your design recommendations consistent with your actual and expected household resources.

Avoid Big Box Stores, every one of them is a trap set for your money. They try to sell us convenience. What we end up with is cheap schlock at a high price and we get all kinds of externalized costs. It's all manipulated consciousness. And it's not as if you save money at big box stores.

For example –

Preparing meals from basic ingredients, even if you pay more for locally produced meats (for example) is more frugal than buying supermarket prepared foods and boxed dinners, even if you pay a bit more for the locally raised meats and organic vegetables.

Think big and think small.

Save pennies – here's a money pit: "Oh well, a few cents don't matter". Times however many times a day you say this to yourself times 365 days/year times 50 working years equals a lot of money.

Look for big money pits that can be eliminated or slashed. Staycation instead of travel-cation. I traded my "monthly plan" cell phone for a pay-as-you-go cheapo cell phone, and am selective at who gets that number. Voila, one hundred bucks a month savings in my monthly utility bills. That's $1200/year!

Make the least possible change for the greatest possible impact.

We've seen this before, and we will see it again. It is at once principle, strategy, and technique. You may be doing some things in a permacultural way already. Find those things during your observation phase and reinforce them with connections and functions.

Be informed about "local market conditions."

Be aware of your local market ecology. Watch for cycles and swings and when you have to buy, buy on the low end. When I bought my Geo Metro, I was lucky, the big price run-up in oil hadn't started and I got it for $675. A year later, the price of oil and gasoline had increased and judging from the advertisements, the cost of a Geo Metro had doubled. As oil prices subsequently declined, so did the price of the Geo Metro. One practical advice item is to buy Metros when they are cheap, to prepare for the next run-up in energy prices. "The time to buy the extremely fuel efficient vehicle is before the next energy crisis hits."

If the flow is against you, use a pattern to deflect the flow and/or use its energy in a beneficial way.

Social norms are fine as long as the reinforce the good, the beautiful, the useful, and the virtuous. When they drive gluttony, waste, and unsustainability, they are bad. Consider the rush right now to expensive electronics and phones, which replace perfectly usable "out of date" phones and electronics. On one hand, we have an enormous amount of resources going in to the manufacture of new electronics and phones. On the other hand, we have a steady stream to the landfills of waste electronics and phones that are perfectly functional.

What kind of a pattern could you use to deflect the flow of social norms that work against you? Perhaps you could resist the urge to have the latest, in favor of the "next to the latest." When everyone sells their tech because something new has come out, that seems to me to be the time to upgrade. You get the benefits of newer tech, without the expense of brand-new tech. You remain a year or two "behind" the crowd. Is this such a problem?

Curb the urge for instant gratification.

Grocery stores and gambling casinos prosper from the inability of people to curb their urge for instant gratification. When we spend money without a plan, we spend more than we need, for items of dubious utility. Design well, spend in accordance with your design, and you will do much better.

The Bottom Line

Permaculture design is inherently frugal, and frugality is inherently permacultural. Strengthen your household's resilience and increase your quality of life by rejoicing in the discipline of frugality and your designs for economy. Freedom isn't free. It doesn't have to be expensive either.

You do not save money by spending money. You save money by not spending money.

OK, there are certain times and situations where you should spend some money to save some money over time. The classic example of this is energy conservation. Insulate now, pay less later. But many of the ads you see with the "spend now you will save later" promise are money grabs.

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08091 Alternative Currencies and Investment Structures

There is nothing like a dream to create the future. -- *Victor Hugo, Les Misérables*

Alternative currencies are legal in the United States as long as there is no attempt to avoid federal or state taxation.

While investment is more highly regulated, opportunities remain for raising capital "outside the box." There are special difficulties raising money for small scale local enterprise, because the Wall Street's friends in Congress rig the system to drive money toward the stock market and mutual funds. But it's possible.

Ithaca Hours
http://www.ithacahours.com/

Ithaca hours are an alternative currency created and used in Ithaca, New York. Each Hour is worth one hour of labor or $10. They can be spent at local businesses and with people who have agreed to accept them.

Time Banks http://timebanks.org/

A time bank is a way to trade time and services. People "deposit" time by doing things for people in their local Time Bank. If they need a service, they can use the Time Bank to get services.

Peer to peer investing – Solari Circles

Peer to peer investing involves no more than a dozen people, who make investments with people they know. For example, people could form a club and decide to pool a certain amount of money each month. Members of the group could apply for investment funding for the group or bring information about investments in opportunities outside of the group. The group considers the issues, does the research, and makes decisions on where and how to invest the money. A particularly innovative way of doing this is the Solari Circle, developed by permaculture finance expert Catherine Austin Fitts. http://solari.com/blog/solari-circles-an-intro-for-financial-permaculture-students/

Crowd-sourced funding

Crowd-sourced funding uses the internet to arrange financing for projects. One example of this is Kickstarter, where supporters can pledge to support projects. If people pledge the full amount of the project, it funds and the entrepreneurs get the money. Google "crowd-funding" or "crowd-sourced funding" and you will find a world of capital formation waiting for your start-up business or worker-owned cooperative.

Ecosystem Investing

This is a concept developed by the financial permaculture folks in Tennessee. It combines concepts of investing IN an ecosystem with investing LIKE an ecosystem. They seek opportunities that are:

-- Diverse (risk management!)

-- Possess qualities of intimacy, integrity, authenticity

-- Local oriented

Deposits in Credit Unions.

Credit unions loan locally and typically do not sell loans to outside investors. Instead they keep their loans so the

interest paid remains in the local community. Besides this, there are innovative ways that credit unions can help local enterprises. Outside investors that want to invest in the Equal Exchange Coop can buy a 3-year targeted CD from a local bank, and the bank uses that as a collateral for a low interest loan to the Coop.
http://www.equalexchange.coop/eecd

Cooperatives

Most state laws authorizing cooperative incorporations exempt cooperatives from some or all of the state's laws regarding securities. Coops can sell non-interest-bearing membership shares, and depending on the state, may be able to sell shares that bear dividends.

Local Investment Network

This is a structure, similar to the investment club profiled above, except that individual investors make personal decisions about investments. The group is a way for people with capital needs to meet people who want to invest in local enterprises. See for example No Small Potatoes, sponsored by Slow Food Maine, which links local farmers with investors. http://www.nosmallpotatoesinvestmentclub.com/ .

Cash Mobs

A cash mob isn't an investment. It is a bunch of people who get together and agree to spend a small amount (say $10 or $20) at a local business.

Advance Sales

People raising money for a start-up can offer advance sales of products or services, typically in the form of a discount.

Direct Private Offering.

The general rule is that you can't advertise the sale of securities (stock) to the public without going through the registration process. However, you may be able to sell stock privately, to people you know, without going through the registration process. Contact http://cuttingedgecapital.com/how-we-work/financing-strategies/five-categories/ for more info.

Low-cost Direct Public Offering

In a conventional Initial Public Offering of a stock, the an intermediary bank sells the shares. This process requires a considerable amount of financial and legal work to register the securities for public sale. It can cost upwards of a million dollars to go that route. There is a loophole for smaller enterprises who want to sell their stock directly without using a bank. Details vary based on your state, but it may be possible to sell stock directly without incurring the huge fees involved with an IPO. More info is available from http://www.entrepreneur.com/article/52818 .

Open a local exchange.

Set up a local exchange where local businesses can sell shares to local investors. See LanX – a local exchange for Lancaster, Pennsylvania – at http://lancasterstockexchange.org/. And Mission Markets Sustainable and Impact Investment Exchange http://missionmarkets.com/platform/ .

Self-directed Individual Retirement Account (IRA)

In the US, the IRS allows an individual to set up an IRA that the beneficiary will make the investment decisions for. It requires a legal custodian, so there are some fees. The account holder of a self-directed IRA could direct the custodian to invest the assets in a limited liability company managed by the account holder, which would then make investments in local enterprises. Besides the local impact, it has the advantage of reducing custodial fees and transaction costs and delays.

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08101 Job and Career

Whenever it is possible, you should choose some occupation which you would do even if you did not need the money. -- *William Lyon Phelps*

Most people go about the choice of job and career completely backwards from what they should do if they want to pursue happiness.

When our young people get to high school, people start asking them – "What will your career be?" By the time they are juniors and seniors in high school, career counseling begins in earnest. We think it's a smart idea that these young people, at the end of 12 years of often dysfunctional schooling, who may or may not have any real education, should rush to judgment on their future.

They may or may not have some sensible advice on the subject. Many people unfortunately receive career advice that is not oriented towards what is best for the person. Instead, the counseling benefits the educational institution. Such schools see students as nothing more than profit centers. That's a lot more common attitude in higher education than anyone is willing to admit.

Because they are pressured to make these decisions too early in their lives, young people often change their minds as they get older and learn more about themselves and the world. If they are in school, this can mean that some credits they've earned won't count towards their major and they will need to take additional courses, which cost even more money. If a young person rushed into a trade school, and then find that that is not what they want to do, they may be loaded with debt for a career they will never pursue.

The concept of deciding first what a person needs out of life and then thinking about the role of work, job, and career in meeting those needs, is foreign to the modern way of doing things.

A better way is to decide first what you need to fulfill your human needs for happiness.

What are your passions?

What do you need to live and be happy?

These answers have something to do with what your needs and wants in life will be and how much it will cost (money, effort, education) to meet those needs and wants. Note that the questions are about needs and wants, not about greeds.

After you know something about your needs and wants, you can ask and answer a second question --

-- How much job or career do you need?

As you organize your life by permaculture ethics, you may find that your need for money is less than you previously thought. With the right lifestyle design, you may find that you don’t need nor want full time employment for cash.

A third question is –

-- Do you want to work in the global economy or the local economy?

We think our only option is to find a job and a career somewhere in the globalized world economy. While that’s been a great

strategy to date, people shouldn't automatically bet on it going forward.

Most areas have a growing local economy. These local revivals of mutual economic links usually begin with producing and distributing locally grown and made food and non-food items such as artisanal body care products and clothing. An additional growth sector is locally-based services. You could join or start a worker owned cooperative that makes a useful product or sells services to your community.

Your local economy may offer better and more secure opportunities for you to make a living and enhance the quality of your life. Now you have options for earning a living outside of the globalized economy.

Whatever path you take in life – whether you are at the beginning or well advanced – ask yourself –

-- How do my career or work plans care for people, care for the planet, and have a care for the future?

This is one of the reasons why permaculture design is important for your life.

Following the popular madness and delusions of crowds is never a good way to make life decisions. It is better to observe, evaluate, design, and then live an exciting and practical plan to meet the needs and goals of your life using methods that have some chance of succeeding in the real world.

You can come into the praxis of permaculture design in your life at any stage. It's never too late to start making better decisions.

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08111 The borrower is the slave of the lender: why student loans, credit cards, and all other forms of debt are dangerous to you, the planet, and the future.

Debt, n. An ingenious substitute for the chain and whip of the slave driver. --*Ambrose Bierce*

All debt is dangerous, but the most dangerous debt in the United States is the student loan.

It is the only debt, besides taxes, that cannot be discharged in bankruptcy court.

There are credible reports of student loan lenders lying to borrowers and advising them to take actions that benefit the lender and disadvantage the borrower. There are so many reports of abuses like this that the practice of lying to borrowers and advising them to take actions that benefit the lender and hurt the borrower could be considered a standard business practice in the student loan industry.

Laws exempt student loan lenders from most of the basic consumer protections that other borrowers rely on to ensure their lenders don't cheat them. Never assume that the government will protect you from fraud and abuse in the student loan program because it most definitely does not protect you from loan abuses.

Student loan lenders can lie to borrowers without any consequences.

If a student loan goes into default, lenders invoke drastic penalties so that the principle increases rapidly and the interest rate zooms up. This politically inflated debt will never go away unless paid in full. It will negatively impact the defaulting borrower's life until paid in full.

Student loans increasingly burden young people coming out of college today. During a time when they should be establishing families, starting new businesses, and saving money to buy a house, student loans complicate their finances..

Many former students fall prey to predatory programs like "forbearance," where they postpone payments for as long as two years. However, during that period, the interest continues to accrue on the loan and if not paid, they add the interest to the principle. This significantly increases the size of the loan and the future interest payments.

Is a student loan a good deal?

The blunt truth is that student loans are not always a good deal for the borrower. They are, however, always a good deal for the lender.

The famous pro-loan propaganda statement is that people with college degrees "on average earn a million dollars more" during their lifetimes than people without degrees.

To develop this statistic, the student loan industry averages the incomes of high-priced lawyers, medical specialists, and corporate executives with those of low paid social workers and teachers. For many of the lower paid "college educated" jobs, skilled blue collar work would provide better financial return than the jobs they earn with their degrees. As a result, many student loan borrowers must repay high dollar student loans with low

dollar hourly wage work instead of professional salaries.

The implication that "everyone" who goes to college earns more than those who don't go to college is a d**elusion fostered by expensive advertising campaigns paid for by the people who financially benefit from student loans.**

In 2012, half of everyone who graduated from college in the last few years works for cheap hourly wages in jobs that have nothing to do with their degrees or does not have a job.

Should you borrow money for your college education?

You can only answer this question after long and thoughtful observation of your situation. Here are some of the questions you must ask and honestly answer.

How much can you earn with your degree? Be brutally realistic in your answer.

How quickly will you be able to find a job once you get your diploma?

What is the total amount you will borrow? What will your payments be each month?

How long will it take to pay off your loan? What is the total amount of interest you will pay? What is the total cost of this loan (total borrowed plus total interest)?

How much income will you have left over each month after paying your student loan?

If you do not have a scholarship, and you depend on student loans for all, or almost all of your education expenses, you had better be sure you have a good dollar job waiting for you upon graduation. If there is anything doubtful about your earnings, take the worst case, not the best case.

If you depend on student loans to pay for college education, and you aren't sure you will have a good job waiting for you, or if you aren't confident about the earning power of your degree, you should –

-- Transfer to a less-expensive school if you are at an expensive state or private school, or

-- Drop out of college to earn some money and go back to school later with money in hand and pay cash for your expenses.

For many students – at both state and private schools – student loans are not a good deal. They are tickets to a lifetime of indentured servitude to a giant vampire banking institution that will cheerfully suck your surplus dry.

The new government Direct Student Loan program has some benefits for lower income graduates, but it is a political program. Under its provisions, your payment is tied to your income. After a certain number of years, any balance is forgiven. Alas, there is a bitter pill hidden in this seemingly good deal. If the government does pay-off the balance, the government will also classify the amount they forgive as income! You will have to **pay income taxes on that amount and there won't be a payment plan** for the amount forgiven. It will be due and payable on tax day in the year following your loan forgiveness.

What the government gives, the government can take away, so you're not safe until you pay the loan in full.

Most students are better off without any student debt.

"No student loan" does not mean "no education."

You can go to school part time while you work to pay your expenses.

You can live a frugal lifestyle while in school.

You can go to school one year, work a year, go back to school for a year, and then work a year, to get yourself through school.

By using these strategies, it may take longer to get your degree, but you will end up with a degree without the debt. Over the next 40 years, you will be happy

you weren't in a hurry to get out of school and that you earned your degree without debt.

Unconvinced? Read more before you make your final decision.

Should I default on my student loan? http://www.peakoilblues.org/blog/?p=329

Read some of the student loan victims stories at http://studentloanjustice.org/victims.htm.

Read more info at http://studentloanjustice.org/argument.htm.

The best advice is – don't get a student loan!

If you already have student loans . . .

Do not believe anything that your lender tells you without first checking it with an independent source for corroboration. Always assume that the advice your lender gives you will benefit the lender and hurt you. Get independent financial advice about your student loans.

Pay your loans off as quickly as possible. Pay more than the loan requires you to pay each month so that you pay the loan off quicker than you would otherwise. This means you will pay less interest. If you have a ten-year loan, every dollar you pay extra early in the game is a dollar you won't pay interest on for ten years.

Suppose you have student loans totaling $15,000, paying 6.8% interest for 10 years. Your monthly payment is $172.62.

If you pay it out for the standard ten years, you will pay $5,714 in interest, for a total loan cost of $20,714.

If you make an extra payment of $20 each month, you pay off the loan in nine years instead of 10, and the total interest payment is $4,843, a savings of $871.

The extra payments over the nine years total $2,060, which means that you would make 4.2% interest on those extra payments in terms of the interest you did NOT have to pay.

Now let's look at another, less rosy scenario.

Suppose instead of making extra payments, you put your loans into FORBEARANCE. It seems great because you don't have to make payments. However, every quarter that interest gets added to the principle of your loan.

At the end of two years forbearance, the principal of the loan has increased to $17,116. The monthly payments increased to $193.82. The total interest paid increases to $6,416. The total cost of the loan is now $23,532 –

-- $15,000 in the original principle, plus

-- $1,684 in capitalized monthly interest payments for the first two years, plus

-- $6,416 in monthly interest payments once you start paying back the loan over its ten-year term.

Let's look at an even worse case. Suppose you went to a private school and came out with $45,000 in student loans at 6.8% interest. We assume you applied for and received a 20-year payback time, so your monthly payments are $343.50 and you go into forbearance for two years.

The principle of your loan increases to $51,443

The monthly payment once you start paying the loan increases ton $392.88.

The interest you pay on the new principle totals $29,802.

The total cost of the loan is $81,245

If you have debt, you need to learn about **amortization.**

When you make payments on a loan, each month the payment consists of principle plus interest.

The interest payment is the amount of interest owed for that month. The formula is:

Principle owed on the loan
TIMES the annual interest rate
divided by 12.

The principle payment is the amount of principle that must be paid each month so that the loan is paid off in its stated term with its equal monthly payments.

The proportion of the payment dedicated to principle and to interest changes each month. Each month you pay off some principle, so you no longer pay interest on that principle. Thus, the amount of interest decreases each month and the amount of principle increases each month. At the beginning of the loan, most of the payment is interest. At the end of the loan payment period, most of the payment goes to principle. This is called the amortization of the loan.

This is why extra principle payments made early in the life of a loan save you so much money. At the beginning of our $45,000 loan described above, the amount paid each month on principle is only $88.50. All of the rest of the payment is interest. So every ten dollars extra principle you pay early in the loan will save you $30.40 in interest of the life of that loan. It's like an investment that triples your money!

Many spreadsheet programs include amortization software. You fill in the amount of the loan, the interest rate, and the months of its length, and it gives you a spreadsheet showing the payments for each month. There is a column where you could plug in extra principle payments and see how that affects the term of the loan and the total interest paid on the loan.

You need an **amortization spreadsheet** for every loan you have.

Extra principle payments do not have to be the same amount each month. If you are short on cash, make only the basic payment. If you have a windfall, pay more on the loan. Every dollar paid ahead is a dollar whose interest payment goes away. That's what you want.

The second most dangerous borrower trap is CREDIT CARDS!

If you have a credit card, the only thing to do with it is chop it up right now and recycle the plastic. That's all that there is to that.

There is no good reason to have a credit card, none whatsoever. It will continually tempt you to spend beyond your means and you will pay more and more of your income in interest to the big vampire banks. If you want to buy things online, use a debit card. Ignore the advice to "establish good credit" by borrowing on credit cards.

Use a credit card -- make yourself a slave. Pay cash – learn to be free and you will be independent of financial domination.

What about mortgages? Business loans?

The borrower is always the slave of the lender. The word "mortgage" derives from Latin words meaning "death grip." Until you pay the loan in full, you run the risk of losing all of your investment and your home if you default on the mortgage. Millions of people learned this to their own personal grief when the economy started its long collapse 2007-2008. Since we expect more such hard times in the future, you should think hard about signing up for any debt that lasts as long as the typical mortgage.

Thirty years of interest more than doubles the price of the home. For many years, people have paid off long term loans with cheaper dollars than they borrowed, because inflation has been constant since World War II.

In the present economy, however, you can't count on inflation that will allow you to pay off your loan with inflated dollars. We may experience deflation instead, in which case you will pay the loan off with dollars that are more valuable than the dollars you borrowed. Meanwhile, as part of the general deflation, the value of your home may decrease. You better believe the bank

won't lower the value of your mortgage to match the market value of your home.

It is best to save your money and pay cash for a home or a car or whatever it is you want to buy. You may buy a smaller home or apartment than you would have if you had borrowed the money, That's not necessarily bad. Bigger homes and apartments mean bigger bills, bigger taxes, bigger repair expenses, bigger bills for furnishing and other interior accouterments. The future doesn't need more big houses. The future – the planet, the people – need appropriate scale housing for your life and household.

Businesses that depend on debt are not sustainable. It's better to start smaller, and go forward without borrowing money, than to try to pump yourself up with an amphetamine finance rush that may put you at risk of complete collapse later on if credit suddenly goes away.

Youth is a time when you learn knowledge and skills you will need in your life. One of the most important things you can learn today is how to live without debt. **The borrower is the slave of the lender! Declare your freedom today!**

The bottom line on debt is simple:

Pay cash for what you need, whether it is an education, a house, a car, whatever it is you want. Make payments to yourself and pay cash. Don't voluntarily enslave yourself and your family to banks and lending corporations. Learn to defer present gratification for future economic security.

Lies ride on debt's back. Close your ears to its temptations.

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08121 Design for Regeneration

Earth teach me to forget myself as melted snow forgets its life. Earth teach me resignation as the leaves which die in the fall. Earth teach me courage as the tree which stands all alone.
Earth teach me regeneration as the seed which rises in the spring. – *William Alexander*

Regeneration (Renew, Reproduce, Reorganize)

Resourcefulness by itself is not enough. Thanks to the 2nd Law of Thermodynamics, every time we do something useful we lose some of the energy in the transaction. Over time, we lose it all. The mainstream economy finesses this with exploitation and extraction. We need something better. Thus we seek to strategies of regeneration to renew, reproduce, and reorganize so we keep things going over time.

With proper design, your life should produce a surplus as you journey along. This may be in the form of money, it may be production (food, goods, arts, crafts, makings, etc.), it may be ideas, action, organization, services, or other useful activities.

Everyone needs a surplus for two reasons.

First, you need a **surplus so you have something to give away to others or invest in the community.** Everyone should be part of the work of community organizations and charities, who depend upon the gifts of others for the funds they need to do their work. By investing in enterprise or community resources, you put surplus into circulation for the benefit of all while adding something to your own surplus, which allows you to do more.

Second, you need a surplus so you have **something to save for your own future needs and purposes.** You need a financial reserve to take care of future financial issues and present day emergencies.

Savings may be in money, or they may be in the form of goods saved for future use, such as food storage. Savings may be found in social or intellectual capital. The point about savings is that they are quickly accessible. They are "liquid" as they say. If you have food storage, and you need food, you can use some of your food storage for dinner. If you have money (or gold or silver) stashed somewhere, and you lose your job, or have an emergency that needs funds, you can use some of your saved money to take care of the present need.

Savings should be secure. Savings aren't worth much if they can disappear overnight. While you may be able to earn some income from your savings, generally savings do not pay a high rate of return.

That's OK, the purpose of your savings is to provide protection in a time of need and achieve future goals, not necessarily to earn money.

Investments are money, resources, or effort that you invest in an enterprise. Generally, invested funds have a higher rate of return, but this comes with (a) a lack of liquidity, and (b) a much higher risk of loss.

Depending on the structure of the investment, you may not be able to withdraw from it quickly if you need the money. Your investment could disappear overnight if the enterprise fails. This is the meaning of "lack of liquidity." Investments are a way to share surplus, as it puts your surplus into circulation where it can benefit others.

A good rule of thumb is that nobody should invest in anyone other than themselves until they have at least a year's expenses in the locally owned bank or credit union and a significant amount of food storage. (In this context, "investment" is not the same as "gift.")

When people think of investments, the first thing that comes to mind is the stock market. That's a bad idea from a sustainable living viewpoint, for several reasons, the first one being that investing in the stock market starves the local non-globalized economy for money.

That's an easy thing to say. The problem is that there aren't many vehicles for such investments. If you want to invest in the regular stock market, it is easy to do. If you want to invest in the local economy, it is not so easy to do. Chances are, you may have to be part of a process of inventing a way to invest in your local economy.

This isn't an accident, it is the way the system is designed. Rent-seeking economic aristocrats who benefit from stock market investments want the system to work this way. The want the stock market to be the default choice for investment and to have an advantage over competing, localized investment choices.

One way avoid the stock market trap and to invest in your local economy is to start an **investment club.** This is a relatively non-complicated way for a small group of people to pool their money in order to make investments. Two things will keep you out of problems with compliance with various security laws – don't solicit the general public to join via the internet or print publications and keep it to 12 people or fewer.

You need an investment structure, which can be an LLC (limited liability company).

Generally, the group decides on an amount that each person (or organization, as organizations can be part of these groups) will pay in each month. If 12 people each pitch in $100, that is $1200/month to invest. Individuals look around and find investment opportunities in the local economy. This could take the form of short-term loans to entrepreneurs, buying part of a business or shares of stock in a local enterprise, or bonds of a local enterprise. You may or may not meet every month, and may or may not use the internet to facilitate your activities. The members design how their club will work. If more people come along, the group could decide to split and then there would be two groups, which could eventually become four groups and so on and so forth.

As the number of people interested in such investment opportunities multiplies, it may be possible to organize a credit union, or to negotiate an agreement with an existing credit union that might be persuaded to add sustainable local enterprises to its loan portfolio. In the mean time, credit union accounts are great places to park investment funds while waiting/looking for the right local economy investment opportunities.

Generally, you can only **increase the return on your investment by accepting more risk.**

There is no such thing as a risk-free investment.

There is no such thing as a risk-free investment.

Three times I tell you – there is no such thing as a risk-free investment.

Beware of anyone touting a "risk-free investment".

If you “must” invest in the stock market, the only places to put your money are in businesses or funds that besides financial return also offer some form of social good and avoidance of social harm. About this practice, often referred to as “socially responsible investing,” Wikipedia says. . .

> In general, socially responsible investors encourage corporate practices that promote environmental stewardship, consumer protection, human rights, and diversity. Some avoid businesses involved in alcohol, tobacco, gambling, pornography, weapons, and/or the military. The areas of concern recognized by the SRI industry can be summarized as environment, social justice, and corporate governance -- as in environmental social governance (ESG) issues. In addition to stock ownership either directly or through mutual funds, other key aspects of SRI include shareholder advocacy and community investing.

The term "socially responsible investing" sometimes narrowly refers to practices that seek to avoid harm by screening companies included in an investment portfolio. However, the term is used more broadly to include more proactive practices such as impact investing, shareholder advocacy and community investing. Amy Domini, a prominent member of the socially responsible investing community and the founder of Domini Social Investments, has stated that shareholder advocacy and community investing are pillars of socially responsible investing and that doing only negative screening is "not what I would consider adequate."

Investing in the stock market in non-socially responsible businesses or funds is always a Type 1 Error.

Designing for regeneration of our economy is a matter of both providing for yourself and your household, and accepting your share of responsibility for the community and its “commonwealth.” The third ethic – caring for the future, by understanding that there are limits and that surplus needs to circulate – is the essence of a regenerating economic system. All of this begins in your own individual life and household, as you make economic decisions formed by the ethics and principles of permaculture.

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08131 Macroeconomics and the subjugation of peoples

Few will have the greatness to bend history itself, but each of us can work to change a small portion of events.
It is from numberless diverse acts of courage and belief that human history is shaped.
Each time a man stands up for an ideal, or acts to improve the lot of others,
or strikes out against injustice, he sends forth a tiny ripple of hope, and crossing
each other from a million different centers of energy and daring those ripples build a current
which can sweep down the mightiest walls of oppression and resistance. – *Robert F. Kennedy*

If you look up "subjugate" in the dictionary, you read words to this effect –

> To enslave, conquer, bring under control.

Macroeconomics is the study of large economic systems at the national and international levels.

In our era, economics is a method of war and conquest.

It is more effective than the traditional military approach. Infrastructure is not destroyed. It is less expensive. In fact, by clever methods of financial manipulation, conquering powers can make peoples targeted for domination finance their own subjugation.

This isn't just an affair of the economic aristocracy – the citizens, who are economic actors – of the colonizing economic powers bear responsibility for the process of economic subjugation of peoples. Our willing participation is often necessary for the conquest to succeed. We certainly get a share of the profit from the conquests.

In other words, one reason we have it so good in the developed world is that we the peoples of the "First World" enable the oppression of others by our own manipulated participation in the financial conquest campaigns of the globalized economy. It is a "willing" participation to the extent that these decisions are made by our own personal volition. Yet, all of us swim in a sea of propaganda campaigns that manipulate consciousness and conscience to drive gluttony that satiates the greeds of the economic and political elites.

We buy products like coffee, chocolate, and bananas without any regard for economic justice for the peasant producers of these important products. Our manipulated consciences do not register a word in protect.

Our manipulated gluttonies for out of season cheap produce snatch food from the mouths of hungry children in poor countries to satiate our jaded appetites and enrich corporations. Our menu choices drive land grabs that dispossess traditional peoples producing for local markets to convert their land to production for the developed worlds markets, under the control of transnational corporations.

When the economic elites decide its time for a military adventure, we can be counted on to cheer for our politicians' rush to wars that ensure steady supplies of cheap resources to exploit. Like Pavlov's dogs, our politicians punch our buttons and we obediently shout Crucify them, Crucify them.

We elect the politicians that create the laws and economic systems that rent-seeking economic aristocrats use during their campaigns of economic subjugation. We open our minds and drench our consciousness with their propaganda lies. So it comes to pass that we give our consent for their schemes by the way we live our lives.

World peace, justice, and sustainability are incompatible with the politics of economic subjugation. The permaculture ethics of caring for people, caring for the planet, and caring for the future are the practical alternatives that lead to an end to economic colonialization and offer true freedom with justice and sustainability for all.

Our job is to become intentional – and discriminating – in our consumption. The planet and its peoples need for us – the wealthy peoples of the First World – to stop harming ourselves, the human race, and the planet by our excessive consumption.

Examine your own life. What do you buy? Where does it come from? If imported from a less developed country, do you help or hurt the ordinary people there with your purchase? Change what you buy so you help, not harm. Buy fair-traded products.

Don't buy out-of-season produce.

Don't vote for politicians that use war as an instrument of national economic policy.

Withdraw your consent from the system of international subjugation and colonialism by changing the way you live your life.

Write this into your plan –

> I will stop killing poor people in poor countries with my lifestyle.

This is what it takes to break free of the mindless consumption pattern that is so popular these days.

Getting out of that evil system is one of the beneficial connections of the lifestyle change decisions you contemplate by participating in permaculture design. Never doubt for a minute that our lifestyles of the rich and economically powerful are serious-as-a-heart-attack life-and-death issues for billions of people who aren't rich and aren't economically powerful.

Deliberate acts of economic subjugation contribute to the deaths of tens of thousands of people every day due to the consequences of poverty.

As we praxis the permaculture ethics, our willing participation in this economic subjugation of peoples ends. Every person who withdraws his or her consent from this evil system by living a better life gives light and life to a world desperately in need of both. As we gather our strength, we can impact the larger invisible structures as we make it easy to do good and hard to do bad.

We look forward to the day when a critical mass of people living in accordance with the permaculture ethics begins to form.

They fight with money. We resist with time. They will run out of money before we run out of time.

> It may be hard for an egg to turn into a bird: it would be a jolly sight harder for it to learn to fly while remaining an egg. We are like eggs at present. And you cannot go on indefinitely being just an ordinary, decent egg. We must be hatched or go bad. *C. S. Lewis*

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08141 The Unplugged - A Speculative Fiction

by Vinay Gupta, published to the internet, February 20, 2006 at http://www.worldchanging.com/archives/004123.html . Published here with his permission.

A Video News Report from 2030.

Anchor: Touting their movement as a combination of the economic theories of Mahatma Gandhi and the political science of Buckminster Fuller, the Unplugged have now reduced the GDP of the United States of America by 20% over their 15 year programme.

Opponents of the movement call Unplugging an unscientific and cult-like political movement, but proponents say that "Unplugging" was the best decision they ever made. Let's hear from Jack Huston, a former investment banker...

[Cuts to video – Screen opens to Jack Huston, a muscular early-40s New Yorker.]

Presenter: Jack, could you explain what Unplugging did for you?

Jack: Well, first we've got to cover briefly how Unplugging works. The core of the theory is that we can all live off the interest generated by our savings, or the profits from our investments, if we possess enough capital - and generations of Capitalists have dreamed of "getting off at the top" - making enough money to cash out of the workplace and live as they like for the rest of their lives.

Presenter: But what does that have to do with living in a housing pod in the middle of Oregon?

Jack: Well, it comes down to the nature of capital. Wealth stored as dollars was essentially a share in America's national economy - a credit note backed by the US Government. But Buckminster Fuller showed us that wealth-as-money was a specialized subset of Wealth - the ability to sustain life.

To "get off at the top" requires millions and millions of dollars of stored wealth. Exactly how much depends on your lifestyle and rate of return, but it's a lot of money, and it's volatile depending on economic conditions. A crash can wipe out your capital base and leave you helpless, because all you had was shares in a machine.

So we Unpluggers found a new way to unplug: an independent life-support infrastructure and financial architecture - a society within society - which allowed anybody who wanted to "buy out" to "buy out at the bottom" rather than "buying out at the top."

If you are willing to live as an Unplugger does, your cost to buy out is only around three months of wages for a factory worker, the price of a used car. You never need to "work" again, although there are plenty of life support activities to keep you busy, and a lot of basic research and science to do. Unplugging is not an off-the-shelf solution, it's a research career!

Presenter: So tell us about your house over here? It looks pretty weird!

Jack: Unpluggers don't have our own manufacturing facilities for these yet, so we shop them out to fabs in Turkey. The shell is aluminum and aerogel, 50% collector panels, 12 volt appliance wiring, super-insulated windows with liquid crystal shades for internal temperature control. Heat comes from either a wood stove or a peltier solid state heat pump running off ground heat, depending on

how much power we need. Cooling, similarly. We cook in the solar oven on the side sometimes, but mainly on woodgas or in the microwave.

The houses - or "Pods" as you call them - have a reputation as being "one size fits all poorly" but, in fact we found that 90% of people got on well with one of three basic designs. The economies of scale made mass manufacture of those models more cost effective but people still do custom work for about one unit in ten. We're working towards local fabs for a lot of this stuff now, but that's hard to organize without winding up with internal industries which run on grid power and commercial supply chains, both of which are no-nos for our way of life: you can't be an alternative if you still rely on the National Infrastructure for your metabolism. A one-time switching cost - the "Final Purchase" - is one thing, but we can't run our economy inside of the national economy! That would just be dishonest!

Presenter: Can you explain what this has to do with Fuller and Gandhi?

Jack: Gandhi's model of "self-sufficiency" is the goal: the freedom that comes from owning your own life support system outright is immense. It allows us to disconnect from the national economy as a way of solving the problems of our planet one human at a time. But Gandhi's goals don't scale past the lifestyle of a peasant farmer and many westerners view that way of life as unsustainable for them personally: I was not going to sell my New York condo and move to Oregon to live in a hut, you know?

Presenter: Ok.... with you so far.... what about Fuller?

Jack: Gandhi's Goals, Fuller's Methods, if you like.

Fuller's "do more with less" was a method we could use to attain self-sufficiency with a much lower capital cost than "buy out at the top." An integrated, whole-systems-thinking approach to a sustainable lifestyle - the houses, the gardening tools, the monitoring systems - all of that stuff was designed using inspiration from Fuller and later thinkers inspired by efficiency. The slack - the waste - in our old ways of life were consuming 90% of our productive labor to maintain.

A thousand dollar a month combined fuel bill is your life energy going down the drain because the place you live sucks your life away in waste heat, which is waste money, which is waste time. Your car, your house, the portion of your taxes which the Government spends on fuel, on electricity, on waste heat... all of the time you spent to earn that money is wasted to the degree those systems are inefficient systems, behind best practices!

Presenter: Wow! So tell us about the Humane Human Footprint.

Jack: The Human Footprint is simple: it's the share of the world's resources you can use without really harming anybody simply by existing. We call it the Human Footprint as opposed to the Inhuman Footprint. You take the sustainable harvest of the earth - the bounty we can consume without reducing next year's harvest or reducing the resilience of the earth in other ways - and your share of that is one Human Footprint. The earth's Wealth - its life-giving power - is like a trust fund split between seven billion humans and a gazillion other living creatures. That which consumes more than its share is defrauding all the rest of their right to life. And this isn't religion, this is common sense: if there are winners and losers, we're in a race for survival. If there are only winners, we're all artists, scientists, lovers and scholars.

I know how I want to live.

Presenter: So how close to your Human Footprint are you, Jack?

Jack looks uncomfortable.

Presenter: I've heard five times over is a typical number for Unpluggers...

Jack: Well, it depends how you measure it but yes, about that. I have three children, so my family footprint is about 11.2x HF but my personal footprint is about 7.3x. I'm working on it, though. It's hard to make the adjustment, and we only have a few tens of thousands of people at 1.0x or lower.

Presenter: So let's talk politics. Unplugging is also a political movement - you yourself are mayor of a township here, and your "town" is the local Unplugger population plus a few hold outs in ghost suburbs east of here. Why play at politics if all you wanted to do was drop off the Grid?

Jack: Because political assumptions wire everything. Building codes dictate how you can build, which dictates the size of your housing cost, which is the primary factor in your Unplug Cost. Our sanitary systems are greatly more effective than those of the Grid but, because we fertilize food with human waste after extracting what energy we can from it, some say our food isn't suitable for human consumption - even though, in fact, there is no scientific evidence what-so-ever of any disease organisms in the fertilizer stream. Just the idea of fertilizing using processed human waste freaks people out, even though it is how humans always lived. And this pattern repeats for water, our medical practices, all of it. You would think that preventative medicine was a crime!

Because we are different, the existing legal infrastructure works against us at every hand and turn. To create change, we have to play politics. But we are careful to simply use our small-but-growing clout to open doors for our chosen lifestyle, not to close doors on other people's choices. We aren't ecostalinists. Gandhi's approach: voluntary enlistment in the army of truth, if you want to think about it that way, has proven to be the only effective model of political change which is consistent with all of our shared values. We embrace some parts of Gandhi's model more than others - as with Bucky - but you can't argue with the historical success of his approach: India, South Africa, America, Poland, Mexico... the list goes on.

Presenter: Even my kids have an Obey Emperor Gandhi bumper sticker. What's that about?

Jack: It's an Unplugger joke. We call Gandhi "Emperor Gandhi" because in our way of looking at things, he was the political leader of India - a network of Kingdoms - and therefore technically he was an Emperor ([laughs]). In that role, he organized collective defense against the invasion of India by raising a volunteer army of people who bought nothing from the invading colonials, made salt, and got beaten while maintaining rigid discipline - just like an army. All they did not do was leave home or use violent methods to resist their invaders. The fact Gandhi himself didn't own much of anything and advised self-reliance as a keystone of freedom makes him the John Locke of our movement. But we don't take the Emperor Gandhi thing seriously, you know. It's just a bit of our cultural humor.

Presenter: The threat of "Mom, keep yelling at me and I'll get a job delivering Chinese food and then Unplug when I've saved up!" has kept many a parent up at night...

Jack: Unplugging isn't really something you can sustain from youthful rebellion: kids who don't choose this way of life for themselves as adults are usually really poor Unpluggers - they don't take soil metrics seriously, they don't really understand the invest-in-your-lands model of labor, and so on. It's not really something for punks and anarchists, even though there is superficial appeal.

Presenter: There's a lot of science here!

Jack: Oh yes. We monitor everything we have proved pays, and more: soil bacteria genetics, nutrient levels in the soil, nematode populations, you name it. We have such excellent yields and pest control because we don't move around much - we get to know our land as

scientists and artists and designers - we share knowledge and models. Of course, not everybody contributes equally to this knowledge base - I have a neighbor who is a molecular biology professor by (former-) trade and, well, I use his numbers a lot ([grins]). But we all do what we can, and the results are proof that our farming techniques - "high monitoring biointensive agriculture" or "Technical Permaculture" depending on where you live and which school you follow - our farming methods work, and will continue to work for at least a few hundred to a few tens of thousands of years. And that's enough for us: leave it to our children to figure out how to get their own lives to be even more integrated morally, ethically and socially.

Presenter: Some say that Unplugging is a cult because of your "Unplugger Morals" doctrines...

Jack: Acting as if the god in all life mattered is radical politics. But we have people from every faith and tradition living as Unpluggers, as well as those with no beliefs but a deep moral conviction that this is the right thing to do. But as with Satyagraha - Gandhi's social change approach - this takes everything you have and more and you can't do it without a solid internal framework, a deeply personal commitment to this as Right Action in a Buddhist sense, as Dharma from a Hindu perspective, as The Life Divine if you are a Christian. We have radical Benedictine monks - on the edge of getting booted out of the Catholic Church - who have updated the lifestyle passed down from Benedict himself to use Unplugger Farming and who became part of the Unplugger Community as a result. But we also have anarchosyndicalist atheists.

All it takes is a belief you can act on which helps you make personal changes for global reasons. And a political faith isn't usually enough to do that, but it can be. Religion has proven over time that it can move people in ways that nothing else can, and Unplugging is the biggest change a society can make.

Living up to your values is hard. Faith helps some people do it, so we tend to see more of those kinds of people making the switch. It's just a selection bias.

Presenter: What do you mean "a change that society can make?"

Jack: Unpluggers now constitute 5% of the United States population. At first, we were the very ideologically motivated, and there was a lot of interface with older communitarian groups and prior generations who had attempted to make this transition. But as we became more defined, and our thinkers elucidated our case more clearly - as our farmer-scientists began to really get the yields predicted in theory, on a per-square-foot basis... it became clear that we were talking about a partial solution to the problems that have faced the human race from the beginning of time: how do I live myself, and how does my family live. And a society is just individuals and families, and sometimes families of families, all the way up to States and Governments and the International Agencies and so on. If you solve the problem for a single family, and it's something which can compete in the evolutionary marketplace of ideas, then eventually you can solve the entire problem.

You know why GDP has gone down 20% because of Unplugging? Unpluggers are entrapreneurs. We used to start businesses because we wanted to buy out at the top of the game, now we usually buy a fairly lavish Pod, and some really, really good quality land, unplug by 30, and some of us expect to spend the rest of our lives learning, teaching and exploring what it is to be alive. Farming five or six hours a day seems like a lot of work, but you do it with friends, and you're doing science and research some of the time, and you eat what you make. The basic activities of life are so much more satisfying that earn-and-spend-and-eat-carry-out when you actually respect them as basic human activities, as links we share with everything that is alive.

Presenter: Tell me about the Endowment.

Jack: The Endowment is how we help the poor to Unplug, and it is easily the most controversial part of our programme. We encourage the developing world to Unplug as the ultimate form of Leapfrogging: skip hypercapitalism and anarcocapitalism and democratic socialism entirely and jump directly to Unplugging. Many Unpluggers take their excess capital, keep investing it in the system, and use the proceeds to fund private Unplugging programmes. Others simply took their capital and added it to funds managed by a Grameen-bank like institution called the Unplugging Bank which lends people money to unplug, and has them pay for their Pods by selling excess farm goods and teaching agriculture for us. The leverage of these approaches has yet to be verified but - judging by the political repression of Unpluggers in China and India and some parts of Africa - judging by that resistance, I think we are going to be successful.

As the Mahatma said: "First the ignore you, then they laugh at you, then they fight you, then you win."

Software used to be an industry, you know?

Presenter: Thank you, Jack, for telling us about your life.

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08151 Unplugging as a Lifestyle Strategy.

The goal of the future is full unemployment, so we can play.
That's why we have to destroy the present politico-economic system. *Arthur C. Clarke*

Here's an outline of the Unplugging strategy (from document 08141):

Dwellings – the movement offers a place to live – pods – made by enterprises associated with the movement. The pods are small, don't cost a lot of money. Systems owned by Unplugging organizations mass produce them in three basic designs. They make energy and are super-energy-conservative to operate.

Food – they have an organized communal way to grow food. Unpluggers live in communities. The communities produce food for the use of their communities. A surplus may be sold.

Wealth is the ability to live without a cash job (a/k/a "job-job"). This is not a monetary definition of wealth. It is a functional definition. Instead of saving and investing large amounts of money, the Unpluggers participate in systems which provide them with what they need for life, without spending money.

Last Purchase is the buy-in to an existing Unplugger community. It comes with a "pod" designed to personal needs/wants. It is an amount of money that could be reasonably saved on a blue-collar income.

Education and medical care – they take care of their own.

Governance – their communities are organized as cities and towns, either by taking over existing governments or by establishing new municipalities.

At present, the Unplugged movement is just a story. Wouldn't it be fun though if it came true? I know this sounds crazy, but . . . why don't we make the Unplugged a self-fulfilling prophecy?

Like any successful crusade, it starts at the grassroots. No one gives an order and says "go." We don't have a debate and then take a vote. People just start unplugging on their own. They develop their own small communities. They tell others what they do and invite them to do likewise.

As more people Unplug, we develop more resources to help people along on their journeys. Maybe somebody will actually design a pod or maybe we will just become specialists at renovating existing housing to be sustainable dwellings that make energy and grow food besides providing comfort and security to its inhabitants.

No one is in charge of the movement because everyone is in charge of their individual lives and households and families govern themselves. As more people do this, the individuals and families and permaculture learning communities link up and work together to create quality of life and protect well-being and happiness.

The more people involved, the easier it becomes – the more impact we can be as we go about our lives maximizing cooperation, beauty, happiness, health, and freedom, while minimizing conflict, consumption, injustice, waste, and work.

Obey Emperor Gandhi! That's our motto. I see little signs on people's doors – This household obeys Emperor Gandhi! Or maybe, God Save Emperor Gandhi! And, Obey Emperor Gandhi! Also, Emperor Gandhi ROCKS!

Eventually there will be signs like these at city limits and state lines and national ports of entry.

Nothing is stronger than an idea whose time has come. So said Victor Hugo (and he should know!)

Just do it. Go to www.ipermie.net and print some of the Obey Emperor Gandhi printables. Put one or more of them on your door. When people ask, "What's that?" Explain – "I quit being the problem and now I am the solution." When they say "What's that?" send them to http://www.ipermie.net.

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08161 Tools for Economic Sustainability

This is a plan for creating the Open Source Economy. The program begins with developing the open source Global Village Construction Set (GVCS).

The GVCS is defined as a minimum set of technologies necessary to create advanced civilization from locally available "dirt and twigs" with 12 people and 1 year of time starting with a container-load of GVCS tools. In the process of developing the GVCS, we will be developing a scalable, open source product development platform – the Distributive Enterprise platform. . .

The goal is to create economies capable of being powered by local resources. The intended sociological effect is to allow people the autonomy to pursue mastery consistent with higher purpose – as a possibility for the next step of humanity's evolution. The current state of OSE is transition from vision to institution, fed by learnings about the need for solid organizational and development infrastructures as immediate priorities.
The Executive Summary of the draft strategic plan for Open Source Ecology.

Economic action requires tools. In the globalized economy, control of tools translates into control of economic destiny. That's why one of the most important sustainability initiatives in the modern world is the Open Source Ecology project, found online at http://opensourceecology.org.

Its present focus is to design and build the Global Village Construction set, a "modular, do-it-yourself, low-cost, high-performance platform that allows for the easy fabrication of the 50 different industrial machines that it takes to build a small, sustainable civilization with modern comforts."

See the list of machines they plan to design and produce at http://opensourceecology.org/gvcs.php.

View a TED talk about the project at http://youtu.be/d-D8FGZi0qc.

This is not somebody's pie-in-the-sky dream. It's a "them that's doin'" project that produces useful tools for local economic activities. These people have actually designed, tested, and produced some of the machines on their list, with others in various phases of active development. The four machines thus far in the "implementation" phase are:

-- Compressed Earth Block press
-- Soil Pulverizer
-- Tractor
-- Power Cube

Details about these projects are at http://opensourceecology.org/wiki/Civilization_Starter_Kit_DVD_v0.01.

Plans and construction instructions are downloadable for free!

One of their interesting projects is the development of a sustainable design for houses based on a hybrid of straw bale and the Compressed Earth Block technologies. The goal is a low cost, low energy, self-sustaining, and comfortable habitations that care for people, care for the planet, and have a care for the future. This could fulfill the role of the "pod" which is such a critical aspect in the Unplugged scenario. Instead of being manufactured and shipped to a site, it would be built onsite.

See http://opensourceecology.org/wiki/OSE_Microhouse and pictures at

http://opensourceecology.org/w/images/3/30/Microhouse04.pdf.

The group is presently testing the CEB/straw bale hybrid during construction of the Hab Lab, a 3,000 square foot building to house the members of the community living at their site (known as Factor E Farm) in Missouri. The design and construction page for that project is at http://opensourceecology.org/wiki/Hab_Lab.

Everyone interested in economic sustainability should network with and support these design projects.

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08171 Economic Inventory

Where justice is denied, where poverty is enforced, where ignorance prevails,
and where any one class is made to feel that society is an organized conspiracy to oppress, rob and degrade them,
neither persons nor property will be safe. -- *Frederick Douglass*

What is your annual income?

What is your annual cost of living?

Note that this is a different number than income. This is what you spend, or is spent on your behalf, in order for you to live. It may be more or less than your actual income. If more, then you are subsidized by debt, transfer payment, gift, parents, etc.

You get extra bonus points for being able to quantify your expenses by category – food, shelter, transportation, fun and games, mindless shopping, clothes, medical care, donations, etc. If you can't do this, then start right now keeping track of your expenses.

Do you support people other than yourself? How many?

How much do you owe? Credit cards, student loans, mortgages, etc.

How much money do you have in savings? This is not "money in the stock market or a mutual fund." Savings consist of cash in hand and money in a bank or credit union account (savings, checking, or certificates of deposit).

How much money do you have in investments? Here is where you list your stocks, bonds, mutual funds, etc. if you have any.

What is your net worth? (Add up all your assets, subtract all your debts.)

If your income stopped, how long before you become homeless or have to move in with someone (parents, friends, etc.)?

If you are in college, what are the actual prospects for getting a job using your four-year degree? Can you make enough money to pay off your student loan and live your life?

What will you need to earn in the future? Do you have student loans that must be repaid? What will you health care cost?

If you out not in school and are working, do you like your job? Do you earn enough from the job to pay your expenses and save money for the future?

Does your household require more than one income to survive?

Do you have areas of expenditure you would like to cut or eliminate?

If you cut or eliminate those expenditures, what will you do with the income that used to be spent on them?

Do you need to increase your income?

Besides your job – or instead of a job – do you operate a business? What are its revenues and expenses? How many employees work for you (if any)?

Do you want to quit working for someone else and start working for yourself by

starting a small business or cooperative? If you have developed any detailed thoughts about this, include them with the inventory.

What do you think it would take for you to unplug? Think about resources, systems of support, and cash.

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08181 Design your household economics

Freuchen tells how one day, after coming home hungry from an unsuccessful walrus-hunting expedition,
he found one of the successful hunters dropping off several hundred pounds of meat. He thanked him profusely.
The man objected indignantly: "Up in our country we are human!" said the hunter. "And since we are human
we help each other. We don't like to hear anybody say thanks for that. What I get today you may get tomorrow.
Up here we say that by gifts one makes slaves and by whips one makes dogs."

... The refusal to calculate credits and debits can be found throughout the anthropological literature
on egalitarian hunting societies. Rather than seeing himself as human because he could make economic calculations,
the hunter insisted that being truly human meant refusing to make such calculations, refusing to measure
or remember who had given what to whom, for the precise reason that doing so would inevitably
create a world where we began "comparing power with power, measuring, calculating" and reducing
each other to slaves or dogs through debt. It's not that he, like untold millions of similar egalitarian spirits throughout history, was unaware
that humans have a propensity to calculate. If he wasn't aware of it, he could not have said what he did.
Of course we have a propensity to calculate. We have all sorts of propensities. In any real-life situation,
we have propensities that drive us in several different contradictory directions simultaneously.
No one is more real than any other. The real question is which we take as the foundation of our humanity,
and therefore, make the basis of our civilization. – *David Graeber, Debt: The First 5,000 Years*

One of the really big design questions in your life is --

How do you manage your household economics?

It doesn't matter if at this point in your life you are a household of one or a dozen, you need a design for your household economics or you will be following the default design, which is --

-- Borrow money, work overtime, never take a vacation,

-- so you can buy, gorge and consume junk.

-- Take emetics, diuretics, and laxatives,

-- purge, vomit, and excrete trash,

-- then borrow more money, work more overtime, never take a vacation,

-- so you can buy, gorge, and consume more junk.

-- Then you take more emetics, diuretics, and laxatives,

-- purge, vomit, and excrete more trash,

-- And so on and so forth until you collapse and die of exhaustion.

If that's what you want to do with your life, you wouldn't have made it this far

into iPermie. So now you design a better way to live.

Your economic design is a significant component of the permaculture design for your life. Your personal economic system does not exist in isolation from the rest of your life. In fact, your personal economic system is a reflection of your life.

There are **five components of your household economic system design:**

-- Earning,

-- Doing,

-- Spending,

-- Saving,

-- Circulating surplus (giving and Investing)

Earning and Doing.

What are the human needs you must satisfy? That is, what are the non-negotiables? These are food, water, shelter, clothing, companionship, community, a certain level of stuff.

How will you meet those human needs?

Will you somehow earn and spend money for them?

Will you be part of other systems that will satisfy some of those basic human needs?

Besides needs . . . what are the human wants in your life that you would like to satisfy?

Is this about stuff? Something more about community? Beauty? Wisdom? To be of service to others? To discover something wonderful? To heal hurts? To solve problems? What is it that you want to do in your life that is different from resolving your basic needs?

You could make a needs, wants, benefits, and costs list for you as a person and look for beneficial connections.

How much of what you need will you pay for by EARNING and how much will you obtain by DOING?

Will you buy all of your food?

Or, instead of buying food, will you grow food? Will you grow all your food or part of your food? If you can't or don't want to grow all or part of your food, will you participate in a sustainable local food economy? What does that participation look like?

You may think, "Well, I'm not going to be a farmer, I will have to earn more so I can buy more." You may think that the need to earn money to satisfy your daily needs and wants will always be a primary factor in your life.

Maybe this will be true for you.

Or maybe not, depending on how you design your life, what your needs and wants are, what your community is like, and etc. Maybe you will trade services or work for food.

What is your economic community? Is it just you and no more? Is it your household? Do others contribute to the economic well-being of the small community of your family or household? Can you be part of an urban ecovillage that provides a system of goods and services outside of the ordinary unsustainable economy?

How this plays out changes and evolves as your life goes on. Plan for that from the beginning and you will be ahead.

Earning choices include –

-- *Job in the globalized economy,* which is what most people would call a "job job." Maybe there might be some additional communitarian/sustainability component, and certainly if you are in the globalized economy, you don't want a job that involves despoiling the environment. This can include professionals who choose to work for governments or institutions, such as a doctor who works for a hospital, or a teacher in a school.

-- *Job in the local economy.* This is the grassroots approach. It includes people working for local governments,

institutions, or non-profits that are financed by local revenues.

-- *Entrepreneurial activity in the globalized economy.* This is where you work for yourself and maybe others work for you. Entrepreneurial activity includes the professions that practice independently, such as doctors, lawyers, nurse practitioners, accountants/CPAs, etc.

Entrepreneurial activity in the local economy. Farming, crafts, artisan production, making, distribution, arts, communications.

Cooperative business in the globalized economy. Your job or business is in conjunction with others in some form of cooperative endeavor.

Cooperative business in the local economy. Local food coops, farmers' cooperatives, etc.

None of these alternatives necessarily require full time work, in the form of the traditional 40 hour, five day work week. The amount of work you need is entirely a product of the level of the lifestyle you want to pursue, the value the economy places on the job or service you can do, and how much you want to do for yourself and community instead of spending and buying.

Doing alternatives include –

-- *Membership in a work cooperative where in exchange for work* you receive stated benefits or products.

-- *Making!* Clothing, body care products, herbal medicines, crafts, do your own repairs, build/make stuff for yourself and others. Etc.

-- *Time banks* (see 08091)

-- *Barter networks* and activities

-- *Growing food* (gardening on the ground, in containers, on walls, balconies, community gardens, etc.)

-- *Membership in a cooperative work space*/maker collective where you can make things.

-- *Barn and house raising* activities.

Spending

Economics is not only a matter of earning. It is a matter of spending. It is certainly a matter of not-spending everything. You need to earn a surplus over and above your basic needs and wants so you can do two things – share surplus with others, and store surplus for your own future needs.

This involves avoiding all of the greeds, being selective and prudent your wants, and frugal about your needs.

All of us receive and so we must give, but if our spending equals our income, there is no surplus to be given to others.

When you do spend money, where will you spend it? As we do our individual parts to move us toward a sustainable economy, our general goal is to spend our money in the local economy as much as possible and avoid the globalized economy. While few of us at this time and place can spend all of our money locally, everyone can pick the "low hanging local economy fruit."

-- Everyone can avoid national restaurant chains and eat at locally owned establishments.

-- Everyone can avoid buying new cars from the globalized economy. If you need a vehicle, buy a used vehicle in the local economy.

-- Everyone can buy some food from local farmers.

-- Everyone can buy some artisanal body care products from local producers.

As we get our spending under control, we develop a surplus. This surplus is available for the other three primary economic activities: saving, giving, and investing.

Saving, Giving, Investing.

There is a difference between saving and investing.

Savings are immediately accessible and secure. This could be a hidden stash of money or regular savings or checking account in a locally owned bank or credit union. People need a year's supply of money for their basic needs in savings. For many of us, that is a very challenging goal. Given the economic tribulations of this era, nothing less can be advised. Many people who are now homeless due to economic disasters wish they had been more prudent when they had money.

Some of your savings should be in the form of food and other necessary consumable items.

There are many necessary activities which depend on the **charitable support** of others to provide their service to the community. Those with more than their needs have a moral duty to share with those who have not. To do this, you must have a personal surplus in your own life. This is one way of circulating surplus.

Investment is another way of circulating surplus. Investment comes after you've developed your personal savings to equal a year's worth of needs. This section has many ideas about investing in your local watershed.

Designing our way to economic freedom.

The purpose of permaculture design is to help you break free of the diuretic and laxative driven cycle of gorging and purging that is so characteristic of the modern economy.

If you want to Unplug, you won't make it without a design to get you there. By careful attention to the details of the design of your economic affairs, you can avoid the traps laid for the unwary in the modern economy and find a liberating release from the unhealthy and ecological devastating cycle of consumption and waste.

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08191 Additional Economic Resources

> Can we actually suppose that we are wasting, polluting, and making ugly this beautiful land for the sake of patriotism and the love of God? Perhaps some of us would like to think so, but in fact this destruction is taking place because we have allowed ourselves to believe, and to live, a mated pair of economic lies: that nothing has a value that is not assigned to it by the market; and that the economic life of our communities can safely be handed over to the great corporations. – *Wendell Berry*

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Section 9: Constancy, Persistence, Resilience

Socialism failed because it couldn't tell the economic truth; capitalism may fail because it can't tell the ecological truth. – *Lester Brown*

Someone was hurt before you, wronged before you, hungry before you, frightened before you, beaten before you, humiliated before you, raped before you…yet, someone survived…You can do anything you choose to do. – *Maya Angelou*

Resilience is accepting your new reality, even if it's less good than the one you had before. You can fight it, you can do nothing but scream about what you've lost, or you can accept that and try to put together something that's good. -- *Elizabeth Edwards (UK)*

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09011 Resilience, Persistence, Constancy
Big questions. Hard questions. Challenging questions. Natural principles to replicate in human systems. Winning by creating a new game and abandoning the old game that is rigged against us.

09021 Psychological Issues in Resilience
We swim in a sea of media that conditions us to act against our own interests. Murder, death, and violence are everywhere. So are beauty, wisdom, truth, and goodness.

09031 Six ways to die: heat, cold, illness, injury, hunger, thirst
Looking for patterns of safety, supply, and shelter.

09041 Services that protect us
Shelter, Safety and Supply stand between us and the six ways to die.

09051 Six Primary Threats to Infrastructure
Neglect, wear and tear, operators and their errors.

09061 Three effects of infrastructure failure
Quality. Supply. Price.

09071 Simple Critical Infrastructure Maps
Mapping your strengths and vulnerabilities.

09081 Climate Instability
Mitigating your risks of climate problems.

09091 Economic Irrationality
Protecting yourself and all you love from the economic craziness of these times.

09101 Political Criminality
Protecting yourself and all you love from the political criminality endemic to our times.

09111 Peak energy
Developing a personal energy plan to carry you into the future.

09121 Punctuated Equilibrium
When things change suddenly and not for the good.

09131 Die-off
The ultimate of environmental boogermen.

09141 Old Ways – New Ways
A work of fiction examining how a house full of young wage slaves make it through a hypothetical crash of civilization and help build something new.

09151 Printable Flyers
Copy and hold for distribution when needed.

09161 Water Resilience
Next to air, water is the most critical resource for life. Take care of it and it takes care of you. On being inhabited in your watershed.

09171 Air pollution
Indoor and outdoor pollution considerations.

09181 Assessing and mitigating hazards specific to a situation
Making a list and checking it three dozen times to make sure your plan is complete.

09191 Mutual Aid
By mimicking natures forms, we build persistence and resistance into our lifestyles.

09201 Mitigating deterioration in a community
Intervene early and often.

09211 Evacuation and shelter in place
Should you stay or should you go? And what to do if you stay and if you go.

09221 Essential equipment for resilience
Not a minimum or a maximum list, just some suggestions.

09231 Unplugging as a resilience strategy
Community is your ultimate protection. There is, as they say, safety in numbers.

09241 Resilience Inventory
What do you know about your risks? For that matter, do you know your risks?

09251 Resilience Design Opportunities
Small jobs to get you going.

09261 Additional Resilience Resources

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09011 Resilience, Persistence, and Constancy

There exist some evils so terrible and some misfortunes so horrible that we dare not think of them,
whilst their very aspect makes us shudder; but if they happen to fall on us, we find ourselves stronger
than we imagined, we grapple with our ill luck, and behave better
than we expected we should. – *Jean de L`a Bruyere*

Three factors determine how much damage or disturbance an ecosystem can experience without going into collapse:

Constancy is the ability of a system to support itself without declining into collapse..

Persistence is the ability of a system to resist dangers that may damage or destroy it.

Resilience is the ability of a system to repair itself and come back and flourish after it has been damaged.

The critical concerns of these times are:

-- Can our political and economic systems support our lifestyles and keep us from falling into collapse?

-- How persistent are our community and economic structures and systems in the face of the growing dangers we face?

-- How resilient are we in the face of economic, social, and weather disasters?

-- How far can we go into decline without falling all the way into the abyss of collapse?

-- What do structures and systems look like that would be more resilient in the face of the problems of peak oil, climate instability, political criminality, and economic irrationality?

Permaculture in large part is a matter of observing nature and replicating the successful patterns of nature in human species. Natural systems must meet the challenges of constancy, persistence, and resilience every day. Here are six aspects of ecosystems that we want to model in our human structures and systems, including the design for our individual lives, are:

Redundancy – many different elements supply essential functions.

Stacked functions – "never do anything for just one reason". The leaves that provide shade do photosynthesis. If it's a deciduous tree, the leaves eventually litter the forest flow, where they decompose and feed the tree and many other of the flora and fauna of the forest. Etc.

Diversity – this is not just a numeric diversity. We seek a diversity of beneficial connections. There is room for all of the parts of the forest within its canopy.

Biology rules! A forest is a biological system that works without intervention, persisting over time, resilient after injuries, constant in its ability to maintain itself.

Feedback! The various systems of the forest and its parts give and receive feedback and adjust accordingly.

No monocultures. Nature abhors a monoculture and that's not what we find in forests.

> Pop quiz! How many times have these concepts come up thus far in iPermie? What does the frequency of these references suggest about the importance of these concepts to the praxis of permaculture design?

What do these principles mean for urban design?

Redundancy. We need many different systems to supply the essential functions of cities, including water, energy, and food..

Stacked functions. As we contemplate our cities' systems, we should never do anything for just one reason. This is a principle of energy and resource conservation.

Diversity. The more beneficial connections among the various disparate elements of our cities, the more resilient, constant, and persistent they will become.

Prefer biological solutions. Anywhere we can put natural biology to work for us, we do so. For example, we can use biological systems to purify waste water.

Feedback! The various systems of the forest and its parts give and receive feedback and adjust accordingly. This one of the trickiest aspects of the natural forest for humans to mimic. Our feedback systems are not advanced compared to those of nature, so we need to work on and improve our systems.

No monocultures. Nature abhors a monoculture and so we want to avoid that in our cities' systems.

A city that is constant, persistent, and resilient begins with individuals and their families and households who pursue resilience, persistence, and constancy as design elements for their lives. They contribute to neighborhoods of resilience, persistence, and constancy and that creates cities that model these essential aspects of sustainability.

The big system can be pretty overwhelming. The existing game is rigged against us. The political and economic elites are parasites on the majority. They are like economic elites sucking the lifeblood of our economy for their own sustenance.

We know that we can't beat them by competing with them. What we can do is **build small systems where we live and work that serve our needs as we define us** and not as someone else defines for us. This requires understanding our needs, wants, and greeds.

This changes everything. It's an important lesson for creating systems that are constant, persistent, and resilient: When the rules are stacked against you, **don't play!** Why volunteer to have the system cut your throat? Instead. . . **start a new game!** Write new rules! Organize your systems according to rules of justice and abundance!

The return of the city-state?

With the increasing dysfunction evident in national and state governments, we may be on the verge of a new era when the city states may become the most important unit of government. I earlier noted the observations of Vinay Gupta on how local resilience can make or break a situation when catastrophe's occur (cf the difference between what happened on the ground in Iraq and Somalia versus the experience of Russia and Argentina, when national systems crashed).

While we hope to avoid a catastrophic crash and manage our devolution, we may not be able to realize that hope. The odds against managed devolution are long. I always figure that any day our federal system doesn't completely collapse is a lucky day, given the extent of political criminality and corruption endemic to our political systems.

If worse comes to worse, though, the health and resilience of your local

government will become a make or break situation.

-- Will the water stay on?

-- What happens with the sewer systems?

-- What about your local electric and natural gas distribution grids?

-- What is your local food system like? What are the prospects for jump starting a food system fast enough to avoid widespread starvation?

-- Can your local transit system be expanded rapidly in the event there are catastrophic problems with fossil fuel supply due to wars, terrorist actions, corporate malfeasance, etc.?

If the answer to these questions are

-- No,

-- It collapses.

-- They go down for the count.

-- There is no local food system.

-- There is no surge capacity in our transit systems.

then the prospects for your urban area in the event of severe challenge and strain are more oriented towards doom than survival.

Creating a better local situation begins, as we have seen, in your own personal efforts. But that is not the end of what is necessary.

You could start by asking difficult questions of your local politicians, starting with your own city council person:

(1) What happens to our city's water and sewer systems if the electrical and natural gas grids go down for an extensive period of time?

(2) What plans does the city have to provide food in the event of interruptions in the conventional food system?

(3) Do your city, and/or the local utilities, stockpile spare parts for the energy distribution grids?

(4) If there are widespread problems in your city, what plans does the city have to protect the families of essential personnel such as firefighters, police, and utility workers, so that they will be able to do their jobs without worrying about what happens with their families?

(5) Why don't we have plans in place to surge access to our public transit system in the event of need?

If you don't get satisfactory answers to these questions, keep asking them. Over time, increase the volume of your questioning by writing letters to the editor, handing out pamphlets, calling in on talk shows, starting websites and cyberspace discussion groups, and asking questions at council meetings.

Develop a Precinct Community Assembly (07061) in your neighborhood and discuss ways that you can protect your neighborhood from problems elsewhere in the city. Encourage people elsewhere to start their own grassroots networks to develop their own redundant methods of providing services during emergencies. .

As this process develops, bring pressure to bear on city authorities to encourage them to strengthen city infrastructures and develop redundant methods of service delivery.

Throughout history, the city-state has been an important unit of government. In the present situation, it is the level of governance that is closest to the people and the place where you are likely to have the greatest return on your efforts for political intervention in favor of sustainability. With the increasing number of disasters worldwide, and the continual devolution of our economies, prompt action by cities to become more persistent, constant, and resilient is critical for our future well-being and safety. The time to save your City is before the crises hit.

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09021 Psychological Issues in Resilience, Persistence, and Constancy: a back of the envelope calculation

The big boys in their shiny armor are up there on castle walls hurling their thunderbolts.
We're the ants patiently carrying sand a grain at a time from under the castle wall. We work from the bottom up.
The knights up there don't see the ants and don't know what we're doing. They'll figure it out only
when the wall begins to fall. It takes time and quiet persistence. Always remember this:
They fight with money and we resist with time, and they're going to
run out of money before we run out of time. -- *Utah Phillips*

I am not a psychologist nor do I play one on television. I am not qualified to diagnose anyone's mental states except for my own, and probably not even that. For a much more in depth and professional look at these issues, read every single blog entry at the Peak Oil Blues blog http://www.peakoilblues.org/blog/ written by Dr. Kathy McMahon, whose doctorate is in psychology. She writes –

> We're bombarded with alarming headlines on a daily basis. How do we find the sane space between Doom and Denial?

That's what we're going to talk about here. This is a back of the envelope calculation, take it for what it is. And what it isn't also.

We live in an ongoing, slowly unfolding, catastrophic disaster.

Just as in a standard disaster movie, one person gets crushed by a collapsing building while another seemingly skates through unscathed. The disaster hits different people and different places in different ways, with varying intensities and magnitudes and time scales. Many people are mostly fine. Other formerly middle class people must now learn to live out of their cars or to sleep in a homeless shelter. Another group die because they had the misfortune to be caught between two warring factions. Refugee camps trap millions of people that have no place to go.

Depending on your physical, economic, and social locations, your children could be starving to death before your eyes. (You probably aren't reading this if that's true.) They could be at risk of death by terrorism or military attack. (Most of us reading this are at risk of terrorism and military attack.)

In a different physical, social, and economic place ... you might be headed to a ball game in an SUV loaded with friends ready for a good time. You never think about the people that die everyday because of the consequences of poverty. You don't know, or are in denial, about the guilt of the wealthy countries, whose greed, violence and covetous sense of entitlement to cheap resources conspire with corrupt leadership classes to keep people mired in poverty and despair.

None of this is free of psychological impact, common sense tells us that. But we can be incredibly delusional about the

consequences of all this catastrophe on our lives. Denial is not a river in Egypt. Denial is a pandemic psychological problem that afflicts multitudes.

The mainstream mass media daily exposes us to vivid portrayals of murder, violence, and cruelty. (This is a good argument to minimize your exposure to such "stimulations.")

The mainstream media teaches us that we have value only as mindless consumers. Authorities tell us that satisfaction can only be found in accumulating ever greater quantities of cheap, useless junk. Movie scripts teach us that violence is fun and solves problems all the time. Our leaders praise gluttony and scorn frugality. Competition becomes more important than cooperation. Commentators preach the virtue of selfishness. Their words fall on minds perfectly prepared by war and violence to not only hear, but to embody ethics of egoistic gluttony as a way of life.

As bad as everything looks, this is not all of reality as reality actually is.

Evil exists, denying that is foolish. We experience evil, violence, selfishness. We find beauty, wisdom, love, and goodness. Where do you want to be? Do you want to share bread with Adolph Hitler? Or would you rather be with people who personify wisdom and goodness instead of violence and death?

This homely way of looking at things rings true even in the face of the overwhelming media onslaught in favor of lifestyles of the conspicuous bloodthirsty lustful glutton.

Don't fight against the system, they tell us. The system always wins. The nail that sticks up is the one that gets hammered down.

That's certainly what the governing elites want us to believe.

But the real reality (which is different from the faux reality and faux consciousness driven by politicized mass mainstream media) is a much different situation.

As Utah Phillips points out (and a hat-tip to Dr. McMahon because I found the quote at her Peak Oil Blues site), they fight with money, we resist with time. They will run out of money before we run out of time.

Consider a forest. There are those who would have us believe that it is a place of vicious unrestrained competition. That's not what we actually see, is it? What happens in the forest is cooperation, where the waste of one element is food for another. The forest system regulates itself and is greater than the sum of all of its parts. There is no waste in a forest. Everything is food. Many of us, however, can't see the forest because of the trees. In other words, we focus on the parts so we don't see the whole.

The story is not over until it is over. I have over the years become fond of self-fulfilling prophecies. I like them because they always come true. That's why they're called self-fulfilling prophecies.

I think we should be careful, however, in the prophecies that we self-fulfill. It is not hard to self-fulfill prophecies of doom and destruction. It is much better for everyone, the planet included, if we self-fulfill prophecies of joy, wisdom, love, goodness, and peace.

There we find the real psychological questions at the heart of resilience, persistence, and constancy:

What am I doing with my life? And why am I doing it?

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09031 Six Ways to Die

I'm not afraid of death; I just don't want to be there when it happens.-- *Woody Allen*

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Death is something everyone wants to avoid. The problem with life, of course, is that none of us get out of it alive. Even people who believe in heaven don't want to die to get there. Fortunately for all of us, there is much that we can do to avoid departing in an untimely manner. Thus, some amount of thinking about death and its risks is necessary and useful.

We're not actually supposed to do this. We're supposed to stay in denial about death. Then, when it cannot be avoided, we employ professionals to manage death and help us cope with it. We're not suppose to talk much about it before it happens. The system doesn't want anything to interfere with the ongoing consumption program.

When I first encountered the concept of "Six Ways to Die" in the work of permaculture thinker and polymath Vinay Gupta, I thought, "This is too simple, there must be something missing." Here is what he identifies as the six ways to die:

-- Heat
-- Cold
-- Illness
-- Injury
-- Hunger
-- Thirst

Surely this isn't a complete list, I thought.

Murder and criminal attack? Deaths by nuclear bombs and poison gas?

All those fall under "injury."

Cancer? Heart attack? Food poisoning? That would be "illness" and "injury."

Heat stroke? Death by burning? Those all quality as "heat" related causes of death.

Freezing? Frostbite? Hypothermia? "Cold."

Starvation? Equals "hunger."

Amuse yourself a bit and see if you can find an exception to Vinay's construction. I don't think you will, but it never hurts to question authority a bit, even if it is a permaculture authority.

In any event, the point of this exercise is to focus your thoughts on the essentials of resilience, persistence, and constancy.

This is about avoiding death and injury, not only to ourselves, but also to the larger systems of our life.

In part, this is a matter of identifying hazards and designing ways to mitigate the danger they pose to ourselves and those we love.

All human populations have infrastructures to protect them from hazards and provide services. Our infrastructures may not be as robust as needed in the face of the challenges and threats of the future. In areas of wealth and development, the infrastructure will be highly developed, technological, and invisible. In places of extreme poverty, the infrastructure may be primitive.

Everyone everywhere has some measure of an infrastructure, because human life is not possible without it. "Primitive" does

not mean “not resilient,” as the systems in such areas may have persisted for long times and have done a good job of maintaining the constancy of the human cultures they support.

Because these are not minor casual problems, as part of our lifestyle design we look for **patterns of safety, supply, and shelter** that can protect us from these threats. The six ways to die apply also to the systems that keep us safe and alive, without which avoiding those six ways to die becomes much more problematic and skitzy.

Hunger and thirst? Infrastructure systems can collapse (die) if starved for the resources they need to operate (which includes liquid fuels).

Heat and cold? Infrastructure systems can die if damaged too much by wild weather driven by an increasingly unstable climate, summer or winter, extreme heat or extreme cold and most points between.

Illness and injury? Infrastructure systems are vulnerable to violence and the basic routine wear and tear of mechanical systems. They can die if damaged too much by war or terrorism or if not maintained properly.

So the Six Ways to Die apply, not only to us humans, but also to the systems that keep us safe and alive.

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09041 Services that protect us

Community development, or community building, depends on identifying, developing and sustaining relationships. Central to being successful in those relationships is community leadership. *– Center for Collaborative Planning*

Vinay Gupta's work on resilience includes an in-depth consideration of the types of infrastructure that protect us from the Six Ways to Die.

In developed countries, infrastructure is invisible, universal, expensive, and hard to repair. Your sewer lines may be buried 12 feet deep in the ground. I found this out when the my connection to the city's sewer collapsed. Excavating for that repair was a major undertaking.

The three types of services that protect us are **Shelter, Supply, and Safety.**

Shelter includes our houses and the utility systems that make our homes comfortable. It protects us from heat and cold and some aspects of injury. It is an essential component of Safety. Notice how these three sets of essential services beneficially connect with each other.

> **POP QUIZ!** How many times have you read in iPermie about "beneficial connections" being important before? What does the prevalence of this concept suggest about its relative importance to the design for your life?

Police and fire departments and medical care and public health systems provide us with Safety. Informal networks of safety consist of neighborhoods, families, and friends. These systems protect us from injury and illness and provide rescue and healing when injury and illness do occur. Our houses and supply systems help keep the population safe and alive.

Supply protects us from hunger and thirst. Our safety systems ensure that supply can work economically and effectively to keep the population supplied with the necessities of life (and a considerable amount of non-necessities in the process).

Depending on where you are in the world – your geography and economics – there are dense networks of overlapping infrastructure where these three essential service systems operate. There can be as many as seven levels –

-- Individual

-- Household

-- Neighborhood/Village

-- Municipality/City

-- Region

-- Country

-- International

The successful operation of these layers and systems of infrastructure requires the interaction of technology, science, engineering, finance, manufacturing, law, communications, management, politics, and governance.

This cooperation often extends across political and bio-regional boundaries. The density and complexities of the systems are both strength and weakness. While

overlapping layers provide some redundancy, if there is too much disruption, the complexity of the system makes it hard to restore during a time of trouble. For example, a food processing factory requires:

-- fuel (to haul the ingredients in and the products out, electricity and maybe natural gas to operate the processing machinery),

-- ingredients (incoming farm products),

-- containers for the processed foods,

-- trained personnel to operate the systems,

-- finances to pay for everything,

-- a system to haul way or otherwise process the waste,

-- a distribution system to take the processed products from the food factory to the distribution points.

All must be in place for one pound of food to be processed. If the product goes into jars, if there are no lids, or if there are no jars, the factory can't operate. The lid factory may be on the other side of the continent or in another nation. There may be only one place in the whole world where a necessary component is made, without which the entire plant grinds to a halt.

If there is disruption in the area, the infrastructure may not be able to do its job protecting us from the Six Ways to Die.

At the micro (household and individual) level, our resilience, persistence, and constancy challenges are to understand the risks caused by our dependence upon continental-scale systems that are brittle and may fail in the face of future challenges and threats. We look for ways to mitigate the hazards that may result if emergencies disrupt existing infrastructure and services. This suggests a need for both alternative local systems and local storages of food, water, and other critical materials.

At the macro (community) level, we think about designs that will increase the constancy, persistence, and resilience of regions by evolving our layers of infrastructure to be more robust in the face of multiple future challenges.

We look for patterns that we can replicate to provide these services of safety, shelter, and supply. The most desirable patterns are those that –

-- stack functions,

-- provide redundancy,

-- offer many beneficial connections,

-- use natural methods, featuring the biological, the small, and the slow,

-- are conservative of all forms of stuff (resources, energy, money, etc.),

-- are conservative in their demands on people,

-- regenerate systems and supplies.

We want to see a lot of beneficial connections that will integrate our infrastructures.

The equation of safety and persistence:

More beneficial connections = more resilience = safer infrastructure = reliable services

The equation of failure:

Fewer beneficial connections = less resilience = brittle infrastructure = unreliable services prone to collapse and failure

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09051 Six Primary Threats to Infrastructure

It's not that hard times are coming, it's that soft times are going. -- *Harpo Marx*

Nothing stays where you put it. Entropy is always at work. Murphy's Law and the Laws of Thermodynamics operate with infrastructure too. Continuing our discussion of resilience based on the work of Vinay Gupta, he identifies six primary threats to infrastructure:

Neglect. Mechanical systems must be maintained. Personnel must be trained. Vital information systems must be backed up. Any decrease in maintenance will yield an increase in neglect and that will eat away at infrastructure.

Time, Wear, and Tear. Even with maintenance, systems and equipment must eventually be replaced or substantially repaired. People need training, supply, and safety to be effective operators of infrastructure.

Operators. Infrastructure systems require highly trained personnel to operate them. Lack of trained personnel can be a factor in infrastructure devolution, especially during pandemics, wars, insurrections, etc.

System Externalities. No system is an island. All infrastructure systems are interconnected and to a greater or lesser extent dependent upon other systems to continue operating. A basic example: a power plant requires fuel. No fuel = no power. A power plant requires trained operators. No operators = no power. A power plant requires a distribution grid. If weather or violence damages the distribution grid, there is no power.

Economics. Personnel must be paid. Supplies and fuel must be bought. Taxes (and sometimes bribes) are necessary.

Violence/Disaster. These hazards destroy both physical infrastructure and trained personnel, often quickly and without warning.

The consequences of infrastructure failure range from minor inconvenience to mass death.

These threats to infrastructure integrate with many negative connections.

In permaculture we focus on increasing beneficial connections. Alas for us all, because of the Default Excess Consumption Design System, negative connections characterize our world's systems. Just as beneficial connections magnify the positive effects (synergy) of a chain of actions, negative connections magnify the negative effects (dysergy) of a series of negative events.

The synergy of beneficial connections often seems greater than the sum of its parts.

The dysergy of negative connections often seems greater than the sum of its parts.

This is why we often say, as we observe a cascading series of negative events, "One thing leads to another." We say that because it's true. Negative connections spawn negative happenings. To stop negative events – to break the potential for a negative chain of events – before

they happen is the essence of persistence. It is almost always easier to stop something from happening than it is to pick up the pieces afterwards in repair and replacement of damage.

The best places to intervene are early in the process. As the ball gets rolling, it has inertia and it won't want to stop. More negative connections click in and that drives the situation onward at an increasing velocity toward the catastrophe.

If those responsible for the Titanic had seen the ice berg earlier, and turned the ship away, the ship would not have sunk. They didn't see it in time. The ship hit the iceberg and sank with great loss of life, in spite of much heroism and last minute attempts to save the situation.

So when we think of designing for resilience, we look for beneficial connections to add to our systems.

We look for negative connections that we can eliminate.

We follow those negative connections to the best of our ability all along their chain of causality to the origination point. If possible, we eliminate every step in that chain of connections and if we can't do that, we figure out some way to reduce the likelihood of activating a chain of negative connections. We seek to mitigate or short-circuit the cascading events once the dysergistic process erupts.

Finding and linking those beneficial connections – discovering and breaking the negative links – are two sides of the same coin of resilience, persistence, and constancy. The process of resolving these threats, mitigating these hazards, and growing systems that are less brittle and more resilient and persistent involves a continuation of the search for patterns with the characteristics we listed in 09031. Since redundancy is a good thing we will list them again here. The most desirable patterns are those that –

-- stack functions,

-- provide redundancy,

-- offer many beneficial connections,

-- use natural methods, featuring the biological, the small, and the slow,

-- are conservative of all forms of stuff (resources, energy, money, etc.),

-- are conservative in their demands on people.

-- are regenerative of systems and supplies.

Demand destruction and replacement is an essential aspect of infrastructure protection. When demand strains services, the risk of collapse or other damage to the system increases. Expanding infrastructure to meet the needs of new demand is a major expense for infrastructure providers. Actions we take to reduce our demand for infrastructure services help protect existing systems from damage and reduce the need for new capital investments.

Besides shoring up existing infrastructure systems, and limiting our demand, work needs to be done to develop alternative, parallel infrastructure systems that can take over if the primary infrastructure systems fail. Depending on the context, this may include household and local storage of food, water, and other critical items, devising new ways to provide infrastructure services at the neighborhood level, and perhaps even discovering ways to eliminate our need for certain infrastructure services.

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09061 Three Effects of Infrastructure Failure

We have also arranged things so that almost no one understands science and technology.
This is a prescription for disaster. We might get away with it for a while, but sooner or later
this combustible mixture of ignorance and power is going to blow up in our faces. -- *Carl Sagan*

This chapter continues my discussion of the work of Vinay Gupta and his Simple Critical Infrastructure Maps, together with my own thoughts on coping with the risk of infrastructure and service failure.

There are three primary consequences of infrastructure failure:

-- the service becomes unavailable,

-- the price for the service increases,

-- the quality of the service decreases.

The service becomes unavailable.

When weather or terrorists or neglect destroys power plants or takes down transmission lines, electricity will not be distributed through a grid. The infrastructure fails. Water stops flowing. Sewer systems stop working. The electrical and natural gas grids go down. This has immediate negative consequences for public health and safety.

If the interruption is for a short period of time, these consequences are only minor irritations. If it is long-lasting and widespread, it becomes life threatening. Other problems, such as weather, can quickly exacerbate a problem like this and make it even more dangerous to health and safety.

The price of the service increases.

The value of the money may decline. The cost of inputs and personnel may increase. The quantity of service available may decrease while the demand increases. All of this adds up to higher prices. This is the default response of our economic system for slow-moving infrastructure crises like peak oil, water scarcity, etc. The price increase may be a rational economic response to the context of the problem. It can be a rationing method by which the rent-seeking elites ensure that they have plenty of whatever is in scarce supply, at the expense of those who can't afford the new prices.

The quality of the services decreases.

Water may continue to flow through a distribution system. The purification systems may not work, or may work imperfectly. Power supply may be intermittent and fluctuate, with frequent brownouts and blackouts. This often happens unevenly in a geographic area. It may be subject to finagling by those with access to political power. For example, those in charge of the utilities may allow the quality of services in low income areas to degrade, while maintaining the quality of services to upper income elite areas. If the decline in quality happens uniformly everywhere, it is likely the precursor of a total failure of an infrastructure system.

All three of these consequences may be at play in any given crisis.

People in some areas may have no services at all.

People in some areas may see price increases coupled with a decline in the quality of the service(s).

Everyone may experience periods without the service (such as rotating blackouts).

We can protect ourselves from the consequences of infrastructure failure by –

Demand Destruction. We reduce our dependence upon infrastructure in advance of service problems. We insulate our dwellings, use passive solar, install wind generators and PV panels. We plant edible landscaping, start gardens, and develop direct relationships with farmers.

Redundancy. We develop back-ups for important systems. For example, if you use natural gas or electricity for cooking, you might have a propane camp stove, a solar oven, and a Dutch oven (for use over a campfire) as back-ups in case the electrical or natural gas grids go down due to weather, violence, or other catastrophe. At our house, besides redundant heating, we stock sleeping bags, thermal underwear. Plans are afoot to set up canopy beds during the winter.

Substitution. If we can't get natural gas, maybe we use propane, wood, or electricity. If we can't get electricity, maybe we use candles, batteries, and a small generator. If the heat doesn't work, we put on extra layers of clothes and coats.

Storage. We keep supplies of important items (like food, water, medications) on hand in case there are problems with production and distribution in the just-in-time inventory systems of our modern economy.

Evacuation. If our infrastructure degrades, and we learn that other places are fine, we may decide to evacuate our home and temporarily move to another area which retains services.

There are **two primary design responses** to the possibility of infrastructure/service failure.

1. Working with our communities, we protect ourselves **by designing and implementing more persistent systems of services** that are less likely to be degraded or fail under the pressure of challenges and threats in the future. We look for and **eliminate the chains of negative connections integrated with our infrastructure that cause them to be brittle** and at risk of failure. We look for and **integrate chains of beneficial connections to boost the persistence** of our systems. We don't locate critical facilities in places at risk. Where possible, we use natural processes and ecosystem services to protect ourselves and our infrastructures. We want infrastructure that is hard to break or degrade and easy to repair.

2. Working with our communities, we develop strategies for **coping with infrastructure failure** (redundancy, substitution, storage, evacuation). The more people in an area the store food and water, first aid supplies, and have alternative systems for cooking and light, the better situated the area is to cope with challenging circumstances.

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09071 Simple Critical Infrastructure Maps

Decentralized infrastructure . . . can take advantage of **economies of agility**. They are bought as needed rather than planned decades in advance, scaled to fit needs, can be upgraded piecemeal or moved and generally have much lower risk. Decentralized infrastructure is the wave of both the past and the future. Old decentralized systems were things like water mills and pit latrines - systems which ran directly from the natural world to provide basic services.

New decentralized infrastructure is systems like solar panels, local water purification (SODIS or SOPAS,), advanced composting toilets, wind energy and so on.. . . From an infrastructure mapping point of view, the critical distinction between centralized/decentralized systems is dependencies. Centralized systems typically have large and complex networks of requirements to operate, but operate at high efficiency. Whether the input is fuel or chlorine or spare parts, it seems that in general **the cost of efficiency is complex dependencies and overall system brittleness.** -- *Vinay Gupta, Mike Bennett, SCIM*

The Simple Critical Infrastructure Maps system is a Creative Commons licensed mapping and analysis tool for evaluating personal and social persistence and resilience. It is intended to be used for planning, and is simple enough to learn during a crisis to facilitate cooperation and effective response

Developed by permaculture designer and polymath Vinay Gupta, it helps us understand our vital services and how they keep us safe. By creating a better understanding of our actual situation, we can develop ways to make our systems more persistent (resistant to failure) and resilient (able to recover after damage or disruption).

As a tool, it helps us understand the whole system at play in any given situation.

You can download the original document at http://www.ipermie.net in English, or you can download it in English, Greek, or Spanish at http://www.resiliencemaps.org together with other graphics that illustrate its concepts.

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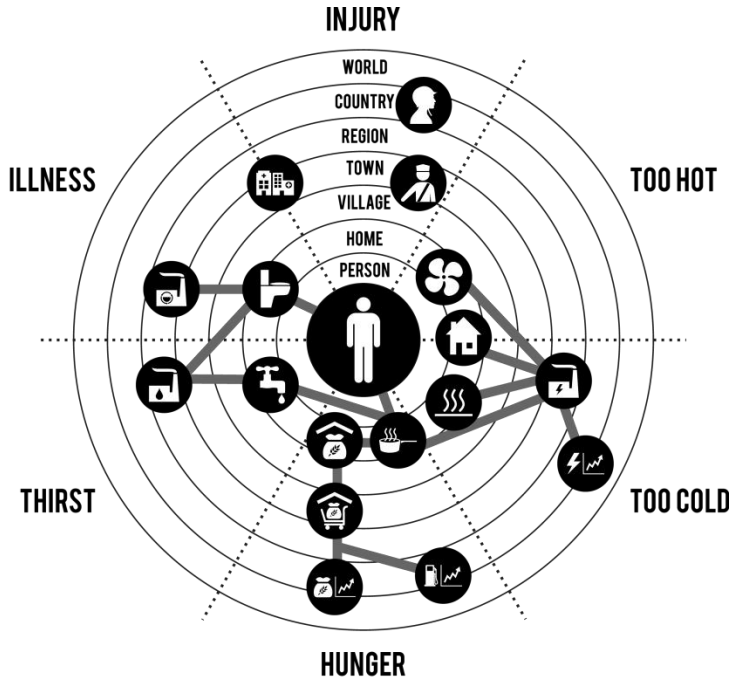
INJURY
WORLD
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TOWN
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HOME
PERSON
ILLNESS
TOO HOT
THIRST
TOO COLD
HUNGER

INDIVIDUAL
HOME
COOKING
COOLING
HEATING
FOODSHOP
KITCHEN STORES
HOSPITAL
MILITARY
POLICE
FUEL MARKETS
FOOD MARKETS
ENERGY MARKETS
TAP WATER
TOILET
POWERSTATION
SEWAGE PLANT
WATER PLANT

09081 Climate Instability

War contributes greatly to global warming, which shouldn't surprise us. All those bombs going off, all those rockets, all those planes and helicopters. All that fuel of various kinds being used. It pollutes the air and water of this very fragile and interconnected planet. – *Alice Walker*

People debate the causes of climate change with religious fervor and this short article is not going to persuade anyone one way or another. My position is that as a matter of empirical observation, the history of the world is a story of unpredictable, changeable, and often hazardous weather. Variations in the climate can and often have been major contributing factors to the collapse of civilizations throughout history.

Protecting ourselves and those we love from hazards is one of the purposes of permaculture design. Everyone needs to carefully study and evaluate your risks and design ways to protect yourself and your household from the climate risks of the particular geography that you inhabit.

As we go forward into the future, some areas may eventually depopulate due to the severity of climate impacts. Six years after Katrina, the Gulf Coast has yet to recover all of its pre-Katrina population, with Louisiana suffering the greatest losses. Besides the ongoing effect of the hurricanes on the area, Louisiana is the epicenter of an enormous amount of industrial pollution hazard generated by oil and gas exploitation and the chemical industries.

Drought and desertification may drive population movements. The migration of the Okies from the Great Plains Dust Bowl to the West Coast is a historical example of how climate can force population shifts.

There are factors that may trump concern for extreme weather (such as family and job). If you decide to stay in an area at risk for regular devastation due to climate issues, "forewarned is forearmed" as they say. Do so with your eyes wide open and detailed plans for mitigation, protection, and recovery.

In all areas, we ignore climate change to our mortal peril. The younger you are when you start your permaculture design for your life, the more problems you will experience with due to climate during your life. Plan from the beginning how you will protect yourself from these hazards and mitigate their consequences.

Mitigation of climate and weather hazards is a beneficial connection integrated into almost all other aspects of your lifestyle design plan.

-- Your housing plans need a plan for shelter from extreme weather.

-- Your economic plans include contingency plans in case you lose income due to extreme weather.

-- Your resilience plans need evacuation plans and provisions for bug-out kits in case weather forces an evacuation. Plans for storage of emergency supplies should include protecting those supplies to keep them from being destroyed by extreme weather.

In general, most of us in the United States expect prompt help if there is a weather

disaster from government and civil society organizations. While this usually works, it doesn't have a 100% response rate. The Katrina disaster shows the terrible impact of political criminality on our disaster response systems, as politically appointed bureaucrats, who were not qualified for their jobs, made a serious mess out of the federal government's disaster response.

The modern reality is that when the going gets really tough, especially if it is a disaster that encompasses a large area of extreme damage, some people may be abandoned by government and by civil society.

This is particularly a risk for those who are poor, elderly, weak, and ill. In recent disasters, care-givers abandoned some residents of nursing homes and euthanized sick people instead of evacuating them. Police shot unarmed racial minorities while attempting to evacuate through mostly white communities outside of large cities.

The government wants everyone to believe that Katrina was an aberration and that they have solved the problems so evident in the Gulf disasters. Yet, during Sandy, many of the poorest areas of New York City were left without any help from local, state, or federal governments, for a considerable amount of time after the hurricane had passed. The only help for those areas was from private relief, much of it spontaneously organized by Occupy Wall Street activists.

When it comes to climate disasters, it is best to plan as if you will be on your own with your immediate neighbors. If civil society and government do come to your rescue, that's all to the good. But if you are among those your government leaves behind for the weather wolves to devour, you will need other plans and resources. Expect and plan for the worst. Hope and pray for the best.

Observation

The first task is observation and this is mostly a matter of research. You need climate records and weather observations going back as far as possible. The ideal records will include, on a monthly basis:

-- Minimum and monthly temperatures for the month,

-- Total monthly precipitation by type of precipitation (rain, snow, ice, sleet)

-- Number of days of extreme weather (90+ degrees high in the summer, high below 32 degrees F in the winter)

-- Heating and cooling degree days per month

-- Cloud cover (this may actually be expressed as hours of sunshine)

-- Number and intensity of extreme weather events such as tornadoes, thunderstorms, and hurricanes.

In the United States, climate and weather information at this level is available from the National Weather Service. Here is the page for information for central Oklahoma. http://www.srh.noaa.gov/oun/climate/get_f6.php?

Your area will have something similar. I think it is likely that many other developed nations will have similar databases of information available online.

It would be very helpful to you if you can find something like a 100 year record of rainfall, drought, and flooding for your area. You can start with internet searches like "100 year rainfall record for (your locality)." If you are unable to find something, or have problems finding climate records in general, contact the climate and weather department of a nearby university.

Climate record averages do not provide useful information for permaculture design.

If it was 100 degrees on Day 1, and 0 degrees on Day 2, the average temperature for the two days is 50 degrees. That relatively benign number

would not prepare us for the actual weather extremes possible in the area.

The purpose of these observations is to guide you in making basic decisions, the first one being –

-- Do I want to live in this geography and its associated climate and weather?

There are no hazard-free areas in the planet's geography, but all climate problems are not created equal. Some are easier to mitigate and protect from than others. Climate and weather hazards can be rated as follows based on their potential for damage and their frequency of impact -

Damage Potential: High impact, low impact

Occurrence: Frequent, infrequent.

If you plotted this on a chart, you would have four quadrants:

-- High Impact/Frequent Occurrence

-- High Impact/Infrequent Occurrence

-- Lower Impact/Frequent Occurrence

-- Lower Impact/ Infrequent Occurrence

A third layer of analysis could be **ease/difficulty of mitigation and protection** from the hazard, so it will be helpful to rank the climate hazards of your area using three factors:

-- Damage Potential
-- Frequency
-- Ease or Difficulty of Mitigation

Mapped on a chart, you would have:

-- High Impact / Frequent Occurrence / Easy Mitigation

-- High Impact / Frequent Occurrence / Difficult Mitigation

-- High Impact / Infrequent Occurrence / Easy Mitigation

-- High Impact / Infrequent Occurrence / Difficult Mitigation

-- Low Impact / Frequent Occurrence / Easy Mitigation

-- Low Impact / Frequent Occurrence / Difficult Mitigation

-- Low Impact / Infrequent Occurrence / Easy Mitigation

-- Low Impact / Infrequent Occurrence / Difficult Mitigation

Once you have identified all of the climate and weather hazards, and ranked them by these criteria, you have the information you need to decide how to mitigate their severity and protect yourself from the hazards.

You should probably start with the high impact/frequent occurrence, both easy and difficult mitigation. Then you could move on to the other "easy mitigation" items. Third could be the high impact, infrequent occurrence, difficult mitigation events. Low impact, infrequent occurrence, difficult mitigation would be last.

This is based on my own subjective opinions. Each person will have their own ideas about this.

Be sure to go over this information with all the stakeholders in your design, since perceptions of impact and ease or difficulty of mitigation may vary.

Building Persistence and Resilience

When it comes to climate and weather issues, there are two aspects we have to consider:

-- Persistence (the ability of a system to resist damage), and

-- Resilience (the ability of a system to recover after damage or disruption).

In the United States, we generally are invested in resilience. We buy insurance for cars, buildings, lives, liabilities. We have police and fire departments, National Guard disaster response, the Federal Emergency Management Agency, and many local and state equivalents. There is a huge civil society disaster response

system, organized nationally, that rushes in to damaged areas to assist with the recovery. The system works well as long as it is not stressed. We saw during the Katrina disaster what happens when the system is stressed beyond its ability to adequately respond.

While we certainly want to maintain excellent systems for disaster recovery, given the realities of our climat5e future, we need more investment in persistence – the ability of our systems to resist damage.

For example, we continue to build ordinary stick-built houses on the Great Plains of the United States, even though that type of housing has proven its inadequacy ever since the first Caucasian settlers began to plow the prairies and build towns. They are hot in the summer, cold in the winter, and vulnerable to rain, wind, hail, severe straightline wind storms, as well as tornadoes and lightening. The only thing that makes them habitable is excessive expenditures of fossil fuel energies.

Given the realities of the present climate, and the likely climate issues of the future, the smart housing design choice on the Great Plains is underground housing. If my house were to be destroyed in a wind storm, I would likely replace it with underground housing.

In the meantime, on the Great Plains, existing housing can be adapted and evolved to meet the challenges of the future. The Shelter section discusses our own evolutions in some detail. Additional persistence renovations could include storm doors and windows and a metal roof.

The needs of people in other areas, with different climate impacts, will be different. Context is everything in permaculture design and each person must seek the best climate solutions for their particular situation.

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09091 Economic Irrationality

"I readily acknowledge that it may be difficult to know where to draw the line between 'corruption' and 'rent-seeking behaviour'.... The latter term is generally used to refer to the process by which interest groups adopt (lawful) means to secure competitive advantages from the political process and is a phenomenon widely recognized as influencing law and legal institutions in industrialized societies and is the subject of a huge literature (surveyed in Tollison, 1982 and Rowley et al, 1988). Rent-seeking may, indeed, impose costs to the economy as high, if not higher, than those arising from corruption (narrowly defined)." *Anthony Ogus*

Anything written about the economy at this stage of the game can only be considered a fleeting snapshot of rapidly devolving systems.

Unemployment
Government unemployment figures are politicized statistics finagled by bureaucrats to achieve political purposes. A good rule of thumb is to simply double the officially reported rate to find the true unemployment rate. The U.S. government deliberately distorts the unemployment figures, to make the situation seem better than it actually is. It's not a surprise to discover that the government lies to the people. But the government's bad data doesn't make the job of building a better future any easier.

The Corporations
Corporate profits are at all-time highs both in absolute numbers and as a percent of the economy. CEO pay now runs 350 times the average worker pay, that's up from what prevailed between 1960 and 1985, when CEO pay was 50 times that of the workers. CEO pay has increased 300% since 1990 alone. Corporate profits doubled during that period, while worker pay increased only 4% and adjusted for inflation, the minimum wage declined. In fact, after adjusting for inflation, worker pay has not increased for the past 50 years. Wages, as a percent of the economy, are at an all-time low.

The Households
The top 1% of households now holds 23.5% of all pre-tax income. The top 1% own 42% of the financial assets in the US. The top 5% own 70% of the nation's financial assets. The bottom 80% of households owns 7% of the national wealth. Social mobility in the United States is at an all-time low. Much of this concentrated wealth derives not from actual honest productive activity, but from finagles and shenanigans in the "FIRE" economy (Finance, Insurance, Real Estate). It's money rooted in speculation and rent-seeking by powerful economic interests. It's not honest earned wealth. It's politicized wealth.

The Banks
During the financial crisis of 2008,large banks received a major bailout from the government. Yet, bank lending declined sharply and has yet to recover. Banks made $211 billion in the first six months of 2011 by borrowing money from the government at a zero interest rate and then buying treasury notes and lending it back to the government, which pays the

banks interest on the money that it previously lent them for free!

Where do we go from here?

OK, it's not news to everyone that the economy is crazy. The statistics above are "only the beginning of sorrows." The iPermie plan is to design ways to mitigate hazards and dangers and economic irrationality is one of them.

The entire Economics section of this book offers numerous ideas about developing an economic plan for your life that will support you, be resistant to disruption, and resilient in the event of trouble. It seems to me that the most important factors that mitigate your risks from the economic irrationality of these times.

-- Be in control of your budget. Have a good understanding of your needs, wants, and greeds. Develop a surplus and then give, save, and invest wisely.

-- Develop multiple income streams. It is not prudent to all of your income eggs into one income basket. You may have one full time job, or two or three part time jobs. You could add a couple of money-making projects that work without a lot of time or attention from you. Examples: a website running Google Ads, and/or a book or pamphlet that you sell via a website with an auto-responder, as well as at all the :"usual suspects" for online publication sales – Amazon Kindle, B&N Nook, Apple I Store, etc. Develop backup job skills to your primary income skills.

-- Grow a supportive community.

Unplugging, as described in 08141, is a second defense against economic irrationality. If you want to Unplug as a lifestyle, "earning a living" becomes a different sort of economic affair.

> You need a **place to live**, where your only operating cost is routine maintenance or secure sources of income if you are renting. In the best situation, your house generates all, or at least most, of the operating energy required for life in the dwelling. It is super-insulated and uses passive and active solar. The house grows some of the food for the people who live there. The household connects with other Unpluggers who specialize in food production for the rest of their diet.
>
> You need a **community that supports sustainable living**. Your sustainable dwelling needs to be integrated into a community, a neighborhood, where everyone is part of the sustainability movement – an Unplugged neighborhood.
>
> You need **alternative social service systems and safety nets**. You look to your alternative neighborhood community as your social service, education, and medical care systems. Your local neighborhood will network with others to support larger institutions, but the basics – your general medical practitioner, your basic educational system, your social security, your credit union – is there in your neighborhood.
>
> You need a way to **earn your living using both cash and non-cash income.**
> -- If you have a place to live that has no mortgage debt, you don't need to earn money to provide a dwelling for your household. You have non-cash income in the form of a place to live.
>
> -- If the house generates all or most of its operating energy, that's more cash income you don't need to earn. You have non cash income in the form of on-site generation of electricity.
>
> -- If you don't have other debts to pay, you don't need cash to

pay debts. This is non-cash income.

-- Once you establish your non-cash methods of earning a living, your remaining cash needs will be met by whatever skills you bring to the situation.

-- The Unplugging community provides ways to satisfy other needs of your life – to be involved, to participate, to be part of something bigger than you. This may be a job or a business or a cooperative in your neighborhood community. It might be something in the globalized economy where you bring home new resources that strengthen your Unplugged community. To the best of my knowledge, no such community exists at present. So we all can have the opportunity to be among the first to invent this important structure of safety and community.

This would be a good place to review the concept of Ecovillage Development, as outlined by Bill Mollison in the Permaculture Design Manual. This is the ultimate in a movement toward sustainability and resilience.

Ecovillage Development

An ecovillage is a group of people, consciously united in a network of mutual support. They are the Unplugged who Obey Emperor Gandhi! In Chapter 01041, I discuss the Ecovillage as a method of urban community in some detail.

One of our primary economic problems is that most of us are isolated from each other. We live in nuclear family households, or as singles or a couple of roommates. We are "alone in the city," so to speak. This makes us vulnerable to the economic irrationalities of this era, who are well-organized and united to take more resources for the powerful at the expense of those who are not powerful. We lack relationships of support and cooperation that can sustain us through hard times.

That's why there's so much talk here at iPermie about the need and necessity for community. The system profits as it keeps us isolated from each other, because in our isolation we are dependent upon the system for everything that keeps us alive. Just as people once banded together in villages to protect themselves from raiders, we need to join together in urban villages of protection, support, and cooperation.

The possible forms of these urban eco-villages are unlimited. They may occupy a contiguous geographic space. A village could occupy an apartment building. Or it could be an alliance of people in a particular part of town, who don't necessarily share fences, but they share their lives and experiences and are a community of hope and support for each other. There may be other ties that bind – religion, politics, culture, ethnicity – or the groups may be notable for their religious, political, cultural, and ethnic diversity. All of the above and more are the likely answers.

We've learned over and over of the necessity for beneficial connections in our designs. We often think of that when you work with gardens and energy conservation. The need for beneficial connections is just as important in our community relationships as it is to anything else.

The ability of isolated households to economically survive on their own dwindles away before our eyes. For many, "The Collapse" has already happened. They were middle class, now they live in a tent in some obscure place where they hope the authorities will just ignore them and not drive them away. They had no community of support to turn to, so they became economic refugees right here in the United States. Every year there are more and more of them and this may be soon coming to your own neighborhood.

So yes, we need to develop multiple income streams, save money, store food

and other important and useful items, and be frugal in our expenses. More than anything else, however, we need to build local communities of economic support. Ecovillages are seeds which can turn an entire metropolitan area into an "ecocity."

Worker Owned Cooperatives

Some people find that worker owned cooperatives provide a place of economic refuge during economic hard times. See 08041 in section 8 (Economics) for more information on how to make that work for you.

The key here is to link up with others of similar temperament and ideals and work together. Many hands are better than only two.

Don't know anyone? Start with a free advertisement on Craig's List and go from there.

> "Motivated and concerned young person seeks partners to organize a worker owned cooperative. Object: to provide secure and prosperous employment during economic hard times."

This could be the seed that would grow into your own Unplugged neighborhood in your city. Seeds are always small. They never look like much. But they grow into glorious trees in the right circumstances.

A Message from the System Architects

Found floating around the internet, forwarded by Anonymous

Without our chewing gum, no one will want to kiss you. Without our deodorant, no one will want to touch you. Without our lipstick, you won't catch anyone's eye.

Without our athletic shoes, you won't be able to keep up with the guys. Without our cigarettes, sophistication escapes you.

Without our cleaning products, no one will want to come home to you. Your children won't have any games to play without our toys and cartoons. She won't enjoy the date unless you take her to one of our movies.

The fun hasn't really started until you have our beer in your hand. How can you feel free and alive without our new sports car?

Consider all your leisure-time activities and you'll see: you're not having any fun unless you're paying for it.

We play on your insecurities, on your fears and anxieties. There are products for every human activity, even sex, because the things that are natural and free are not good enough for you without our synthetic supplements.

Eventually you're so conditioned that you'll pay for the most useless of products, just to be paying for something.

And should you ever try to step outside of our system, you'll see that we really have made it impossible to be a human being without our products: you must pay to eat, pay to sleep, pay to keep warm, pay for a space just to exist.

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09101 Political Criminality

But in our political system, we have an industry dominated by two firms, Republicans and Democrats. Together they have a 99 percent market share. They have undertaken actions at the state and national levels to make it practically impossible for any other party to enter. This system forecloses good competition, the kind that raises new ideas or asks embarrassing questions. We have been fooled into thinking the system is competitive, because we constantly see vigorous rent-seeking competition for access to the public purse. This bad competition is an expensive gladiatorial combat, where Congress keeps a lot of the ticket receipts. Some of the rest of the spending is simply wasted building those expensive office suites on K Street and using the time of those lobbyists who could be doing something more productive. – *Michael Munger*

The rich and the super-rich..."demand and receive special entitlements in the shape of a news media that coddles them, huge subsidies from the state for their enterprises, undue deference by those who seek jobs or philanthropy from them, an amazingly low estate tax, tax laws that allow them to pay a lower percentage of their incomes than their employees, and special access to public officials to ensure that their activities are not closely regulated in the public interest." - *William E. Connolly*

According to the U.S. Constitution, the purpose of the US government is –

> We the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defense, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

I'm sure other governments have similar statements in their constitutional documents.

It reads rather quaint, however, in this day when billions of dollars or euros are spent to win and lose elections in a typical general election year.

Do we believe that anyone will spend that much money to altruistically defend the common good?

By their actions, everyone can see that our federal and state governments do not promote the general welfare but instead loot the public in order to reward the friends and punish the enemies of the parties in power.

The worst fears of our Founding Fathers for their new government over time are a daily reality.

I don't intend to further bemoan the political criminality of modern America. I'm not talking about other governments because each country has its own set of issues that must be addressed.

If you need more moans, try my blog, www.bobwaldrop.net, where I rant with

hair and beard on fire on politics, economics, and most other topics.

The question of this section is – how do you protect yourself from political criminality?

The first question is – **how does the political criminality of the government harm me**? Make your own list. Here are some general observations.

Risk of political terror. All of us are at risk of the midnight knock on the door. The president of the United States has the authority to secretly disappear any American citizen, forever, without trial. In fact, the president has the authority to order the assassination of an American citizen. The execution can be carried out in secret and with impunity from any consequences. At present, the government claims they will only do this in extraordinary situations involving terrorists attacking the United States. "Trust us." Having established the constitutional principle that the executive branch has this authority to murder citizens, tomorrow there may be a new definition of who is so dangerous that they must be executed without trial by Star Chamber executive directive.

Theft of your productive effort for the benefit of rent-seeking political elites. This takes two primary forms –

1. Diversions of tax money away from the common good toward special interests, spending on wars, ear marks, road construction and other federal, state, and local construction boondoggles. This reduces the public funds available for the useful functions of government. Over the long term, we pay two ways for this criminality – we pay higher taxes and we suffer from degraded infrastructure and declining services.

2. Finagling government rules and regulations to favor some companies while excluding others from the market place or making them less competitive. We pay a price in the form of less competition, lower quality services and products bought at higher prices, lost jobs, damages to our communities

Increased risk of war. The aggressive and adventurous foreign policies of the US government put all of us at increased risk of war and terrorism. Instead of making us safer, our policies put all of us at risk of violence and death right here in the homeland of the United States. Blowback is real and because there are millions of people out there who have lost friends and family to the aggressive military and terroristic actions of the United States Government, we are all at risk of it.

Subsidizing and pollution and destruction of the environment. Clean air and water standards are constantly under political and regulatory attack. The government takes many direct actions that attack and cause harm to the planet's ecologies. Laws and regulations make it hard for individual households and grassroots communities to live more sustainably. Some sustainable activities in some areas – like composting toilets – are illegal!

Permaculture thinker Vinay Gupta says that the six primary threats to humanity and the planet are state-funded –

-- biological weapons
-- nuclear weapons
-- nanotech
-- global warming
-- biotechnology
-- environmental failure

The second question is – **how do you protect yourself and your household from government criminality?**

Fortunately, we stack the function of "protecting ourselves from political criminality" on the same elements and systems involved with protection from other hazards of life and the general goals of permaculture design. Permaculture design and its implementation as a good-life plan will **liberate you from economic and political subjugation and give you true freedom** to be what you can be.

How to vote with your body.

As in ancient Rome, where republican forms persisted well into the imperial era, the United States maintains a certain pretense in our civic life of political involvement by ordinary people. The government claims that its rule is of, by, and for the people.

That isn't quite true. A more accurate description would be to say our federal government is of the corporations, by the politicians, and for the rent-seeking economic aristocrats. The purpose of "We the People" in their scheme is simply to "pay and obey."

It's called "manufacturing consent" and the elites of these United States are masters of the process. If we don't like what our present politics do in the world, it's time to withdraw our consent. We do that when we –

-- Realize

-- Remember

-- Report

-- Refuse

-- Resist

-- Repair

-- Restore

-- Redesign

-- Redirect

-- Rally!

Let's call this the **Ten R's**. They are a description of how we can vote with our bodies for a better future and grow new systems and structures amidst the collapsing ruins of the old. The goal is a government consistent with the permaculture ethics so that it cares for people, cares for the planet, and has a care for the future.

Realize what goes on around us. We open our eyes and our minds and understand the nature of the game. To realize the criminal nature of the present political system at the present moment in history does not mean that we give up nor that we concede the future to the rent-seeking aristocrats presently in control. Accurate observation is the first step toward good design. If we want a better system, we have to see the existing system for what it in reality is.

Remember and Report the events, actions, deeds, and crimes of the criminals in government. Do this publicly, consistently, and persistently. It is equally important to Remember and Report the events, actions, and deeds of those who work to heal wounds, create beauty, foster wisdom, and live in accordance with permaculture ethics. **Do not allow the criminals to control the public square and conversation.**

Refuse to go along to get along. Refuse to buy their cheap schlocky junk. Refuse to watch their advertising propaganda. Refuse to watch the mainstream media and instead seek your news, information, and commentary from side-stream sources. Refuse to participate in the collective delusions that keep criminals in power. Refuse to spend your money in the globalized corporation-dominated economy.

Resist further outrages and increases in government criminality. The truly effective resistance to the violent system that governs us is found in the way we live. If we live by the standards of this world, we give our consent to gluttony, violence, and the destruction of the earth's ecologies.

If we live by the ethics of permaculture, we care for people, care for the planet, and have a care for the future. We embrace and live non-violence. Since violence is the existing pattern that causes our problems, deploying patterns of violence to oppose them will not solve our problems. It will only substitute a new set of problems for the old.

The opportunities for effective peaceful resistance to the system are many and that

is where our efforts should be placed, in accordance with a grassroots strategy that is diverse and without leadership. The way you live your life is the most effective method of non-violent resistance to the system. Direct peaceful and nonviolent resistance to the systems and actions of the political and economic criminals is a second effective method of resistance. We resist the ideologies of power and domination by and with living patterns of wisdom, beauty, goodness, and truth. "Do not be overcome by evil; overcome evil with good," was Paul's advice to the Christians in Rome during a time of hellish persecution and evil government.

Repair and Restore traditional cultural systems and structures. Repair and restore our diverse communities. Repair and restore biological ecologies and watersheds. Repair and restore constitutional governance.

Redesign and Redirect the political system through the application of permaculture design and whole systems thinking to resolve our governance crises. Where there is greed, sow generosity. Where there is gluttony, teach frugality. Where there is violence and bloodlust, practice peace and beauty. Where there is reckless disregard for the future, live prudence and wisdom.

Rally all to the cause of peace, abundance, wisdom, and beauty.

The day will come when we will see a critical mass in the population with experience in living the permaculture ethics. That will be a day of revolution, as we use the tattered remnants of our constitutional procedures to bring into being a government that truly is of the people, by the people, and for the people, that cares for the planet as well as having a care for the future.

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09111 Peak Energy

I think OPEC is about maxed out. when people talk about spare capacity in OPEC, I don't see it. I just don't see it coming through and I'm not sure it's there. And it's not just that they're greedy, but they're really producing what they can produce.
– John Hofmeister, former President of Shell Oil interviewed on CNBC, February 2012

The discussion of peak oil and the general context of energy issues is in Section 3. This chapter is about designing your life to reduce your energy risks.

How will your life change as the availability of fossil fuels declines and the prices of fossil fuels increase?

Start with your monthly records of expenses.

-- How much do you spend on gasoline?

-- On energy of all kinds?

OK, now let's double the amount you presently spend on energy. What does that do to the rest of your budget?

Double it again. Is you budget still balanced?

Now let's assume that the price of most everything else you buy goes up in price due to the increase in the cost of fossil fuels. How far into the proverbial hole does that run your finances?

Suppose the price doesn't increase, but instead falls, as does the price of everything else. Then your income declines because of the deflation. Maybe you lose your job because your business can't keep going in the new deflationary economy. You have to pay off a mortgage with more expensive dollars than the ones you borrowed.

How long before you are homeless?

Everyone needs built-in energy resilience for their lifestyle.

Start with demand destruction.

Go through every activity of your life and analyze its energy footprint. Document the source of the energy for each of your lifestyle activities –

-- Fossil fuels

-- Alternative/renewable energies (passive solar, hydro, wind, active solar, tide, solar thermal, bio-fuels)

-- Mechanical energy (I have a friend who has a washing machine that can be powered by the mechanical energy of his water pumping wind mill),

-- Human energy

Ask yourself over and over –

-- Can I do this without any fossil fuel investment?

-- If not, can I do this with less fossil fuel investment?

-- What has to happen for this demand destruction (or demand reduction) to happen?

Don't forget to analyze your annual acquisition of stuff, since everything you buy has energy embodied in its manufacture and distribution.

Passive measures are among the most productive alternatives. These options range from adding insulation to your dwelling, cross ventilation, and on to investing in a good set of layered winter protective clothing.

Next look at **redundancy.** Since energy is critical, you need a plan for what happens if there are problems with conventional energy grids and supplies.

So go back through your list and make some decisions about what to do if, for example, gasoline gets really expensive, or the power grid goes down or becomes intermittent for an extended period of time.

Here's where you build in back-up structures like –

-- a wood burning stove,

-- a propane camp stove,

-- a solar oven.

-- marine battery with inverter,

-- Etc.

Go through your energy-using activities, figure out what is most critical. Design back-ups to preserve the critical functions even if the energy distribution grids go completely down for an extended period of time.

Energy Storage

It can be helpful to stockpile some stuff. Energy storages are a significant strategy we see in nature. Food and water are high on the list. Your circumstances and your needs dictate your ability to store energy in the form of fuel. If you don't have a safe place to store fuel, you can't store it. But if you have a safe ventilated place for storage, a tank or two of propane, a marine battery and some small batteries and solar powered battery chargers can be of significant assistance during a short-term emergency. We cook on a propane stove, and in 12 months, we use ten five-gallon tanks of propane, cooking usually 3 meals a day. We use a little more in the winter, when we bake more, and less in the summer, when we rarely bake.

Storage has its limits. We can't store our way through peak energy. We have to create new systems and ways of living to meet these challenges.

Beneficial connections supporting energy resilience.

At the risk of being repetitious, let's look at some of the beneficial connections integrated into a sustainable energy plan.

Start with your own personal living arrangements. Do you live by yourself or in a small family of two or three? If so, consider increasing the size of your household. More people in the household makes it more resilient in the face of energy problems.

Where do you live? Where does it locate in relation to the geographies of your life and the travels (origins and destinations) that characterize your life? How energy conservative is your dwelling? What needs to happen to make it more energy conservative? If you do not own your residence, should you work toward ownership somewhere? If not, how can you adapt your existing place to be more energy conservative? The time to move, and/or redesign and remodel your dwelling is before the energy crises start.

Where does your food come from? How much of your diet comes from within 150 miles? If you're eating at a college cafeteria, probably not much. Fortunately, most of us don't make a lifetime of eating out of a college cafeteria. If you are a college student, think about how you will transition your food system as you leave school.

How often do you travel? Do you travel by car, train, bus, airplane, boat? Can you learn to travel less, and be satisfied with stability in the region where you live? If not, why not?

Is a response only for your household adequate? What community initiatives can you think of that would help you cope

and adapt to peak oil? As with economic and political resilience, you will be safer and in a better energy situation if you are part of a community of hope and support.

The time to get an energy plan is before the energy crises hit.

That's why we do permaculture design.

Do what you can, with what you have, where you are.

Don't let the perfect become the enemy of the good.

While looking for beneficial connections, be on the lookout for negative connections that can cause trouble. Eliminate them from your life if possible.

If not, figure out how to mitigate or short-circuit any problems they can cause.

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09121 Punctuated Equilibrium

"What quarrel, what harshness, what unbelief in each other can subsist in the presence of a great calamity, when all the artificial vesture of our life is gone, and we are all one with each other in primitive mortal needs?" – *George Eliot*

Punctuated equilibrium is a biological theory which proposes that most species change slowly, if at all, for long periods of time and then undergo rapid periods of change before settling down to a new form. Besides biology, we also use the term to describe sudden and often calamitous changes in human societies. Like species, societies may continue for periods of time with little change and suddenly experience times of upheaval and change leading to a drastic change in circumstances.

The American Revolution of 1776, the French Revolution of 1789, the Russian Revolution of 1917, and the fall of the Soviet Empire in 1989-90 are examples of this process. More recently, the financial crisis of 2008 was a time of punctuated financial equilibrium. We have yet to recover from that event, and it may mark a permanent decline in our economy and standards of living.

It is likely that other such moments of punctuated equilibrium are ahead of us.

Many people came through the financial crisis of 2008 just fine.

But others didn't come through that financial crisis just fine. They lost their jobs, their retirement plans, their savings, their homes. Some of them went from middle class lifestyles to living in homeless shelters or shacks and tents in our own American version of the favelas and barrios of Latin America.

Is your life at risk of punctuated equilibrium?

If you had to get up from your sofa, walk out the door, and flee –

-- Where would you go?

-- Who would you go there with?

-- What would you take with you?

-- What would happen to you when you got there?

This is what punctuated equilibrium is about – a sudden and catastrophic change in your circumstances. The catastrophe could be small and localized to your building – or your neighborhood – or your city. It could be statewide or nationwide or a world wide disaster.

What do you need to meet this challenge?

You need a **permaculture design for your life** that incorporates the possibility of sudden catastrophic change for the worse as **a contingency to be planned and prepared** for. Included within that design is an emergency response plan that considers the possible hazards and threats in your area and describes how you will respond in the event of the potential catastrophes for your area. The time to prepare a disaster plan is before the catastrophe hits.

You need **a psychological understanding that will allow you to realize** when a greater-than-normal change is in progress that may have a catastrophic effect on you and your household. By having a plan in place, you can avoid panic and fear and respond proactively to protect yourself and those you love from the crisis.

You need **a bug-out bag with essential items in it already packed** and ready to just grab and go. Everyone in the household needs a bug-out bag. You need a bug-out book bag with certain essential books in it. If you have pets, they need a bug-out bag too.

You need a **shelter in place plan** if it is not possible to flee and the outside environment has become hazardous.

You need **connections in your community, networks of support and commitment.** The time to develop such connections and relationships is before the catastrophe hits.

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09131 Die-Off

If you were born after 1960, you will probably die of violence, starvation or contagious disease. *Jay Hanson, dieoff.com*

Die-off is the ultimate boogerman of punctuated equilibriums.

The classic illustration found in ecology textbooks is St. Matthew's Island.

In 1944, the US Coast Guard established a radio navigation station on the remote island in the Bering Sea. They landed 29 reindeer on the island as a back-up food source for the Coast Guard folks. It was wartime. Supplies for the base might be intercepted by the enemy.

A few months later, the Coast Guard closed the station, evacuated the men, and left the reindeer behind. In 1957, a research expedition landed on the island and found more than 1300 reindeer in great health. In 1963, researchers again visited the island. Now there were 6,000+ deer on the island! They were thinner than the deer found in 1957.

Three years later, in 1966, scientists returned to the island, and found it littered with the bones of reindeer. Only 42 reindeer remained on the island, 41 females and one infertile male. The deer population died off completely by the 1980s.

This is what happens in nature when usually self-regulating systems get out of whack.

It is one thing to observe this happening in nature to animals, insects, yeast, etc.

But it would be another thing to watch it happen to the human race. The impact of human systems on both the human race and the ecologies that we inhabit approaches the "wildly out of control" stage.

A primary purpose of the iPermie project is to help us avoid a catastrophic die-off of the human race. Our rescue begins with you, as an individual, when you decide to learn permaculture design and develop a permaculture design for your life. It continues as you share this with others, and they start their own designs for their own lives. As more people take actual control over their own lives, the concepts of permaculture design begin to influence the larger structures and systems of our societies. We grow our own rescue, one person, one design at a time.

The consequences of our failure will be the die-off of the human race, which will be an ecological catastrophe so great that we will take many other species down with us.

Don't go there. Instead, let's fulfill a self-fulfilling prophecy of abundance and beauty instead of horror and death.

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09141 Old Ways, New Ways

This is a story of punctuated equilibrium. It describes how a group of young people, living in Kansas City, Missouri, made it through the Crash of the Old Civilization and helped jump start the birth of the New. This is not a prediction as to how things will go in the future. It is a fiction story, with the background devised to provide a stage for the activities of the characters.

Mid February, Year 1 of the New Future
13 months past the first days of the Change.

It is a cold winter morning in Kansas City. We get up with the sunrise. Everybody climbs out from under layers of blankets and quilts, already dressed warmly (flannel shirts and sweats). We put on our pants and shoes. As the sun rises, we open the curtains and insulated interior shutters on the east-facing windows to let in light and warmth.

Breakfast comes out of a hot-pot packed the night before. Last night, a small propane stove converted to run on methane gas brought breakfast to a boil in a cast-iron Dutch oven. When boiling, we put the pot into a box lined with aluminum foil and insulated with grass and straw harvested during the summer, where it slowly steamed overnight. It's a tasty breakfast -- oats and raisins and dried apples, all grown and harvested in the summer, served with a thick Greek yogurt. We trade with a farmer for the oats, apples from our back yard and raisins from up the street. Besides our porridge we feasted on slices of home-baked sour dough whole wheat bread brushed with real butter (from the neighborhood dairy cooperative, which is the source of the Greek yogurt), toasted on a cast iron skillet on the methane stove. Yesterday breakfast was biscuits and gravy. We baked the bread and biscuits in a woodburning brick oven we built in our back yard.

After breakfast, Jennifer starts the day's batch of bread dough while James, David, Sean, and Nick go to work in the greenhouse. The greenhouse began as an improvised plastic cover on the back deck. Now sunlight streams in through windows salvaged from ruined houses. It has a pleasant homemade look about it, with several different sizes and kinds of windows patched together to fill the wall spaces. Nobody in the house had ever built a greenhouse before, but hunger is a good teacher. It is really amazing how fast you can learn stuff when the pressure is on. There were times in the past few months that the learning curve seemed almost miraculous. It needed to be.

My name is James. When the shit hit the fan, and the old system of doing things crumbled, I was a convenience store clerk in Kansas City, Missouri.

Several of us hourly wage slaves rented an old two story house with a full basement on a hillside street that ran into Truman just east of Hardesty close to the St. Paul School of Theology. We played a bit at being anarchists. We would sit around, drink and smoke and talk about what might happen if civilization collapsed. For all our talk, we were as surprised as anyone when the flying feces hit the ventilation devices. We were as unready as everyone else. You hear about people who had big stashes of food and

tools and stuff like that. Not us. We were not Mormons and we didn't know any.

But we learned quickly. Everyone did. Those who didn't, died. There was not much margin for error.

We built a greenhouse because one of the local churches had a class about how to do it and why we should. When we heard "heat for the house" and "food to eat" we were ready to get started. We had little to eat and no heat, so what was not to like about this greenhouse schtick?

We were hungry. We were cold. The church people gave us seeds for radishes and greens and said come back when they are growing and we will explain how to get seed from the plants so you can plant more. We went home and got to work.

Our house was on a hillside, two stories with a full basement. The basement opened out onto the back yard, the first floor of the house, ground level in front, opened out to a deck in back. There was a long room facing south on the 2nd floor. We took the siding and inside sheetrock off the south walls of that second floor room. We nailed window frames over the inside and outside of the now naked frame of the south wall. Some of the windows we put in we fixed so they would open or shut, to allow for ventilation as needed. It looks way amateurish, but it makes for an extremely sunny place which was exactly what we wanted. Putting it together was labor intensive, which was fine because labor and time we had. We grew radishes, lettuces, and onions at first.

We got the windows from abandoned houses in the neighborhood. This area did not lack for abandoned houses, even before things collapsed. That was why we were here, rent was cheap. We didn't ask our landlord for permission. He lived in another state and we mailed him money orders for the rent. Since the phones and the internet and the mail weren't working, we just did what had to be done. If he comes by and complains, we will throw lettuce at him and feed him ham steak sandwiches on sourdough bread with homemade mayo and our own pickles. I bet he takes the food and is glad for it.

There was an illegal dump just behind our house. It turned out to be a gold mine. We found a bunch of clear plastic and some miscellaneous lumber there which we used to put up a framework on the first floor back deck which we covered with plastic. It worked for us that first winter as a "low mass solar sunspace heater." At first we couldn't use it for growing anything because without a real roof or east/west walls, it got too cold in there at night. Now that first floor deck greenhouse extends all across the south face of the house and has been enclosed and roofed, we grow lots of stuff.

As we ease from winter into the second spring of the Change, the two levels of our green house grow salad crops and starts for the early spring garden (onions, peppers, cabbage, broccoli, and tomatoes, mostly). The vegetable plant starts are in trays, the salad crops are in columns made from chicken wire and burlap. We had herbs and a few specialty items, like the little cinnamon tree and the miniature orange tree that yielded tart little oranges and a miniature lemon tree. Bob – we used to call him "he who likes house plants" – had seen them advertised in the back of a Sunday supplement in the newspaper, and ordered them just for kicks. Everyone wishes he had bought more edible plants. As I said, we weren't prepared for anything that happened. Even so we are still here! We aren't hungry any more and we weren't cold this past winter, well, as long as we stayed inside. It was plenty cold outside.

We lined the back walls and floor of the greenhouses with concrete blocks and bricks (all salvaged) which, together with barrels of water painted black, act as heat sinks during the day and heat radiators at night. Also at night, we put covers made from blankets and quilts and insulated interior shutters over all of the glazing. A small propane heater converted to run on methane gas is available for the really cold nights. Our final line of defense is an alcohol stove. We hate using the methane

and alcohol though, because they are scarce and valuable, but we'd hate losing the greenhouse crops even more.

Why don't we use wood, you ask? Well, we are in a city. There isn't enough wood to go around. Everyone wants wood. There's a lot of concern about deforestation, so once we made it through the first scary winter, everyone worked hard to minimize our use of wood as fuel. Our only wood use is for the brick oven in the back. We've bought a couple of coppiced trees in a woodlot two blocks from here, although it will be a year or so before we can start harvesting the wood poles. Eventually though we will have a sustainable source for wood for our brick oven.

About three hours into the morning, the water cooperative truck comes by. The Kansas City Water Cooperative is a joint venture of people in neighborhoods and the former employees and management of the city's old water department. Each household provides five hours of labor per week, plus 20 Neighborhood Bucks and we receive water delivery twice a week. We get 2,000 gallons/month for our household of six people.

Everyone is a "water conservative" as we say these days. Yes, we get our showers but we heat the water with the sun and we are quick to wash and rinse. We painted our old hot water heater black, and put it on a platform beside the back deck. The book we read on the subject called this a "bread box" configuration – it laid on its side, with a slanted piece of glazing on top, which was an old glass storm door we salvaged from a ruined house. We built a box, put glazing on one side, painted the tank black, lined the interior of the box with aluminum foil. It's hooked to a shower in the basement. For washing dishes in the kitchen on the first floor, we put out buckets we painted black, which heats five gallons reasonably quickly on a sunny day, even in the winter. The church people had a class about that too. None of us were religious, but we sure went to church a lot once they started those classes about how to live now that civilization collapsed.

In our particular case, everybody uses the shower in the basement, as besides the fact that our hot water tank is on the first floor, we built our water tank (out of cement) on the main floor, so we get good pressure is the basement.

We only buy purified water for drinking, cooking, washing dishes, and showers. Any water we use in our garden comes from our water harvesting system, which has two parts. Part the first is a series of earthworks to capture, slow down, and spread out the rain and water runoff entering our yard.

As we learned in another class at one of the neighborhood churches, we started at the highest point and dug a series of ditches and built raised beds. We designed them such that when one ditch and basin filled, the runoff flowed into the next lower, and so on all the way to the lowest part of our property in the back yard. The guy teaching the class said that these were swales, which seemed to us to be a rather fancy word for what amounted to a ditch. We like our ditches in our yard that catch water. It's really nifty to watch how it works from the top floor of our house when it rains. You can see the water fill up the top ditches and then flow down a little to the next rank and on down the slope and around the house and into the back yard. It has to rain a lot for any water to escape out of the backyard spill-away we made. You bet we got great ditches on Oakley Street.

Our house already had gutters. They used to just empty into the yard. Now they empty into cisterns we built from chicken wire, rebar, and ferrocement. That was another class at a church. We had to buy cement and we did that by trading our labor. The cisterns were worth the expense and labor because the gardens need the water and we need the garden food. Also our fish need extra water but I will say more about that later. Plus they are pretty. They looked like large jugs. Someone traded us some paint for some

work: we painted them in a somewhat gaudy fashion.

The water cooperative truck runs on soybean oil, which they get from farmers, trading them either Neighborhood Bucks or barter certificates or other items of value traded to them for water. In the days before the system crashed, the truck had run on diesel. It smells a lot better now, sort of like baking bread.

Tomorrow is one of the two weekly neighborhood market days. Everybody is busy working on whatever it is they plan to market. Jennifer, Nick, and Sarah prepare packets of dried herbs, while Bob and James look over the salad crop to see what is available and ready that we won't eat and thus can be sold at the market. The Truman Street Market is in the parking lot of a former grocery store, now (literally) a ghost of its previous self. Like many corporate owned properties, its owners abandoned it. Some people in the area homesteaded the property, and organized market days for the neighborhood. A sociology professor I ran into at the market said it was an example of "spontaneous order at work."

If you didn't mind a bit of walking, or had some silver or something to trade for a ride, there was a market every day of the week within a couple miles of the house. With transportation being the way that it was, going five miles was something to think about. It was either ten miles worth of walking (five there, five back, half a day's work easy), or alcohol or methane fuel and wear and tear on a vehicle. Most people walked, as there were other more important uses for methane and alcohol fuel.

Everything we needed was right here in the neighborhood anyway. No one had to drive 30 miles to a Home Depot (that 60 mile round trip would be a two or three day round trip walking journey now!) We have bars and theaters -- little restaurants with different kinds of music, storytellers, public and private libraries, it's kind of amazing really, when you think about this area being such a slum in the old days, with stores that had bars on their windows and bullet proof glass, and those stores being few and far between anyway. Now people live in the back or second floor of their house and run a coffee shop in their living room, with jazz on Mondays and Wednesdays, blues on Tuesdays and Thursdays, reggae on Friday, rock on Saturday and gospel on Sunday, seven days, seven different artists or musical ensembles. Live music is a lot more pervasive these days, especially since most people are out of batteries.

The Greenhouse, Continued

I should tell you more about our greenhouse.

In the summer of Year 0 (the first year of the Great Change), we extended our deck across the entire south-facing back of the house. For materials, we harvested six tall metal utility polls that were in the alley behind our house. We rented an acetylene cutting torch and cut them down just as if they were big trees. Then we cut them so that we had eight sturdy pillars the height we needed plus crossbeams.

This was a major turning point for us and our entire street. We debated doing this for a couple of weeks and we decided that since there was no news about any return of electricity or phone service, we would just take them and use them. We harvested quite a bit of the cable strung on the lines. None of us are construction workers or engineers or architects, so we over-engineered everything, relying on brute force and not worrying too much about elegance of appearance. Not knowing how to calculate how much load a wall could or should bear, we relied on common sense and trial and error. We only collapsed the floor once. When that happened, we went and got another pole for that spot.

Having expanded the deck on either side of the existing deck, we built insulated walls on the west and east and an insulated roof on top. We used salvaged windows floor to ceiling for the south wall. Most all the materials came from abandoned houses. In those days there

were a lot of those, including one right next door to us which we knew was owned by an absentee landlord who lived on the west coast. The house had been empty for years. All the wiring was gone; the windows were intact as were the doors. We ended up practically dismantling the entire house and either using it or selling it and now we garden that empty lot. As we learned, an abandoned house has a lot of useful resources – wood from the frame, windows, doors, nails, bricks, chunks of concrete.

On the ground floor below the kitchen, there was a room in the basement with a door that opened to the outside. We converted this room to our waste processing and energy generating center, and expanded it by turning the space below the deck into another room. We used cob construction for the non-load bearing walls for that addition. This involved mud and stones and a little bit of scavenged cement mixed in with the mud. This area contains the biogas methane digester that we built in the summer.

Our only household toilet is in the back deck greenhouse. The toilet simply empties into a bucket in the room below. After using the toilet, we drop a little crushed dry material down the chute (shredded leaves, straw, sawdust, whatever we have.) On a scheduled household rotation, we empty the bucket into the digester. We have a continuous process digester which means we add stuff and it produces gas. Later this year, we will clean out the sludge. We're not looking forward to that, but it will be a doable job and in the meantime, we need the methane. The sludge goes into the compost, and we'll watch and maintain that so it gets hot and kills any pathogens in the sludge.

We would like to rig something up to automatically empty the toilet into the digester. That requires plumbing! We will negotiate with one of the plumbing contractors who comes to the Truman Market for the work. The south wall of the digester room is mostly glass which helps keep the digester warm during the winter. We cover the windows at night during the winter with insulated shutters.

We could build a wood stove out of bricks, but wood is hard to get. While that wasn't true in the old days, now everybody wants wood. It seems to us that it is too valuable to burn, except of course for baking bread and pizza and biscuits.

As for other trash, well, we don't have any. Paper is way too precious to throw away (I'm writing this story on the backs of pages of information I printed in the old days with my computer printer), and the same is true for tin cans, lids, plastic containers, bottles, all the other usual American trash. We use and reuse everything until it can't be used anymore and then we still save it because you never know what you will need in the future and what possible use it might have. Even the illegal trash dump in the wooded area behind our house was useful, as we found all kinds of handy stuff in there (especially tires, cans, and bottles, all of which have many uses in this new world.)

You might be asking, how do we get all of this work done? We now have eight adults and three kids in our household, and everybody works at something. It's not that we don't have time off -- we do -- but some things have to happen several times every day and attention has to be paid to details. Otherwise, we lose an entire digester of methane, or a batch of sprouts, or a gallon of alcohol, and we can't afford losses like this. Bread has to be baked every day. Food has to be cooked every day.

But you're right, there's no way that one or two people could keep an operation like this running. Around here, nobody lives alone anymore and few people live as single couples in a dwelling. The few one and two person households link with others in community arrangements with their neighbors, or they wouldn't be able to survive. This is one reason there is so much raw material available for harvesting. In the first place, a lot of people left the cities, especially the

suburbs in the early phases of the collapse. They had family or friends elsewhere and that's where they went to ride out the situation. They aren't coming back. In the second place, all this living alone and as single couples by themselves has passed from the scene because of the logistics of our new ways. In the third place, a lot of people died. The medically fragile. The elderly without family. People dependent upon medical technology. Criminals, thieves, and fools thought they could make crime pay forgot that this being Kansas City, everyone had guns. So many of the targeted victims shot back that the criminal population was greatly reduced in the first weeks of the Change. So there is lots of surplus housing available for deconstruction and repurposing.

Surprisingly, apartment buildings are still in use, although most of them were initially abandoned. As we developed better ways and became more experienced in what we were doing, people began to rework apartment buildings to make them practical for the modern situation.

Our diverse energy operations are interdependent. We distill alcohol fuel (we traded our mechanic some food and labor in the late spring to convert our old pickup carburetor to run on alcohol). We make and use methane gas (mostly for cooking). We heat water with the sun. We walk, fetch, and carry a lot. We only use the truck if we have to haul something or if there is a dire emergency that requires carrying wounded, sick, or injured people to medical care. Anything else, we walk.

All of our organic waste goes to one of four places: methane digester, compost pile, alcohol mash, or the livestock (pigs, cats, dogs, chickens, fish). We never have enough organic waste; everyone is always on the outlook for more.

By the end of that first February, farmers were bringing animals to town, live and on the hoof, cattle, sheep, even pigs. They came the old way, driving them across the land (or in this case, down the interstates). I tell you, we were right glad to see those cowboys on horses driving their pigs down the street, -- it's funny how the old cowboy shows never showed them driving pigs to market. My great-grandfather used to do it all the time. I'm glad they remembered. We heard on the shortwave that farmers elsewhere had frozen to death bringing grain, soybeans, and oats to cities.

Little Susie spotted them coming. She went running down the street to tell us, and we all moved fast to see this amazing sight. I asked a cowboy where he thought he was going with his pigs, and he said, well, if you want some, we'll sell them right here and now. They drove the pigs into the parking lot of the abandoned Thriftway, and made a pen by pushing abandoned cars around and started dickering with the crowd.

So we went back and ransacked the house, coming up with $5 in assorted silver change, four old silver dollars someone's grandfather had given him for Christmas many years ago, and some miscellaneous cheap gold and silver plated jewelry, and the cowboy said, "You can have a breeding pair plus one." Best deal I ever made. Each of the occupied houses on Oakley got at least a pig to slaughter and eat, and there were six breeding pairs acquired for the street. We were in the pig business – and that meant we could look forward to barbecue, which as most folks know, is a necessity in Kansas City. Maybe this new world wouldn't be so bad after all.

Our problem became immediately apparent. We had our pig to eat. The problem was that none of us had ever slaughtered a pig; the most I had ever done was a chicken, and that had been about 25 years ago. We were hungry, and the idea of fresh meat was rather appealing after two months of canned and dried foods. I could already taste the pork roast, but a live pig is a wiggly and inconvenient thing and this one weighed a couple hundred pounds anyway, and we never got around to buying a shotgun or any kind of gun.

Just as someone said . . . "Well, my grandfather said they used to hang them up by their hind legs and then slit their throats," a guy came down the street, shouting, "Pigs slaughtered, Thriftway parking lot, for a share of the meat." The former butcher of the Thriftway had heard what was going on and was setting up in the parking lot. He'd butcher the hog for 10% of the meat, plus the hooves, hide, bones, and innards. He hired some of the guys in our household to help, and they brought home ground meat for sausage as their pay. We had to bring our own containers for the meat, as he was low on butcher paper. It was still cold, so refrigeration was immediate. We got busy making sausage and we built a smoke house in a day using plans and instructions in one of the books I found in the library for the hams.

Remember what I said about always being on the lookout for more organic matter? None of the manure from those cattle and pig drives went to waste. People followed along behind the herds and scooped the poop to take home. Even in the early days, we had already learned the value of animal poop. When the animals were all gone out of the Thriftway parking lot, within a day you would not guess that a herd of animals had been there the day before. It might not have been spotless, but there was no manure to be found.

We hear things are about the same all over. We listen to our shortwave for the news every day. That radio and the rechargeable batteries and the solar battery charger were practically the most useful items we had in the house, other than our tools and the citrus and cinnamon trees.

One thing we have to do is work with our neighbors. They know us and we know them. The old way of living in isolation, two or three people in a house just doesn't work anymore. Everybody lives in small extended family-like communities, in both cities and the rural areas. Our area, Blue Valley, is about 2 miles wide and centers on the intersection of Truman and Hardesty, where there is a supermarket and big parking lot/commercial area, plus the St. Paul School of Theology, whose large open spaces are now gardens and little shops/markets. There is a second center at Hardesty and Independence, centered on the old now-defunct Price Chopper supermarket/strip mall lot and the area's public library (one of the most important buildings these days).

But right here on Oakley Street, you can buy all sorts of things, we even have two cafes, each of which has music on various evenings. Up on Truman, there is a veritable mall. It's obvious that no city planner has been near what's going on up there. There is little traffic. Truman which formerly was six lanes, has become two lanes plus some walking trails amid the new "urban spaces" (mini-gardens with benches and tables and other amenities). Sure, there's plenty of existing construction, but already by the end of that first summer after the Crash people decided that it was easier to tear down some of the buildings and use the materials to rebuild more sensible structures. The really old ones (1920s or so) weren't the problems, it was the new stuff, especially anything built since the 1960s. Windows don't open. Everything depended on centralized heating and air conditioning. They are cold in the winter and stifling in the summer humidity. Brute force energy made them habitable once upon a time. We don't have that kind of power anymore. They are great sources of raw materials though.

Now we have to work with our environment -- what a concept! If we had thought of this years ago, we wouldn't have had so many troubles that first winter! Fortunately, there are plenty of raw materials around. When we needed something to seal parts of our greenhouse, we dug up some asphalt from the edge of a street and melted it. No Asphalt Police showed up to arrest us.

What do we use for money you ask? Well, we use Blue Valley Bucks, or silver, labor, barter, whatever it takes to get the deal done. We work for the church people for a while and they usually pay in

Catholic Bucks. It is not anywhere near as simple as money used to be. Somehow it seems more personal, and being someone who has always liked to shop, it is a lot more fun. At the markets, there are people who make a living by making deals -- putting buyers together with sellers and taking a small percentage on the initial deal. "Whatta you got?" is as common as "how are you" on Market Day.

Plus, we don't need money as much as we used to. I have no clues as to what happened to my landlord. He has never showed up. If he does, I'll offer him a ham, I bet he takes it. He lived a long ways away, in another state. Our need to pay rent just disappeared and we acquired our house by default. Not everybody was so lucky. Some people, evicted by greedy landlords, ended up better off, because they got a jump start on building sensible dwellings and urban spaces. Most of them simply homesteaded vacant land. Churches who owned properties made them available and people considered the grounds of government buildings as fair game for places to build housing for desperate people. Here in Kansas City, most such people dug in -- literally -- building earth sheltered homes using scavenged materials, dirt, and human labor. I've had dinner in some real nice places that people built like this. A book circulated around the churches – "The $50 and up Underground House Book" gave a lot of people ideas.

We use a variety of scripts for money. The monopoly of the United States dollar is gone. There is no one money that everybody accepts. While some people will take the old US dollars, they sure won't buy what they used to. Catholic Bucks, on the other hand, backed by the full faith and credit of the Catholic Diocese of KC-St. Joseph, and in accordance with the emergency legislation of the city council can be used to pay local taxes, buy water, medical care, and as a result, are a valuable medium of exchange for other things (no the local taxes did not go away, although nobody pays much attention to the federal taxes anymore, since there isn't much federal government these days). The same is true of Blue Valley Bucks, authorized by the Blue Valley Community Association. Both of these programs were authorized as an emergency measure in the early spring that first year, to help jump start some economic activity.

Local government hasn't gone away. It has changed. The most important governments are the neighborhood associations, which evolved to take the role of the old cities and towns. Each neighborhood became an urban village. These group into some regional associations, which are like the old counties, and the city council is like the old state government. Police, courts, and regulating the issuance of money are its most important jobs. That's about all it does. As to the original federal and state governments, they seem to have just disappeared.

The Crash Begins

You're probably wondering what happened at the beginning of the Crash, early in January that first year. The first sign of bad news was a stock market meltdown crash. Due to frequent suspensions in trading, the stock collapse unfolded over several days. By the time the Wall Street Stock Exchange closed permanently, the Dow Jones was down 95%. I wrote down the final close, 592, down from somewhere over 12,000.

People freaked.

Some of the cable television shows were riots. They had screaming politician and sobbing bankers and freaked out stock brokers. "Don't panic, don't panic" was their mantra, often juxtaposed with quick shots to that clip from the movie 2012, where the protagonist says, "When they tell you not to panic, that's when you should panic," just before the earthquake hits and Los Angeles begins its slide into the sea.

A studio audience rioted and murdered the secretary of the Treasury and the CEO

of the NY Stock Exchange live and in color during prime time after they made some particularly stupid remarks.

As the stock markets collapsed, the banks teetered on the edge of the abyss. People began withdrawing their money, all of it. Every bank had a line of people waiting to withdraw money. Banks shortened their hours. When they closed for the day, people didn't go home. They camped out on the steps.

So the banks announced a limit on withdrawals. This sparked riots all over the country. Unfortunately quite a few bank people were unfortunately killed. The government stepped and announced an indefinite bank holiday. A lot of banks burned over the next few days.

Being in a two-story house on a hill, we had a good view of downtown Kansas City and a huge swath of the area. It was really eerie – like something out of a sci-fi movie – to see columns of smoke all over town, as far as we could see.

Meanwhile, shopping runs on the grocery stores followed the bank runs. That lasted all of a week and ended when the grocery stores emptied out and the warehouse supply trucks failed to show up for resupply.

The next shoe to fall was the collapse of the cell phone network, then the internet went down, and soon there was no more dial tone on the landline phones.

I know everyone reading this went through something similar. Things sure got weird.

The lines at banks persisted for a week after they closed. I guess people expected a financial miracle and they wanted to be first in line. You'd see people obsessively dialing their cell phones, putting them up to their ear, as if they expected something to magically happen and their call would go through. I watched a young man obsessively texting a dead phone who then slammed it into the ground, stomped on it, and hit it with a rock before running off sobbing and crying.

Seventeen days into this situation, the power went out throughout Kansas City. The next day, the natural gas stopped. We noticed immediately because we were cooking breakfast with the last of our eggs on the gas stove. We watched the burner dwindle and die. Fortunately we cooked with a cast iron skillet and the eggs were almost done so they finished cooking with the heat of the cast iron and we ate the last of the eggs. No one said much during that meal and afterwards, we just sat there for a while looking at our empty plates.

Water was the next aspect of modern life to go away.

Later that day, the water pressure seemed noticeably less. We got quickly busy and filled every container we could find, the tub, and washed all the dishes. By the 19th day, there was nothing but a drip at the faucet and that was gone later in the day.

None of us had any family in the area. We were just anonymous 20-something urban wage slaves. Some of us had drifted to KCMO from rural areas elsewhere in Missouri. Others were from surrounding states. We had no place to go around here. We had no family in the area where we could find refuge. One of the roommates was from a farm in southwest Missouri. He thought about going there but he and his folks didn't get along and he wasn't sure they would take him in even if he walked all the way down there.

So it came to pass that we watched and waited as things went from bad to worse. Nineteen days was all it took to take us from 21st century affluence to 19th century penury. Worse, because people in the 19th century knew how to live in the 19th century and we didn't.

Surprisingly, once the bank thing got closed down, and the grocery stores emptied out, and the liquor stores had been looted, the riots and violence died down. There was a burst of crime as things fell apart. That died away as their intended victims, or outraged bystanders,

started shooting back and they were surprisingly accurate in their aim. The thing about Kansas City is that nearly everybody had a gun. Everyone seemed to instinctively understand that if not confronted, criminal violence would get out of hand, so an injury to one really was an injury to all. The police couldn't be everywhere. They had no fuel and the phones weren't working. Ham and CB radio operators transmitted messages to police dispatch locations but it wasn't as quick as dialing 911. This communal response to crime was one of the early large-scale manifestations of spontaneous community solidarity to emerge as our world fell.

I think the magnitude of the disaster helped suppress violence.

No one could quite believe what had happened.

No one knew why it happened or why things weren't getting better.

It was OK to have a disaster, but after the disaster, the Red Cross and FEMA and all the other cavalries were supposed to come to our rescue and bring us meal packs and blankets and teddy bears for the kids and cases of bottled water.

That wasn't happening.

Here we were in the midst of Kansas City, a major metropolitan area, hundreds of thousands of people with no power, no natural gas, no leadership from City Hall. On Oakley Street, there are 36 addresses housing 140 people before the Crash. About half of everybody on our street left within a week of the power and natural gas going out. It was cold. There was snow on the ground, which was good because we figured out we needed to drink melted snow pretty quickly once the water stopped. The ones who left had some place to go, or at least, that's what they thought when they cleared out.

We took a household inventory at the end of the first week, after we went to the grocery store and found it empty. We managed a little panic buying before the stores closed. We had some rice, peanut butter, Ramen noodles, macaroni and spaghetti, instant oatmeal, and some canned veggies.

It wasn't going to last long.

I still had the keys to the convenience store where I worked. We went over there to see if anything was left and found the owner inside, with his family. He closed the store when the banks closed. He and his family defended it with shotguns, so it hadn't been looted. I noticed some new stains on the concrete out front, but he was quite closemouthed about what had happened. The building was built like a bank vault, with iron bars on the windows and a sturdy metal front door and bullet proof glass. Yes, it was that kind of neighborhood. He and his family had loaded up a pickup, trailer, and a car. There was still quite a bit of stuff left. He said we could take what we wanted of the rest. He owed me two weeks pay and said that should clear it.

So we stocked up on convenience store food, which included a few good things like pickled eggs, bananas, and oranges. The owner had taken all of the beer and soft drinks (we saw him later in a parking lot selling his stock). We got jerky, and peanuts, sunflower seeds, raisins, a few canned goods, and chocolate. Not exactly chicken fried steak and mashed potatoes, but hunger is the best sauce.

Our most immediate need was heat. We had none. It was winter, there was snow on the ground, it was cold. We went around inside fully dressed as if we were outside – layers of clothes, hats, gloves. We congregated in one or two rooms all day when we were inside. At night we slept close together, several people in the same bed, all in the same room. We were so cold we didn't even make any rude jokes about guys sleeping with guys. Nobody cared. It was that cold.

The problem with the cold was that it didn't go away. Before, it was nothing to be cold for a short time, because you knew you would shortly be back in a heated building and could warm up. We

no longer had the luxury. No natural gas, no electricity. There was no respite from the cold.

At first there were a dozen houses on the street with heat. Being a poor neighborhood, people often had to cope with utility shut-offs. People had kerosene and propane stoves and some fuel and there were a few houses with fireplaces or wood-burning stoves. By the end of January, though, we were down to three houses with heat, using wood heat. Everyone else was out of propane and kerosene and there was none to be had anywhere. We got the "several people in a room are warmer than one or two people in a room" really quickly and people crowded in with each other.

January was bad but endurable. People still had some food. February was another story altogether. The population of the street climbed back up as people from neighboring streets drifted in and some families came back after finding that they weren't welcome where they thought they could go. We ended up with 20 people in our house, huddled in two rooms. Someone said that each adult body was the equivalent of a 100-watt heater, so ten people in a room are collectively a 1 kilowatt heater. We hung blankets over the windows, doors and walls and put layers of newspapers on the floors. We lucked out and found a newspaper truck that had overturned up on Truman. Newspapers are really useful in a situation like we were in. They are excellent insulation.

Nobody resisted the thought of taking in their neighbors. This neighborhood wasn't particularly close and happy. Before all this happened there were feuds, fights, disagreements. I was the only resident of the street who attended the neighborhood association meetings. Just a month before all this happened, three houses on our block burned in some kind of a gang feud. People knocked on the door late at night, offering cocaine and pot for sale and there was a steady supply of cheap electronics that flowed through the area. Now there was no TV, not much radio (most people lost battery power by the first week of February), no gas or other transportation, no jobs, no money, no government benefits, and people were very, very scared. Even the remaining criminals were too freaked to do anything. Many of their crime pals were dead. What was the point in stealing a television if there wasn't any electricity to run it nor cable to hook it up to? As time wore on with no good news, people wanted company, and managed to put up with quite a bit of discomfort, especially as things went from bad to worse.

People started to die. People ran out of their meds. An older guy had a stroke and died quickly; he was on blood thinners and he ran out. One of our neighbors, an older woman, had diabetes and was dependent upon insulin. She went into a coma and died. One of her friends walked to a hospital, to see if she could get some insulin – none was available. Three children got sick and died quickly. We never knew what happened with that. The parents carried them to the hospital and were turned away. The Catholic parish for the neighborhood turned its lawn into a cemetery. Being young and strong, we helped dig graves and the church people would give us a little food. Someone would come by, pretty much every other day, and tell us that one or more graves were needed at Our Lady Queen of Peace.

We found one of our roommates out back, dead. He had cut his own neck and bled to death in the woods behind our house. I had seen him sharpening a knife earlier and didn't think anything about it. He hadn't seemed any more upset than anyone else. I guess he reached his tipping point and went on over into the abyss.

None of us did much at first because we all expected the power and the TV and the radio and everything else to come back on and get back to normal. Surely the Government would do something about this! By mid February, that attitude was pretty much gone. People were scared enough that they listened to sensible talk about what needed to be done. In January, about the only thing that managed to

happen was that we dug latrines to take care of the human waste (the digesters were a summer project), and we quit producing trash.

When the first house ran out of kerosene, those people moved in with other houses. We had been wracking our brains trying to think of what to do about heat, and that was when the church people came by and invited us to the class at the local Catholic parish about how to build a greenhouse/solar sunspace.

By the second week of February, everybody on the street was crammed into a handful of houses. This was strictly a lifeboat arrangement, and very troublesome, but people put up with it, because the alternative was death by freezing. The preaching theme from the church people wandering around during this time was that spring is on its way, things will get better, we have to make them better. No cavalry seems to be coming to the rescue. We must rescue ourselves. They didn't just offer platitudes, however, they had classes on how to do things so we could learn how to help ourselves. Not many came at first. As time passed, and people got more desperate, there was more interest.

Food was already a problem. By the end of February, it seemed to me there would be no more food. I think it was the second week of February that everything seemed the most hopeless and I came near to giving into despair. We were down to one meal a day of watery beef jerky soup with a couple of miscellaneous cans dumped in it and a little rice or pasta. Portioning out that soup was done carefully. First we drained the liquid. Then we carefully divided the solids among the bowls, one bowl per person or animal (we had 2 dogs and 1 cat and they got a share too). We poured the liquid equally into the bowls. We drew lots for the order in which we would pick up the bowls. That way everyone got an equal portion. As the food declined, that equality of suffering became important to our household morale.

It was a starvation diet, that much was evident. Everyone lost weight. We were tired all the time. I wondered when we would get scurvy or some other weird disease caused by poor nutrition, but I didn't say anything about that. There was enough trouble on our plates without adding speculation.

People wondered if it was time to cut and run. Everyone was sick of people everywhere, no privacy. You invite 20 people to move into your house and restrict yourselves to two rooms so you can keep each other warm, and not have much water to bathe in, and see how comfortable this is.

If we left, where would we go? The plain fact was we had no place to go – and no energy to get there anyway – so we stayed home.

But there were fish in the river, and we even managed to catch some of them, and within two miles of our neighborhood there were huge grain storage elevators. The third week of February, a police car with a loud speaker came through the neighborhood saying that wheat, corn, and soybeans would be distributed the following day at all public school buildings in the area. We went out in the street and gawked at the cop car like we had just fallen off the turnip truck and had never seen such a sight. It seemed so normal, yet we knew it wasn't. Surely its message was not something we would have thought possible just a month previously.

We were in line early at the closest school with every container we could find and I was glad they handed out some instructions with the wheat and soybeans since none of us had ever seen raw wheat or soybeans or dried corn other than little bags of popcorn, not to mention the fact that we had no idea how to cook with them. We were as excited about this as if they had handed out fully cooked turkey dinners with stuffing and mashed potatoes and gravy and pumpkin pie. What they gave us didn't look anything like we thought food should look. We were so

hungry, we didn't care that it didn't look like food. One way or another, we would figure out how to eat it and that's exactly what happened, with a little help from the church people of course.

There we were, the third week of February, people huddled in houses, drinking melted snow, avoiding the yellow snow (harder to do as time went on), using latrines in the backyard, and now we had 500 pounds of wheat, corn, and soybeans and wondered what to do with it. I remember the last time I had tried to deal with a whole soybean in the kitchen was in 1975, using a soybean casserole recipe from the Laurel's Kitchen cookbook during my vegetarian phase. As I recall my roommate and I ended up going out for hamburgers that night.

But we met this challenge too. The church people had been at the school and they had instructions as to what to do with soybeans, corn, and wheat.

We carried our goods home, grabbed a hacksaw, and followed the instructions.

We cut three steel pipes into 3 ft lengths and duct-taped them together. Sean poured a cup of grain into a can, sat down with the can between his feet holding it in place, put the steel pipes, sharp edges down, into the can and twisted it. Pound - twist - pound - twist and in about five minutes, the cup of grain was a cup of rough ground meal. We kept doing this – we made a chant up to go with the rhythm – until we had enough to feed all of us. We built a fire in the back yard with some scrounged wood, put a grill on it and a cast iron skillet on top of that, and made some flat breads with water and salt. They tasted wonderful. Starvation no longer seemed imminent. We ate them all and then ground some more and made more. We ground more flour and using the instructions from the church people, set it up to ferment so we could make sourdough bread in a day or so. In the meantime, the unleavened breads were wonderful.

Actually, they were probably terrible. Burned on one side, nearly raw on the other. Hunger is the best sauce and we were on the edge of starvation.

Now that the edge had been taken off our hunger, the question of the hour was – "What do we do with this big bag of soybeans?"

When it comes right down to it, there are actually a lot of things you can do with soybeans. True, we never managed tofu. We did learn to make soy grits, and soy flour, and soy milk. As it turned out, we didn't have to manage tofu, because some Vietnamese folks who lived two blocks over brought ten different kinds of tofu and other curious concoctions made from soybeans to the first Truman Market in March. They even kindly explained to us what we should do with it.

We ground some corn just like we did the wheat and mixed it with water and cooked it like pancakes in our cast iron skillet. The church people called this "johnnycake" and although it wasn't technically corn bread, it was pretty good even. They handed out instructions on making hominy, which none of us had ever tasted, but we listened carefully and learned how to make our own lye and the make the hominy. Posole was tasty. I wondered why I had never tried it before!

Now that the immediate threat of starvation abated, and no other emergencies were at hand, we needed something to do. We decided to start publishing a newspaper!

How did that happen you ask?

One of the people who sheltered at our house was an elderly retired school teacher who lived up the street alone. She moved in with us as things went bad. It was like having our own in-house granny. She knew a lot of things that we needed to know. We picked her brain about how they did things in the old days before modern conveniences. It was her idea to make the jerky soup. She said, "We used to live on that kind of soup during the Depression, that and corn bread." We had no corn but we mentally drooled at the

thought of corn bread. It would be so good! The smell! The taste! With melted butter! And peach jam!

One day someone asked her about how people made copies before copy machines. She explained how to make a “jelly duplicator.” We later learned this was a “hectographic duplicator,” and people referred to it as a jelly duplicator because it was made with unflavored gelatin and glycerin. Voila, we had a way to publish a newspaper if we could find some Jell-O and if we could find some glycerin.

She had some gelatin and glycerin and we were in business. As for hectographic ink, well, we had our own in-house tattoo artist who went into the Crash well-stocked with hectographic tattoo inks, which work just for hectographic duplication. So we hand wrote, in passable calligraphy, the first edition.

Here is what we had to say on our first front page.

Civilization Crashes, Blue Valley Survives!

In the first weeks of January, modern civilization collapsed due to a “perfect storm” of economic problems that undermined the nation’s technical infrastructure. Many people left the area. More died of cold and hunger, but if you read this you are alive! Congratulations! You survived the end of the world as we knew it. Most of us ask, "What do we do now?" According to the instruction book, "After the End of the World, immediately begin to build a new one. Remember the mistakes of the old, and do better with this one." Here's some ideas on how to get started.

The rest of Volume 1, Number 1 consisted of information on what to do with soybeans, how to make an expedient grain and soybean grinder from metal water pipes, and the importance of starting a compost pile immediately. It had an advertisement for the Better Times School, which would offer classes in gardening, composting, and surviving in new circumstances starting the first week of March at Our Lady Queen of Peace Catholic Church. It announced the First Ever Truman Road St. Patrick's Day Parade for the upcoming March 17th.

The parade story was a total bluff. We didn’t know of anyone planning to do a parade. The Irish do like to parade on St. Paddies’ Day, and we figured that people would just show up if we announced a parade and sure enough we were right.

We printed 100 copies and took them to each of the churches in the neighborhood, plus the other houses where we were aware of people sheltering. We gave a copy to a policeman on a bicycle who came down Truman, and asked him to pass it along to whoever was in authority downtown. We nailed some copies onto makeshift sign boards we put on telephone poles up on Truman and down on Independence.

The churches were all doing important work. They sheltered large numbers of people. Initially, most of them had access to some kind of propane heating, usually brought in by church members. As propane supplies depleted, they cobbled together wood barrel stoves. Most of them had started schools to keep the kids busy, many with teachers from existing schools in the neighborhood.

But we had another problem looming and that was water. It was a more difficult problem than cooking soybeans. The reason cowboys brought the cattle to town at the end of February was that the snow was melting (we didn't have a meteorologist handy to explain why this was happening so early). We filled every possible container with melted snow (and it's amazing how many containers you can find when you go scavenging), for drinking and washing and other such purposes. It wouldn't last forever.

We were only a couple of miles from the Missouri River, but that water was dirty. We lived on a hill, and thus were dubious about the possibility of digging a well. There was an artesian well in a park, it

was actually further away than the Missouri River. It was pure water though. We had about 10 gallons of gas but any way you looked at it, driving back and forth to the Missouri River or the artesian well was a temporary expedient.

Then it rained, and as I looked out the window at all of the water pouring out of the gutters into the yard and running down the yard to the valley behind, I thought, “Sometimes you miss the most obvious solutions.” We quickly put everything we could outside to catch rain water (including a kiddie wading pool we had in the basement) and started plotting how to make some larger tanks to catch rainwater.

We poured the water through cloth to catch any floaties, and boiled it before drinking it.

So we went into the spring using rainwater, supplemented with an occasional drive to the artesian well when it didn’t rain.

As it turned out, we only had to do this for about three months, because later that summer, the City’s water department reinvented itself as a water delivery cooperative. When they came by and made their offer, we were quick to agree. You could pay with all labor, or with labor plus other value (such as the neighborhood bucks which had just been authorized by the city council, which turned up in March.)

By the first week of March, we had several things going for us. We had food and water -- you would not believe how good soybean grits, sausage, and sourdough biscuits can be, even if you eat it every day. The weather warmed up. We still had some gasoline if we needed it. People were going back to their own homes so the house wasn't so crowded. And most importantly, people started to adapt to their new circumstances.

It was like somebody exploded an "Idea Bomb" in the neighborhood. There was little time wasted on meetings, everybody wanted to learn. Someone found the methane digester idea in some old Mother Earth News magazines that somebody had in their basement. It seemed like a really good idea to everyone, as the whole outdoor latrine situation (or carrying buckets outdoors to pits) just grossed everybody out. Pouring the buckets into methane digesters that we had built ourselves was marginally less gross. At least we would get something back from our efforts. To use methane in propane or natural gas appliances, the jets had to be adjusted. We found people to do this, and most of them accepted a future favor for doing it right now. It only took a few minutes.

So you can see that early in all of this -- March -- we started developing new economic arrangements. Labor was already specializing and commerce was commencing. OK, it wasn't the Kansas City Board of Trade, but it worked for us.

Green houses and cold frames sprouted everywhere. It's amazing how much seed is available in a neighborhood, and this was before people from the University Extension and Kansas City Community Gardening Association came through in April. Everybody was ready for fresh vegetables.

I remember the day I saw the first early flowers peeking through the ground. I found myself thinking, Look at this, all of our technological infrastructure crashes, here is this flower, doing what flowers do, poking its way through the ground. If that flower can survive, so can we.

The First Spring of our New Era

In March we had soybeans and wheat and everything we could make from that, plus we had sausage and some beef. The cattle came into town after the pigs, and while we couldn't afford a whole beef, we got some anyway as pay for helping the butcher in the parking lot. We even had a small freezer, which ran off a battery, which we charged at a neighborhood charging station that opened up in March. This was just in time for the beef and the

end of the winter freezing temps so keeping meat was an issue. Now we have a methane-powered freezer and an ice-powered refrigerator. I'd say the opening of the Truman Road Market was the major event of a busy month.

Despite the food and improving weather, everybody needed something (usually, some things). No stores were open. The shopping rush to end all shopping rushes happened as the stock market crashed and banks went under. There's no doubt that this last minute movement of goods from producers to consumers saved a lot of lives. The wholesale pipeline pretty much emptied itself out in the last panic, which meant the supplies were more evenly distributed nationally than would have been the case if stuff had been left in warehouses.

So a market was essential to rebuilding our community. Fortunately, a market is easy to organize. All you need is space, merchants, and buyers. We had lots of space. Nearly everybody became a merchant and we all were buyers. Never underestimate the ability of human beings to get together and make deals.

About a week after we put out our little newsletter, some people knocked on our door and asked how much we would charge to print them some announcements for a new market they were organizing at Truman and Hardesty. So, the famous phrase, "What-ya got?" came into play. As far as I was concerned, probably the most useful thing for us at this point was livestock, and it turned out that they knew somebody who had some chickens. We ended up with a rooster and four hens and they got their flyers plus I threw in showing them how to make their own hectographic duplicator. The first market was set to coincide with the St. Patrick's Day parade.

Believe me, we treated those chickens like they were gold, certainly, their eggs were more useful than gold, at the time anyway. We gave them their own bedroom until we could build a secure coop. We had to chastise the cats severely, to keep them under as much control as you get with a cat. The dogs were better behaved. They were glad to have some beef or pork flavored mush. They had their bowl of soup with the rest of us during those terrible days in February, once we ran out of dog chow. It wasn’t enough for them either.

Anyway, with the news of the upcoming market, we immediately began to plot how we would win fame and fortune for ourselves at the new market. It's not that we expected we'd become the J.P. Morgan's of Old Northeast Kansas City, but what’s not to like about shopping? We had a printing press (it was faster than Gutenberg's), with limited paper, so we would ask more if somebody wanted something printed and needed paper than if they had their own paper. At that first market, in fact, we did a brisk business printing, "JOHN SMITH WHERE ARE YOU" and "MARY SMITH IS AT (WHEREVER)" handbills. We printed sign bills for tailors, carpenters, plumbers, and several other trades. Nearly every street had sprouted a signboard, and people would come by and tack notices on them. People read everything posted – it was a substitute for the daily news on the TV.

We did some printing business on credit for "future favors" (especially the advertising, one never knows when you will need an expert at something) as this was just before the neighborhood bucks program began (about which more will be said presently). We took a little US money, although if you paid with dollars, prices were sky-high, which is another way of saying that the value of the dollar was low. The government had really let people down, most people figured, and so its money was suspect.

A barber showed up and was busy all day cutting hair. People did hair wraps and weaves. Others offered "consulting" services and announced meetings and classes. People brought drums and musical instruments. A dozen bars operated in various areas of the lot and of course, there was all the typical Irish craziness. The end of the world may come

and go, the Irish will party on St. Paddy's Day. I guess all the Irish stockpiled green dye as part of their emergency preparations because there sure was a lot of it around. Imagine crossing the parking lot of a Grateful Dead concert with a St. Patrick's Day parade and throwing in a large flea market/garage sale, and you'll get the picture. Much more interesting – and fun! – than any mall ever even thought about being.

The parade began with three processional crosses carried by altar boys accompanied by others carrying candles and winging incense, followed by a statue of St. Patrick carried by the Knights of Columbus (in full regalia), with the bishop, the priests, and the parish banners. Then followed the Irish setters, leprechauns, and lots of clowns, Chinese and Vietnamese dragons, Native American dancers, Korean drummers, the Guadalupanas were out in force and there were bagpipes. Anyway, one didn't have to be a rocket scientist to know this was a diverse area. It was nice seeing it all together marching down Truman Road. In the afternoon, a military truck pulled up and some National Guard troops started handing out MRE's. They were liberally repaid with beer (there were some potent and raw homemade beverages available). I hope they didn't get into too much trouble when they got home. We wanted them to think kindly of us and remember the potency of our beer if they had more food to distribute.

After the day's business wound down, the party intensified. People brought instruments, and pretty soon there was a large orchestra carrying on (with minimal direction, but great enthusiasm, and there were some experienced players there), everything from a plastic wastebasket drummer to a flute, clarinet, several string players, and one group even hauled a piano down on rollers, so I got to get in a lick or two. People danced, sang, everybody went home quite happy and satisfied. I noticed the next day that there wasn't any trash at the market site either, not even the containers of the MRE's. Circumstances forced us to learn about this new world, and it would appear our learning curves were due for some rapid acceleration.

Getting ready for the first post-Crash Winter

One of the differences about these new times is that you have to pay attention to what's going on. You can't wait until it rains to buy yourself an umbrella, because there might not be somebody around with an umbrella to sell you when it starts raining. We have to think ahead and plan and it helped that people had formed themselves into large extended families to work together on the basics of life. No one single person had to think of everything; indeed, it would be impossible for one person to understand, plan, provision, and accomplish all the tasks necessary for life these days. Thus, our extended families and the localized neighborhood and community links and networks took on major importance for everybody.

As we came out of the initial shock and emergency reactions (better weather really helped a lot with this), we began to think about the summer and about the next winter. Having just had a particularly miserable one, we were highly motivated to make sure the next winter was better. It was possible that the next winter could be worse, much worse. No one was sure how much grain and beans were still in the storage elevators or whether the farmers would be able to harvest their crops this summer and get them to town. This knowledge helped focus our attention and keep people on task.

As summer progressed, the question about the harvest answered itself as more and more farmers brought produce to town -- in the most amazing parade of alternative fuel vehicles that you could possibly imagine. It was like all the rural tinkerers-with-machinery in the entire country had just become some of the most important people around. And all those people out there who have dabbled with alternative energy for years and years suddenly found

that their experience and knowledge were important to people.

The farmers were happy to take Blue Valley and Catholic Bucks, as well as US dollars, or silver, or other informal barter deals. People would post signs at their market stalls, "Need gasoline" or a generator, or hair pins, or whatever. Trades happened.

The farmers also recruited labor. Half our household spent three weeks on a farm helping with the wheat harvest. They came home with enough grain to feed us for a year, more chickens, some jars of honey, seed packets, a ticket good for a late fall meat delivery, and a deal for straw bales which caused the rest of us to whoop with glee. They had interesting stories about farmers' daughters which made the rest of us decide that next harvest we would go to farm country for a few weeks. Those farmers wanted to make sure they would come back again next year.

One of the things we learned from the church people was that we needed straw bales. They would be important to getting us through the next winter. We could no longer afford the obscenely expensive energy expenditure required by our typical American urban houses. The homeless population had skyrocketed, and many of them had become "urban squatters" on public properties, and in the spring they were already dug in, often literally. We weren't the only people to harvest utility poles for building purposes.

When the cowboys brought the pigs to market, the church people asked them about wheat, because often where there's cattle there's wheat. Everyone wanted grain, and the church people wanted straw bales. The cowboy's ears perked up. What's this about a new market? They told them that I thought they could sell or trade every single bale of clean wheat straw that they could bring to Kansas City. The strawbales were for construction or retrofitting of houses and buildings to make them energy conservation. Straw bale construction is ideal for this country and climate. Cool in the summer, warm and cozy in the winter, cheap, do it yourself, accessible, not rocket science.

Nobody in my neighborhood felt up to tearing down their old house and building a new house, while at the same time putting in a garden and gathering and preserving other food enough to feed yourself for the next year, and etc., all in one summer. Plus building a new house involved a lot of trades like plumbing and such that would drive the price way up. It seemed possible and practical to put a layer of straw bales on the outside of the house, and cover this with plaster, and get many of the advantages of straw bale housing while maintaining the familiarity and investment of the existing structure. Think of it as a red neck urban housing make over, a "bale-wrapped house."

As the Kansas harvest began, grain and straw bales began making their way to Kansas City, on vehicles powered by methane and horses and mules and steam and ethanol. We got bricks and chunks of concrete (we call that urbanite) from ruined houses and laid a foundation for the bale wall right next to the original construction. Rebar and cement seemed readily available; I guess there is a lot of this laying around all the time, and with the sudden end of all major construction projects, a lot of product was left sitting around waiting for a purpose. We did our street the old-fashioned way. The farmers delivered the bales as scheduled and we just went down the street, doing each house as a series of neighborhood bale-wall raising projects. The farmers brought extra people with them, and they stayed to help, mostly (they claimed) so they could see how it was done and learn from our mistakes.

So here is Oakley Street, late August that first year. The houses have all grown new exteriors, plumped out with straw bales covered with white washed plaster exteriors (except for where a couple of our more artistic neighbors decided to add some bits of color.). No lawns, most of the surface area was covered with vegetable gardens or animal pens amidst a

series of swales and berms for catching and controlling rainwater. Everybody's claimed part of the street in front of their house for container gardening, and people put in curb cuts to allow water to drain from the street into their yards.

Houses sprouted greenhouses and passive solar sunspaces on their south sides – the idea was too good and useful for people to ignore, an interesting twist to keeping up with the Joneses I guess. Several yards have outdoor bread ovens (these were mostly built in the spring, one of the first construction efforts). Typically, each oven serves about 4-6 families. You can hear cows, pigs, sheep, chickens. You don't hear the roar of traffic, or any gunfire. You do hear people talking, music, and other ordinary noises at a bearable audio level.

You can hardly believe it was the same street.

To tell you the honest-to-God-truth, it was in August when I looked around, and realized that I liked my new life. I was no longer a piece-of-grit-scum-urban-wage-slave convenience store worker. I was part of a family that was part of a neighborhood tribe. We had our own enterprises. We worked hard and we had a lot of fun. We know all of our neighbors, not just casually, but everything there is to know that close friends would know. We're all different people, we are neighbors, and that means something these days. The guys that used to knock on our door to sell cheap televisions and cocaine rocks helped us put the foundation down for our new straw bale walls. We went over to their house, and helped them do theirs. They made barbecue for us and we brought homemade pruno – an alcoholic beverage made from dried prunes. It tastes better than it sounds and kicks quite satisfactorily.

One of our housemates had spent some time in prison. He worked in the kitchen and learned how to make alcohol from anything available in a prison kitchen, from raisins and prunes right on down the list to dried bread and sugar. (We only tried that once.) Before, he was just another ex-con looking for a job. Now people come and talk with him from all over Blue Valley asking his advice about brewing. He's the Brew Master.

We did a lot more than this in getting ready for that winter. The straw bales and greenhouses were two of the most important activities that summer. I like the straw bales. Gives the entire street an interesting look. Maybe it's kind of an art deco-ish southwestern appearance. We just put plain whitewash on over our plaster. Some people on the street got really creative and there are some brightly colored and patterned houses on Oakley Street. You should see the Deadhead's house up the street. It's a work of art!

We learned something that summer that we should not have forgotten during the years before. Build your house so that in the winter you hang onto the heat and keep the cold out. What a concept! And also, build your house so you keep the heat out in the summer, which in its own way is as important as keeping warm in the winter. When we put the strawbales up, we weren't actually thinking of keeping cooler in the summer, even though Kansas City was plenty hot. Finding out that our inside temperature was cooler in the summer because of the thick insulation of the walls was a nice additional surprise benefit.

Our first Christmas

About ten PM on Christmas Eve we could hear them coming. Drums and trumpets, a bagpipe, many voices raised in song, O Come All Ye Faithful, We wish you a merry Christmas, the First Noel, Silent Night, a big crowd of people coming down Truman. Outside on Oakley Street, people walked up the street, carrying candles and torches, to join in the procession. The route wound through the entire neighborhood to maximize participation. Little Susie, dressed like an angel for the Christmas pageant at church, was already at the front door, inviting us

to hurry as if we didn't they would leave us behind.

As we passed churches -- Baptist, Disciples of Christ, Assembly of God, some people would drop out and go in, our group ended at Our Lady Queen of Peace Catholic Church, where we entered a church gaily decorated with holly and evergreen branches, lit with candles and torches where we had more singing and listening to choirs while we awaited the hour of midnight. At midnight, the bells began to ring, and the pipe organ and small orchestra began to play (courtesy of a big battery and an inverter) and we sang Adeste Fideles as the procession entered the Church, led by acolytes with incense, a processional cross and torches. We paused between the second and third verse and the priest blessed the Creche, finishing the third and fourth verses with a loud crescendo of bells, organ, trumpets, and cymbals.

It seemed so normal -- the golden vestments, the decorations, the music -- that it was hard to comprehend how different things were now compared to last year. We still had Christmas, and what a joyous time it was.

We had been preparing since November. After working frenetically through the spring, summer, and fall, we discovered that these new days and their new ways provided extended times for a change of pace, when work wasn't so hard, and what needed to be done could be organized so no one had to work real hard.

Extended leisure time? Who would have thought that would be a characteristic of post-collapse KCMO. We weren't working 9 to 5 wage slave jobs anymore, and so when the winter's food is laid into the pantry, and the fuel is gathered for the winter, a community can afford to shift its focus from survival to other things – like parties, celebrations, and holidays. Talking, reflecting, thinking. Laying around and doing nothing. Reveling in the feeling of not-being-afraid of what the future would bring.

By Christmas, we were ready for some feasting, and feast we did on Christmas Day. We had ham and roast chickens, deviled eggs (with homemade mayonnaise), pumpkin and pecan pies, green bean casserole (made with green beans we canned, mushroom sauce we made, and French-fried onions that we French fried), a dressing side dish made with corn bread, biscuits, and various dried vegetables, a variety of pickles and relishes, in other words, a traditional American Christmas dinner. The end of the world may come and go, Americans are gonna feast on Christmas.

We gave and received gifts, some hand made, some bought or bartered at the Truman Market. A big part of our giving was among households on our street. We gave each family on our street some herb seed packets, including some of the rare plants that we had collected. We received a nice bolt of hand-woven wool cloth from a cooperative of women up the street that had built looms and spinning wheels and traded with farmers for wool and cotton. In the old days, like us, they worked at various minimum wage jobs. Now they are among the leading families of this neighborhood. The cloth is nice and soft, and most ingeniously colored in a rainbow progression.

We had given them some seeds for dye plants as a gift when they showed up at the Market wanting some hand bills made to announce that they had thread available. We did their handbills for free. We needed a local source for cloth. They in turn had helped provide resources for another cooperative that started raising sheep for wool and meat right here in Blue Valley. There was a lot of this kind of thing going on, growing a new and sustainable economic network, one enterprise at a time, with a lot of mutual support, solidarity, and cooperation.

We carefully unwrapped the packages and saved the wrapping and bows for future use. The days of Christmas being the Big Trash Day of the year are long gone. Many packages were wrapped with actual cloth of some sort or another. I was happy I got two packages wrapped in diapers

(fresh and clean, of course). Diapers are about one of the most useful all-around pieces of cloth in existence. It's a pity so many people used disposable diapers in the old days; there was a real sudden scarcity of diapers early on in this transition. If I could send a message backwards in time to the days before the Crash it would include – "Buy cloth diapers!"

On the Feast of St. Stephen (the day after Christmas), the Blue Valley Winter Festival kicked into high gear, complete with a Good King Wenceslaus (people from Eastern Europe settled here in the early 1900s) presiding over games, concerts, speeches, dances. Square dancing is back, like most things, it's evolved a bit, especially in terms of the music. It always retains that Celtic ancestral sound, there were some new rhythms and harmonies. Quite a few new dance steps have been developed. Swing is popular, in fact, there is a type of square dancing that uses swing steps. It's very aerobic. I sit in on the piano sometimes with a swing ensemble, and we do a little blues. Anyway, it was kind of like a Christmas-Epiphany/neighborhood party/medieval revel.

We drank the last of the alcohol from the old days, the rums and whiskeys and wines. We weren't too worried, as just about everybody had jugs of wine and kegs of various kinds of beers, wines, and distilled spirits aging in their basements. The area's Brew Master lived at our house, so we were especially well stocked. When you're making alcohol for fuel, it's not a problem to make alcohol that's primarily for social purposes. So far no sign of revenooers, even though the whole neighborhood was making "shine." We had tasted some of our first whiskey, at the stage when it's raw enough to cure what ail's you. I'm sure it will be a lot better after it's had a chance to age in the oak barrels we learned how to make at the library.

The whole Kansas City area seemed to be one big festival, in different, localized manifestations. Down at 18th and Vine a huge Kwanza festival was a going concern, and they truly had the best barbecue and the best jazz. We walked down there one morning and had a great time before heading back in the late afternoon.

So these are a few of the snapshots in our family album of memories of Christmas in the first year of the Change. It was a time of renewal, and certainly we needed it, because the depths of our second winter were still ahead of us.

Give us this day our daily bread.

As our lives evolved, we learned to make pancakes from cornmeal and how to cook dried black-eyed peas instead of just opening a can. We cooked them initially on a propane camp stove, bringing them to a boil and putting them in a crockpot insert which we then put into a box packed with newspaper (we got this idea from the church people). We were still learning how to do this, so we pulled the peas out a couple of times and heated them to boiling again, which wasn't necessary, oh well, all of our mistakes should be so minor.

It was necessary to get busy on making some yeast-raised bread, however. When the government distributed wheat, and we made our own flour, the church people taught us how to make a sour dough start using flour and water.

Our first bread oven was in the back yard, made from several stones. We used a flat piece of broken concrete for the base, stacked stones around three sides, and covered the top with a final stone. We built a fire in it, heated it up, and brushed out the ashes and coals. We baked our first loaf directly on the hot stone. We burned the first three loaves, the next three were delicious. Even the burned ones were good with the burned bottom cut off. That's the secret about homemade baked goods. Even when you make a mistake, they taste good.

But we knew that we needed something better, so we started accumulating

materials. The church people had plans for a homemade outdoor oven which were pretty straightforward. We scrounged some concrete blocks and ordinary building bricks, some concrete reinforcing wire and chicken wire, a few boards, and traded for cement. In retrospect, I wished that we had bought a dozen sacks of cement and just stacked them in the basement for use afterwards. None of us expected anything like this to happen. If we had thought about it, our whole house would have been stocked to the max, since the signs of the coming collapse were everywhere in the years leading up to the great change.

In any event, cement was readily available in the spring, although people wanted a lot of value for it. Why would I have bought it before all this happened anyway? I wasn't into home improvement. It wasn't even our house then. It was just another old and cheap rent house in a dingy KCMO neighborhood inhabited by losers and left-behinds. We had no place in the modern world order except as wage slaves in service to our "betters."

The construction of this oven was a community event, as everybody was curious as to what we were up to, and while it did provide a large baking area (about 2 feet by 3-1/2 feet), it wouldn't be big enough for the whole neighborhood. Many experts were present and helped supervise the process. Even so we were able to get it built. Within a week, there were a half dozen other ovens in various stages of construction. This added another item to our agenda, as the increased demand for wood for both heating and cooking would eventually put a strain on our wood supply. This suggested a need for cooperative wood lots and other structures for a sustainable wood and energy supply and we had to find ways to keep warm that did not involve burning wood. When we got into methane, we started thinking about how methane could be used to fire an oven like this.

If it's not one thing it's another, as they say, and it was as true on this side of the Change as it was in the before time. Then, it was one bill after another, this money for that expense to satisfy whatever need. We still have those needs and wants, but we're meeting them in ways that often don't involve money. We take knowledge and combine it with creativity and work and some resources to put the daily bread on the table. We are still interdependent with our community and those interdependencies concentrate at the neighborhood level and ripple outwards from there.

A big factor is that we have to really think about the design of whatever systems or processes that we create to replace our old ways. In the past, we were just too rich for our own good. We had unimaginable wealth and power, and we made bad choices. We designed things to fail and wear out, converting capital goods into consumables. Then, when we were finished with it, we just tossed it -- out the window of the car, into the trash can, and didn't think any more about it. We actually threw glass and paper into land fills, mixed up with all kinds of other useful materials, in such a way that the end product was pretty useless for anything!

One of the things I worried a lot about in the beginning was trash disposal, since trash service stopped just before our trash day. In retrospect that was a completely backwards way of thinking.

If you don't think of useful items as trash, but rather as useful items, then you don't think about ways to get rid of them. Instead, you think about ways to use them to maximize the security and quality of life of the household. The trash problem disappeared really fast, as people just couldn't afford to throw things away anymore. The various illegal dumps in the area cleaned up quickly as people foraged for useful items and things they needed. Some of the earliest enterprises that developed in the summer of the Change year involved mining the city landfills.

What we did with our basement.

Our basement is large. The back of it opens onto the ground level of the backyard. I've already told about how we turned the area under the back deck into our biogas digester room. Here's what we did with part of the rest of the basement.

There was one large room and several smaller ones. We lined the walls and ceiling of the large room with aluminum foil (making the walls and ceiling light reflective). We set up tables and gathered up all of the little containers that we could find (yogurt, cottage cheese, egg boxes, etc.) We transformed those little cartons and containers into seed starting containers, and placed them on the tables. We hung two fluorescent light fixtures down low over the tables (four bulbs total) and planted our seed. We prayed a novena to Sts. Isidore and Maria, patrons of farmers and gardeners. What can I say, I hadn't been to Mass in a long time before all this started. When civilization crashed . . . suddenly going to church seemed like a good idea. We would have gone down the tubes if it hadn't been for the church people.

The truth about our little basement greenhouse was that one of our housemates used to grow pot in a basement and so he was an expert in growing things indoors. And we needed such an expert. He was hungry too, so we were all motivated. So we created the classic indoor marijuana garden in our basement, only instead of growing marijuana, we grew veggies under lights.

How did we run the lights? We didn't have a generator, we did have a lawnmower and we had several vehicles. We rigged the lawnmower engine to run one of the automobile alternators, which charged a battery. Our roommate the former pot grower had grow lights and a small inverter from his previous residential "garden." I know it sounds crazy, it worked. One of our housemates was a pretty good mechanic, and he rigged it up for us. He claimed he had seen something on the internet about how to do this. Now we use the neighborhood charging station. Actually, we sold them our lawnmower-alternator system when they opened up.

That gave us enough power for the radio and in the early days, we listened to a lot of CDs. Now that there is so much live music everywhere, CDs aren't as important nor as interesting. It really is amazing how many university trained musicians there were out there working at non-music-related jobs, until civilization crashed. We occasionally brought one of the light fixtures upstairs if we needed some good quality extra light after dark.

When we started making alcohol fuel, the charging station up the street converted the lawnmower engine to run on our home-brew. We traded a half gallon of gas for additional light fixtures, and expanded our basement nursery as much as space allowed, moving beyond using it for starting to growing vegetables full term to harvest. We had a bunch of squash and pumpkin seeds saved from squashes we bought grocery stores when we dived into the panic buying spree early in the devolution. We used five gallon plastic buckets for the larger plants (tomatoes and winter squash). We filled them to within a few inches of the top with dry leaves, with about 4 inches of topsoil on the top. We fertilized regularly with a compost tea we made in the backyard. These buckets did not have drain holes; instead, we stuck a wooden stick in each bucket. As long as about 4" of the stick above the surface of the container was wet and glistening, the bucket was OK. If there were five inches, it was time to drain the bucket a bit; if there were 3 inches, water was needed. We fertilized with our own urine, diluted one part urine in ten parts of water.

You'd be surprised how much food you can grow in buckets. We were.

We were even more surprised when we learned about aquaponics. By the second winter, we had reconfigured the basement growing area as an aquaponics system. We fished catfish out of the river and stocked tanks we built in our basement

with them. One of the housemates had some goldfish in a bowl that he had managed to keep alive. They grew pretty big in the aquaponics tanks and are not bad eating. The catfish and goldfish do what fish do and that fertilizes the water, which we pipe into growing systems we built that produce greens and radishes all winter long plus we get fish. Instead of going to the river to fish, we just head down to the basement.

When we go shopping, our trade goods include some gold and silver we'd accumulated in the summer, various Bucks currencies, some US currency, spare parts, and shoots from our cinnamon tree plus some other useful seeds. We have rabbits, chickens, pigs, fish, and we participate in a beef, geese, and dairy cooperative. Our membership in these cooperatives entitles us to a division of the production, and requires us to furnish labor each month. Most of our labor share is the gathering of forage for the livestock or helping with the milking and cheesemaking.

Here it is February, about a year after things began to collapse, and we have green salad and fried catfish for dinner tonight, from our basement and back porch, with sourdough bread and a dried peach pie for dessert.

We weren't doing this well in February a year ago. Our margins were dangerously thin. We had to jump out of our box and do some new thinking about these radically changed circumstances.

All the vitamin pills in KCMO were eaten last year and these days you can't find manufactured medicines like that. All pharmaceuticals are hard to find and expensive and so we have to pay attention to our nutrition and avoid accidents. The thinner your margins, the more careful you have to be, the less room you have for carelessness. Throughout all of the first year, except toward the end, there was a real sense of uneasiness, as though we were perched right on the edge of a precipice, and could go falling over it to utter doom with the slightest of provocations. The danger was its own stimulation, in that it helped to concentrate our minds and make us creative, plus people worked hard. There was a brief fad that blew up in midsummer, when everybody told Donner Party jokes. People would laugh – it was hard not to shiver thereafter.

Many things that we used to take for granted now require attention and work. And some things that we thought were important and took a lot of our time and attention and money in the old days are no longer relevant. That's just the way things are in life. We are all on a journey together, and the road has taken a curious twist.

Dinner tonight was a salad plus stove-top noodles and cheese. We made our own egg noodles from our household's eggs and whole wheat flour we ground in the kitchen. The cheese came from up the street as did the cream and butter. I am sure I have never tasted anything so good in the old days as that homemade stove-top noodles and cheese. I like my life now. It seems more honest.

Homelessness

As the collapse proceeded, the homeless population in the United States mushroomed. People were stranded all over, sometimes with only the clothes on their back and a couple of suitcases, maybe a car emergency kit. If your credit card doesn't work, you can't buy gas. If you can't buy gas, you are stranded wherever you run out of gas. Shelters immediately opened in churches and schools, but the experience was tremendously dislocating for all concerned.

McCoy School in my neighborhood was one such shelter. It was an old building, fortunately, built solidly in a previous era, its chimneys were still in place. The place was kept warm initially with a combination of propane, kerosene, and wood. The food -- especially after the first week when the MREs ran out -- wasn't anything to write home about.

The psychological effects of this were immense, especially on those caught in holiday traveling. Many of these people were not accustomed to inconvenience and disaster on this scale. Their cell phones, portable computers, and credit cards wouldn't work. They couldn't buy gas, airplanes weren't flying and the buses and trains were shut down. At the McCoy school, I met bank and university presidents, politicians, and various other members of the A list, who now were refugees in a public grade school in a part of town they probably didn't even know existed before this happened. Most were hundreds of miles away from family and home, and had no prospects of getting there in the foreseeable future, and no way to contact their people to let them know what was going on.

McCoy School had a cross-section of American society, and they all had one thing in common: their status was "homeless refugee." Fortunately, there were poor people among them ("fortunately" for the upper class, not necessarily for the poor) so there was an opportunity to share "poverty skills" with the New Poor. The average upper class person in the United States doesn't know much about how to go about being poor, so it was a true culture shock.

As January progressed, the numbers of homeless people swelled. By the end of January, the public soup kitchens menu was a porridge made from cracked wheat, raisins, powdered milk, and oil. They fed the people in the public shelters and others who had access to a heated shelter but had no food.

The Harvesters organization, which in the old days supplied pantries and soup kitchens with the excess of the cities' restaurants and markets, continued to supply food throughout January to pantries and soup kitchens, although increasingly it was wheat and soybeans, and deliveries were only once a week. Many people gave them gasoline and diesel, which enabled this ministry to continue, as well as food. Harvesters remembered the large terminal grain elevators along the Missouri River first of all, in fact, the general manager of one such operation was a volunteer, and was quick to open the doors and fill up the Harvester's trucks with wheat, soybeans, and other grains. There were millions of bushels of such grains within the city limits, so it was an obvious solution for the entire region. The problem of course was getting it around. That was managed, just barely. Typically, all of the soup kitchens in a given area would send people to a central distribution point, and then the food was hand carried back to the soup kitchen.

Many factors contributed to the homelessness problem. Some landlords illegally evicted people. At first, the courts were open. They operated under a special martial law, and concentrated on criminal matters, with all civil cases, including legal evictions and foreclosures, put on "hold" for the duration. What would happen is that a landlord would show up with some toughs and put the people right out on the street. This continued to the end of January, as few people in the poor part of town could pay their rent – government benefits such as section 8, TANF, Social Security, and food stamps did not arrive that month.

After a family froze to death after being put out on the street, the military and the police started to arrest landlords for making such evictions and the practice stopped. Landlords either abandoned their properties or worked out new deals with their tenants. The good landlords came out in a positive way, because they already had good relationships with their tenants. The slumlords, however, lost everything. In this new world, being a jerk was not a positive survival value, and jerks who got people killed were seen as criminals.

Other people couldn't heat their dwellings, and went into public shelters or (as happened on Oakley Street) found refuge with neighbors. Some people suffered fires -- with all the improvised heating arrangements, there were more house fires than normal, and without the ability of fire departments to quickly

respond or water pressure to fight the flames, most such fires completely destroyed the dwellings. There were some serious apartment fires, which hastened the exodus from the big apartment buildings.

Thus, by the first of February most emergency shelters were packed. They were orderly, the big ones had a small military unit attached, and people were cooperative. All of the shelters were equipped with CBs, and most managed to have radios tuned to the remaining stations, especially short wave. There was a certain amount of huffing and puffing the first week. That disappeared quickly. A lot of high stress corporate survival strategies (e.g., backstabbing, non-cooperation, winning through intimidation, extreme cynicism, radical selfish autonomy/individualism, whining/pouting/tantrums, being a general jerk etc.), became sudden liabilities. Big liabilities, as in, you could get put out of a shelter, so people behaved, not just out of fear, but rather because most people are better than most people will concede.

We always worry about what "other" people will do -- that is, people don't worry that "we" will riot and rape. They think that “others” may riot, turn lawless, act violently, and be criminal. Most of the possible "theys" are just people like you and me, and certainly we aren't lawless rapists, rioters, and criminals, even when we got a bit on the hungry side. In some respects, civilization turned out to be fragile. In other respects, it turned out to be more durable and stable than we thought. We had made the mistake of assuming that our technology and material goods were our civilization, when in fact, they are only parts of who and what we are. We are a clever and industrious species, and when one set of tools and toys was taken away from us, we immediately started building new tools and toys, and perhaps this time we will learn something from the mistakes we made in the old days.

The new important survival values were the abilities to get along with others, to cooperate for mutual support and security, to improvise and be creative, to put up with inconvenience and problems without undue complaining, to see both the long and short term, to break out of existing envelopes and modes of thought in favor of new thinking about the new problems of life, the universe, and everything, and to see the spiritual realities that are far more stable than any mechanical construction.

All of the shelters organized program activities; given the eclectic groups that ended up in most places, there was staff for a pre-k through university school, plus all kinds of specialized skills that could be shared or used for the benefit of the group. Self-help groups organized and met regularly; Alcoholics Anonymous was there, and schools started. Babies were born and people got married. In short, people started to put their lives back together again, adapting to their new circumstances.

Many soup kitchens that were not equipped with grain grinders improvised them from metal water pipes – three bound together with duct tape. They ground the grain by pounding and grinding with the ends of the pipes. It was very labor intensive, but there was a lot of labor. They used sausage grinders to grind soaked soybeans.

Some of these homeless people, perhaps sensing immediately that something was up beyond the traditional electricity blackout, went out and "homesteaded" parks, and other out of the way public spaces. There was so much going on that the police and the military left them alone. Typically, these people would scrounge tarps, sheet plastic, plywood, poles (utility poles, trees, etc.) and tires and build earth sheltered homes that when heated with wood, were actually quite cozy, if unconventional in appearance. People from churches and community groups visited and provided expert advice about issues such as sanitation. New little villages and neighborhoods were born.

We helped one "improvised" family (a number of single travelers who met in a

shelter and decided to hook up as a survival household for the duration) build a nice and cozy home. Here again, there were lots of experts present,. Even so we managed to get the place built. Swiss Family Robinson had nothing on us northeast Kansas Citians! As spring bloomed, there was a mass exodus from the homeless shelters in schools and churches in favor of this kind of construction, plus many occupied abandoned properties and structures. There were new people in our neighborhood, and many of them lived in unconventional dwellings.

In a disaster situation, people often fall into a "monkey-see/monkey-do" behavior. If there is a line waiting to ask for necessary supplies, it is not unusual for people to ask for exactly what the person in front of them asked for, even if the first person's list has items that aren't needed by the second person (an extreme example would be the first person being a woman asking for sanitary napkins, and the second person being a man and asking for the same thing). This kind of behavior was often observed in homeless situations in the old days, and thus it wasn't surprising to see it happening in these new and stressful circumstances. It has some advantages in the present situation. The example set by those who exited the shelters early to take control of their circumstances by building improvised housing on public lands, was followed as the weather got a little better by virtually all of the others in the shelters.

This same kind of creative thought and smart work went into other things needed by these refugees. People modified blankets as ponchos -- which, by the way, were de rigueur for post-Crash winter fashion. Everybody wore them. People made those large #10 cans into stoves, ovens, and buckets. We discovered a thousand uses for wire coat hangers.

Thus, as the year progressed, the homeless problem resolved itself through poor people being empowered by their circumstances to help themselves. This isn't what most people thought about when they thought about solving the homeless problem. In the old days, many systems operated to keep poor people poor. In these new days, all of those disappeared. People were free to use creativity and hard work to make their lives better. Many people experienced a larger return from their personal effort or work after the Collapse than they received during the before time. It was different work than they were doing before, but like the minimum wage workers up the street who became respected and skilled weavers, honest, hard, and smart work brought success in the new world. Hey, look at us! We were mostly peon convenience store clerks. Now we run a newspaper and printing business and have a successful market stall.

Of course, people's definitions of "success" radically changed, and not a moment too soon, if you ask me.

Civil Society and how it saved our bacon

Throughout that first January, there was a gradual slow down of activity, especially for the government. Mail delivery stopped in the third week of January, the last of the services to go.

Here in Kansas City, except for the police and fire departments, local government was pretty much gone by mid-month, the offices were closed. I wasn't too surprised about that. I was glad to see the police remain active. That thin blue line never looked so good. In the best of times, Kansas City government was pretty dysfunctional; our entire emergency preparedness department consisted of a single administrative assistant, whose primary resource was a big book full of phone numbers. The KC Star had recently run an investigative report that claimed that many of the phone numbers were wrong.

So I wasn't betting any farm on Kansas City government as an active player in the recovery, and was right in that judgment. The most useful thing they contributed

wasn't until March, when the city council managed a meeting and, in response to a request from a coalition of civil society organizations, authorized the "bucks" alternative currency program. If the water department had waited on instructions from city hall, there would never have been a resumption of water deliveries to city residences and businesses. Indeed, if it hadn't been for the support and organizational skills of civil society organizations, it is possible that city government could have disappeared entirely.

The myriad of community and religious organizations, ethnic associations, clubs and etc. that exist in our communities saved our bacon on many occasions. As politicians deserted their responsibilities, civil society stood firm in the breach. Churches opened their doors as shelters and soup kitchens, ethnic associations organized self-help and rescue operations, specialized clubs contributed their expertise -- the ham radio associations as usual did a major service by providing communications. Ministers, priests, imans, and rabbis reminded us of our duties to our neighbors. Gardening associations taught people how to build greenhouses, cold frames, and start seeds inside for early planting. As snow melted, they assisted in selecting large community garden locations and helped prepare them for planting.

In the beginning, there was little or no coordination among groups except for those closely associated geographically (such as churches and schools). It would have been nice if there had been some coordinated plan that everybody could have implemented from day one. Nothing so prudent had been attempted locally. Instead, these groups and organizations each looked to the situation it was immediately in, and took action to resolve the challenges and emergencies as they presented themselves. As people knocked on doors of churches for help, shelters were born. Custodians and deacons went in search of propane and kerosene heaters. The Altar Society started cooking dinner for 500 people. The Knights of Columbus went door to door, together with the Mormon elders and the evangelicals and Jehovah's Witnesses. People took things one day, sometimes one or two hours, at a time. "Let's get through this and then see what we need," was often heard in those early days. We never borrowed any trouble from tomorrow, because we had enough trouble with each day as it presented itself to us.

The advantages of civil society in the situation were many. There were on the ground, in the neighborhoods, and had existing communications structures that could be utilized in the present emergency. Most of all, they had structures of trusting relationships and action that could be brought into play. Times of great stress are hard times to build trusting relationships; it's better to get to know people in advance, and community organizations were full of people who already knew and trusted each other and had a track record of working together on projects.

Religious and civil society organizations had authority. In a time when "we the people" had truly been let down by major authorities and structures in our lives, this residual religious and civil authority was precious. It's hard for a devout Catholic to say "no" when his or her priest gets insistent, for example, and many priests got downright insistent in January and February with their congregations. The same was true for religious leaders of other denominations. All religions have a core set of beliefs and practices that derive from past emergency situations, and the institutional memory of such organizations is long. In a time of grave trouble, one of the most important things is for leadership to set an example of strong, proactive, and positive response to an emergency, especially in a situation where there is a serious possibility of a cascading series of events that lead to a highly dysergistic and negative outcome.

One government agency that showed strong leadership was the Outreach Extension of the U of Missouri. They provided all kinds of assistance regarding

food production and preservation. I found myself wishing many times that we had had the foresight to build a community canning kitchen before all this happened. Oh well, hindsight is always 20-20, it's foresight that is hard to resolve to a correct focus. Before all this happened, I didn't know how to garden, I barely knew what canning was, so the thought of building a cooperative community canning kitchen would not have been on my radar even as a remote stoner thought.

Schools made significant contributions, both as shelters and as resources for learning and rebuilding. There are many teachers, and they did not disappear when the phones went dead and the electrical system failed. The same is true for the librarians, whose presence suddenly became one of the most important factors in a positive recovery. Libraries opened early, and some only closed for a week or so. If we ever get around to building memorials, surely there will be several to the librarians who helped us find the knowledge and data resources we needed to dig ourselves out of the hole we had gotten ourselves into.

We know on many levels (spirituality, instinct, experience) that structure is necessary for human community to work. And we know how big a problem this has been in our history. Knowing the mistakes that have been made in the past, people were frightened early on as to what might happen with the government. Should we be worried about the national guard patrolling the streets? Or should we welcome this as a sign of stability and commitment to law and order? . If the old structures go away, what shall we replace them with? Who's to say we won't end up in a worse situation than before?

Civil society played an important role in processing such fears by reminding us that our civilization is much more than mere technology and that most people are better than we think they are. We have been taught by repeated exposure to advertising that we are nothing more than the sum of the products we consume. If we don't have X new and pricey gadget, or a Nike "swoosh" on our clothes, or possess some other substitute for a real life, we are nothing at all. Unless we obey our corporate masters, we fail our civic duty. Spend More -- Buy More was the mantra of the old ways.

This dysfunctional structure created an unstable and unsustainable economic system that was little more than a stack of cards waiting to be knocked over. Everybody was locked in -- credit card payments, mortgages, new clothes every fall and spring, new car every third year, insurance payments every month, student loans -- wealth constantly transferred from the productive to the idle rich, all of life being monetized and politicized by a myriad of structures that rewarded those with political access and punished those without power. Government had become a zero sum game where for one group to prosper, another must be impoverished, and the only ones coming out ahead of the game were at the top of the pyramid. A constant and unrelenting war of aggression and theft raged against the poor. In the old days, the bankers and politicians squeezed the middle class to death -- a small portion made it into the upper 20%, the rest slowly dropped into the working and poor classes. Government statistics suggested that 45% of white families and 75% of African American and Hispanic families would be in danger of homelessness within 60 days if their incomes stopped.

And then our economic and technological infrastructure collapsed. Suddenly, there was a great equalization of poverty. Civil society helped us to focus on what was immediately necessary -- shelter, heat, water, food -- and the religious organizations, in particular, helped us to remember our duties and obligations to our neighbors. In the Old Days, there was some thought that people, as individual families, could stockpile food in their basement and survive a crash when all around them starved. Even in those days, this was a fantasy. Some people thought they could get away with it. Sure, it was vitally important that people store food. People who thought they could eat while

their neighbors starved were mistaken about the way things work. Fortunately, when push came to shove, there was little of this kind of behavior. Those who rejected helping others were left alone, and most all of them had a pretty hard time of it in their fear and isolation. Their thinking was mired in the old ways; they didn't realize just how necessary it was to be part of a functioning community. Their attitudes were influenced by the arrogance common to the Old Days, "I've got mine and that's all that matters." Those who couldn't adjust to the new and more cooperative way of life tended to leave the neighborhoods; who knows what happened to them, I hope they found someplace where they could live in peace with their neighbors.

We needed to repair and re-create our technological infrastructure and our ways of thinking about ourselves and other human beings. In religious terms, this became a time of great metanoia – a turning from bad to good. It's a shame it took something like this to bring us to our senses. Sometimes a bit of world-shaking is in order, especially when a system is as ruthless as was the America Empire.

So just in the nick of time, the cavalry did ride over the hill and save civilization, but it wasn't necessarily the government's cavalry. As it turned out, the cavalry was from the Lion's Club, the Queen of Peace Catholic Church, and the Northeast Kansas City Women's Literary Association.

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09151 Printable Flyers

Sometimes it takes a natural disaster to reveal a social disaster. – *Jim Wallis*

The first version of these "Printable Flyers" was written in 1999. You can download PDFs of these documents, suitable for copying and free distribution, at www.ipermie.net.

Introduction

These flyers provide information for immediate community organizing/grassroots mutual aid response in the event of a catastrophe/crisis which overwhelms normal emergency response systems.

Everyone reading this should print these documents, and copy them in advance of need for distribution later. Store them for use in the event of a seriously punctuated equilibrium, a/k/a TEOTWAKI – the end of the world as we know it.

These flyers may be printed and copied in any quantity for free distribution, by the express permission of the author, Bob Waldrop.

What are Printable Flyers and why are they necessary and useful?

Unjust and irrational economic and political structures afflict the world. We face multiple threats including resource exhaustion/peak oil, climate instability, and economic irrationality and collapse. An unsustainable system will not go on forever. Unless we relieve the stress and make the system sustainable, it will eventually collapse. We hope that a "soft landing" can be engineered for our currently unsustainable systems of economics and politics and lifestyle, but just in case we are wrong. . . or you get stuck in a disaster when help is delayed. . . or there's some sudden need to jump start a sustainable society real quickly. . .here is a selection of "printable flyers" we hope would be useful in such a situation.

Emergency service organizations have great contingency plans for most "ordinary" disasters (weather events, other localized disasters, etc.). We should all be concerned about the response of governments to what would be a continent-wide disaster/collapse. For example, I asked around here in Oklahoma City and local government has no contingency plans for protecting the families of emergency responders in such a situation, so that the police and fire departments can go about their duties confident that their families are OK. How long will they stay on the job if their families are at risk?

The Government's emergency plans bring resources from other areas to help the area in trouble. They don't ask and thus they don't answer the question - what happens if no help is available from outside the disaster area, because the disaster is continent-wide?

As far as I know, these printable flyers are the only community response materials for such a situation available on the internet.

The time to make contingency plans is before the situation collapses, and the most basic thing you can do is to download these flyers and copy them in advance of problems so that they are available when you need them.

And absent a collapse or destabilized situation, they have useful ideas about sustainable living and the importance of knowing and working with your neighbors.

How to use these printable flyers.

My theory on crisis leadership is that "they who get there the firstest with the mostest" have the best chance of carrying the day.

Imagine the situation, a few days after everything pretty much slides into perdition. Maybe its been coming over a period of months, maybe its quick, like an EMP attack. Your neighbors get together to decide on what to do. You show up with copies of the printable flyers. Immediately, the flyers are the focus of discussion. Instructions! You brought instructions! Written instructions! The system conditions us to follow the instructions, and here you are, with some instructions for a situation most of them have never ever thought about or considered possible. You gain cred because you contribute something useful.

Your neighborhood is not out of the woods yet, but now you have a plan, concrete actions to work on, something to do. Useful work that addresses the immediate needs of a complex disaster situation is the best way to process the feelings of panic and powerlessness that most people would be experiencing in such an unprecedented situation.

Besides your neighbors, think about your local government. After you meet with your neighbors, send a delegation downtown to city hall, and make enough of a polite nuisance of yourself to get yourself and your copies of the printable flyers in front of someone with some authority. Here again, you've brought instructions! Better than anything that FEMA has, ideas that even your local emergency services director hasn't thought of. Practical instructions that fit the circumstances, that weren't dictated by bureaucrats from far away.

To give yourself authority, give yourself authority. As you print and copy the printable flyers, start an informal organization. Call it "(Whatever the name of your town or area is) Mutual Aid". My group is Oklahoma City Mutual Aid. We've had a workshop to discuss our options in the event of a collapse situation here in central Oklahoma. See the details at http://www.energyconservationinfo.org/okcmutual.htm. If someone asks, "What is that?, answer - "We are an informal group of people concerned about community resilience in the face of major and grave challenges." While the copy shops are up and running, make yourself a professional-looking laminated ID card with your picture, signature, a logo (find a graphic of two hands clasped, or two people shaking hands), and the name of your organization. Punch a hole in the top for a lanyard, and voila, you look just like everyone else who has some authority.

All the other emergency workers will be wearing something like that, and if your community is of any size at all, somewhere there will be a committee of these emergency workers meeting, and your goal should be to get invited to those meetings. Bring your printable flyers, and you will be there the firstest with the mostest.

The alternative could be a take-over by what Kunstler calls the "corn pone fascists" or even worse. Disasters always bring out the best and the worst, and if you wait around and do nothing, you are at risk of being at the mercy of the worst. Don't wait for the best to come out in others, YOU are the BEST already. Step forward, teach, suggest, coordinate, be a good example.

But if you don't download, print, and make copies now, you won't have the instructions to use in your area when times get tough. Don't delay, print today! Procrastination is the thief of time.

Besides these flyers, you should go to the following URLS and print the documents indicated, which contain important and

useful information in the event of a "quick crash".

Everything Nice Stove Instructions!
http://worldstove.com/wp-content/uploads/2009/11/EverythingNice_Stove_Instructions.pdf

This is a pyrolizing stove that produces a hot flame with little smoke, and the end product is biochar, which can be used as fertilizer.

Building a small slow sand water filter for individual use.
http://www.shared-source-initiative.com/biosand_filter/new_filter.html

Complete plans, with pictures, for building this low tech water purification/filtration device. Water purification in a disaster is a big deal, and once constructed, this works by the simple flow of water through its system.

Simple Critical Infrastructure Maps.
http://www.resiliencemaps.org

Identifies the fundamental threat in a disaster situation as the "six ways to die" -- heat, cold, illness, injury, hunger, thirst. Illustrates the infrastructure that prevents deaths from these fundamental threats from killing us at these levels of complexity – personal, family/household, village, town, region, country, world.

Hexayurt
http://hexayurt.com/

This is a simple emergency shelter that can be built with common materials by amateurs.

Oklahoma City Mutual Aid
http://www.energyconservationinfo.org/okcmutual.htm

Links to notes developed at a workshop in Oklahoma on the theme -- "What do we do here if civilization crashes?"

These next two sites archive enormous amounts of information, all of which would be useful if civilization crashes. Download and print as you have time, resources, and interest.

The Gupta State Failure Management Archive
http://archive.org/details/TheGuptaStateFailureManagementArchive

This is a large archive of material compiled by Vinay Gupta regarding options and management in the event of "state failure" -- the collapse of existing systems.

Compendium of Useful Information
http://www.energyconservationinfo.org/compendium.htm

Access to more than two gigabytes of useful how-to information, compiled by Bob Waldrop, and added to at irregular intervals.

The Time To Build The Cellar Is Before The Tornado Hits

Printable Flyers Supporting Home and Community Scale Disaster Preparations

The various disasters of the last few years have taught critical lessons:

When the going gets rough, your local, state, and federal government may leave you behind for the wolves to devour.

A large disaster – and/or several disasters coming on at the same time – will stretch the ability of the government and private aid agencies to respond adequately.

Government disaster response agencies are plagued with politics. Their decisions are not always made in accordance with the best practices of disaster response. Politics can delay or reduce to the point of inadequacy government responses to disaster. Your mileage may vary with this issue, depending on local conditions and the disaster.

Even with the best of intentions, the government can't do everything, be everywhere, or rescue everybody. During disasters, people may be left to their own resources for an extended period of time. The cavalry may not always come riding over the hill to the rescue.

Besides weather-related disasters, we are at risk of terrorism, military attacks, financial crises, resource exhaustion, & collapse of irrational economic structures. Some disasters, such as an "Electromagnetic Pulse" attack, could affect all of North America. An EMP would destroy all electrical generating and distribution systems on the continent. It could take years for them to be replaced.

We depend upon a long and fragile supply line for gasoline and diesel. There are a hundred things that could happen as early as tomorrow that could break that supply chain. If the fuel stops, so do the trucks that haul groceries. Most major supermarkets only have 3 or 4 days of food in their inventories; if the trucks stop, their shelves will be quickly stripped by panic buying.

The purpose of these "Printable Flyers" is to give general, basic information on coping with a fast-acting, long-lasting disaster where rescue will be delayed. Make copies of these flyers now, so you will have them ready if they were needed. Everyone hopes that something like this would never be needed – but if it is needed, the copy shops won't be open. So make lots of copies now, when they are cheap and access is plentiful. When your neighbors need the info, you'll have it for them. That could make a big difference in your neighborhood. The time to copy your printable flyers is before the grid goes down and the copy shops close.

Printable Flyers Table of Contents:

-- The seven habits of personal, family, and community resilience.

-- Mutual Aid for First Responders to Extreme Civil Emergency

-- What to do in an extreme civil emergency.

-- Disaster preparations on a limited budget

-- Building community during a major disaster

-- Community food projects during a major disaster

-- Food preparation and safety

-- How to make and use a hectographic duplicator.

-- Hygiene, trash, and human waste

-- You never miss the water until your well runs dry.

-- Keeping warm in a winter weather emergency.

-- Managing winter energy bills.

-- How to be comfortable and safe in the hot summer.

NB: the Extreme Civil Emergency flyer is customized for central Oklahoma. At www.ipermie.net, you will find a rich text version that you can download and customize for your particular area.

THE SEVEN HABITS OF PERSONAL, FAMILY, & COMMUNITY RESILIENCE

Resilience is the ability to successfully meet and surmount challenges, obstacles, & problems.

1. Solidarity and cooperation. When the going gets rough, nobody gets thrown to the wolves. This is a basic principle of a human civilization of life and love. Our first concern is naturally for those who are closest to us, but that can't be the extent of our involvement. Our families are only as secure as our communities, and our communities are only as safe as the world. Studies of past disasters show clearly the importance of cooperation in successfully meeting and surmounting a serious challenge. The more solidarity and cooperation that is evident in a society, the more resilient it is when faced with big problems.

2. Creativity and adaptability. Sometimes problems that seem big need to be viewed from a different angle of observation. We get enclosed in boxes that limit our ability to see an entire picture. A rapidly changing world means we have to get out of our boxes in order to see enough of the picture that we can authentically respond. Sometimes we need to see the possibilities of new relationships, new connections, new uses for old systems or machines or resources, or new ways of using those systems to do new things. The ability to creatively meet changing situations is a positive indicator of community and family resilience. If systems break down, we must discover new and better systems that are not so brittle and vulnerable.

3. Pro-activity. Either you will act on a situation or it will act on you. A decision to do nothing may be a decision to make the situation worse. A problem won't get better by itself. A flat tire is a flat tire, it has to be changed. Standing there and wishing it were otherwise, or denying that the tire is flat, gets you nowhere. Positive action in support of safety and security is evidence of resilience in a family and a community.

4. Prudence, preparation, and planning. While the world is full of blessings and opportunities, it is a risky and hazardous place. We know this and so we tell each other and our children stories and proverbs about watching for dangers and taking precautions. Look before you leap, watch where you're going, a stitch in time saves nine, an ounce of prevention is worth a pound of cure, these are a few of the ways we teach the importance of watching out for yourself and others that you are responsible for. The point of "watching out" is to avoid trouble, or manage it when it is inevitable. Cultivating the virtue of prudence & its associated discipline of sustainable living helps a family or community successfully surmount challenges.

5. Responsibility. Civilization works in part because most people willingly assume responsibility and carry out their duties. Your social responsibilities include making a best effort to ensure that your own household is as sustainable as is practical for your circumstances. The more people that assume personal responsibility and carry out their duties in life, living in a more rather than less sustainable way, the more resilient is the community. In a time of rapid change or disaster, everybody must accept responsibility for maintaining community values, order, health, and safety.

6. Awareness of environment. It's easy to get into the routine of life, and go through the motions practically oblivious to what everybody else is up to. We trust our environment because we know it well and have a handle on its risks. But there are times when things change fast and thus normality is disrupted. Such disruptions can be prolonged. To cope with rapidly changing circumstances, we must practice our ability to observe, understand, and be aware of our environment -- its opportunities and its risks.

7. Holistic methodology. We live in an age of specialization, but life has plenty of reminders that there are some things that everybody should know how to do. The crises and challenges of life at this time in place and history call us to expand our horizons, to look for solutions in many different places and peoples. Nobody is an island, we are all connected. We can't cope with particular local situations in isolation from other global issues, because global issues inevitably work their way down to the neighborhood and there is a spiritual reality that unites us. Times of rapid change, disasters and disruptions of life as we know it can stretch pre-existing stresses in a culture to the breaking point. Thus, we must bring all that we have and are -- values, reasoning ability, knowledge, spirituality, faith, prayer, relationships, and cultures -- to the table in the search for solutions to the grave problems which afflict all who live on this planet.

Better Times Emergency Notes

MUTUAL AID FOR FIRST RESPONDERS TO EXTREME CIVIL EMERGENCY

The day will come when fuel prices are sky high, supermarkets will be rapidly emptying, banks will have long lines and may even be closed. Government at all levels appears in disarray and nothing they do seems to help. The only predictable thing about this moment of "punctuated equilibrium" is that it is unpredictable in its timing and its details. This flyer suggests mutual aid ideas to facilitate rapid and authoritative response at the grassroots to such an unprecedented situation. If the good guys and gals don't get there the firstest with the mostest, someone else will.

Gather a small group of helpers. Ideally, this is a group forms pre-crisis, and you already know and trust those involved. If you haven't done that, proceed as best you can. There is a lot that needs to be done, and many hands will make for lighter work.

Give your group identity and authority. Or operate under the identity/authority of an existing organization. In a serious crisis, identity and authority are often one and the same. Authority derives from authentic leadership that offers practical suggestions for adapting to rapid changes and mitigation of dangers. Think and act "servant leadership."

Develop a communication infrastructure. You must be able to communicate with your group, the people in your area, and with your allies elsewhere. If electricity and a copy machine are available, that's great. If not, build a hectographic duplicator. Put up bulletin boards at major intersections/gathering places in your area (e.g. police and/or fire stations, grocery stores). If radio works, use Citizens band, Family Radio Service, or Ham radio to facilitate communications. Set regular contact times, frequencies, and develop/use codes for sensitive/dangerous issues.

Get your plan ready. Use the Simple Critical Infrastructure Map method http://www.resiliencemaps.org to identify primary threats and design your response. Here is a summary in case you haven't downloaded it, the crisis is upon you, and the internet is down: (1) Six primary ways to die – too hot, too cold, hunger, thirst, injury, illness. (2) 3 sets of essential services protect us – Shelter (too hot, too cold), Supply (hunger, thirst), Safety (illness, injury). (3) 7 layers of infrastructure: person/individual, household, village or neighborhood, town, region, country, world. (4) 4 tiers of cooperation – individual, group, organization, government. (5) 4 factors necessary for group formation – communications, space (to meet/plan), transportation, resources. (6) 3 necessary items of social infrastructure for organizations: shared map (knowledge of the area/situation), shared plan (ideas for response), shared succession plan (what happens if leaders don't lead or make too many mistakes) (7) 6 major problems in maintaining infrastructure – neglect, time and wear, operators/skilled personnel, necessary system externalities (such as fuel for a power plant), economics, violence/disaster. (8) 3 effects of infrastructure failure – services become unavailable, service prices rise steeply, service standards drop (e.g.. dirty water, random blackouts). The results of infrastructure failure range from minor inconvenience to mass death. (9) 4 primary infrastructure delivery paths – produce on site, grid services, delivery, fetch/carry.

Get the word out. Use the Extreme Civil Emergency flyer and/or develop your own printed communication that identifies/explains the major threats and how to mitigate/adapt to them. Tell the story! Develop talking points for your unique circumstances and get people out talking. Bring back the town crier if necessary. Get there the firstest with the mostest!

Call a neighborhood meeting. The Shared Critical Infrastructure Map system provides an excellent method for working through a meeting process so that you develop shared maps, shared plans, and resolve leadership questions. As you identify issues, use the common experience/knowledge of the group and the printable flyers to develop responses.

Start a neighborhood safety/security patrol. If the telephones aren't working, tell people to put something red on their front door, window, or fence if they need help, green if they are OK, and yellow if they have knowledge/resources to offer. Organize resistance if anyone attempts to take advantage of the situation. Stop any effort to interfere with necessary survival projects. Beware of the tendency of people to resort to bad behavior/habits when under stress. Disasters/crises always bring out both the best and the worst in people, so plan for this from the beginning.

Secure/protect critical infrastructure/resources. Offer assistance to police, firemen, , EMTs, medical facilities, stores, warehouses, pumping stations, electrical infrastructure, and other essential locations in the area to protect them from looting/damage.

Be helpful and provide instructions. People will need to adapt rapidly to seriously degraded circumstances and many will not have the skills and knowledge necessary to do so successfully. Help people by freely offering advice, instructions. Organize classes to teach, provide a reading room for research. Think servant leadership! Assist with vulnerable groups. Hospitals, schools, child care centers, and nursing homes may need to be evacuated and alternative facilities developed.

Send a delegation to city hall, and/or other local government location(s) and to neighborhoods close by. Tell them what you are doing, ask about outside resources available (be prepared for "nothing" as an answer), offer them resources (information, knowledge, flyers, your plan, etc.)

Better Times Emergency Notes

WHAT TO DO IN AN EXTREME CIVIL EMERGENCY!

An "extreme civil emergency" is a situation where there is no electricity, no re-supply of local stores, no fossil fuels available, phone/internet/communications not working. If no help is coming or it will be long in coming, any rescue will be up to "We the People" in our own communities. Don't wait for the government to "tell" you what to do. Work with your neighbors & civil society organizations (religious/civic groups, schools, fraternal lodges etc.) to secure basic needs, preserve public order, & protect the common good for the duration of the emergency. United we stand, divided we fall. There is a lot to do, & much of it involves manual labor. Working together with others will make the work go easier & smarter. Many hands make the work go lighter. Procrastination is the thief of time.

COMMUNICATE! Set up community bulletin boards, organize meetings. Positive action that promotes security & wellness is the best antidote to fear, panic, & other negative reactions to stress. Bring back the "town crier". Get there the "firstest with the mostest".

VULNERABLE POPULATIONS. If you have friends/family in nursing homes or hospitals, you may need to go & get them. Check on vulnerable people/elderly in your neighborhood. Organize shelters in community buildings and/or provide volunteer support to the staff of nursing homes & hospitals to help them cope with the radically changed circumstances.

WATER. The City's water system will go down without fossil fuels & electricity. Store water! Collect rain in buckets, kiddie pools, trash cans, fish tanks, ice chests, fridges/freezers, whatever – dig holes in the ground, line with plastic, boards, bricks, whatever, to hold water. If you live within 2 miles of the river on low ground, try digging a 20-30 ft deep well. Purify surface water by letting it settle & filtering through cloth (if muddy), then siphon the clear water into a pot & boil it for 10 minutes (rolling boil, not simmer).

SEWAGE & GARBAGE. The sewage system requires electricity & fuels. If the electric/water/fuel systems go down, stop flushing toilets. If households keep flushing, the system will choke/back-flow. Make a composting toilet out of a bucket & toilet seat. Put dried leaves/grass in the bottom of the bucket, add more dried material (paper, leaves, shredded cardboard, grass, etc.) after use. Urinate into bottles or jugs, try not to mix urine with feces (this will help reduce the smell). When bucket is full – dump into a hole & cover with dirt or if you are an experienced composter, dump into a compost bin & cover with lots of organic material. Do this away from any water sources. If you dilute the urine – 1 part urine to 10 parts water – you have a safe & nutritious fertilizer for growing food, if you can rise above the ick factor. As to trash – there is no garbage anymore. Everything is useful. Recycle, reuse, make it over, make do, waste not, want not.

FOOD. If the electrical & fossil fuel systems go down, & the transportation system isn't working, grocery stores will empty quickly. Do not depend on the government to haul in food – in a crisis this big, that won't happen. Work with your neighbors to find food. Within 60 miles of OKC, there are millions of lbs of wheat, soybeans, & other raw food products. Go now, in whatever vehicles you can fuel, & buy/trade to get wheat, soybeans, oats (whatever they have on hand) from the grain elevators (the tall grain storage cylinders you see in rural areas). If no fossil fuels available – make bicycle carts or handcarts & organize teams to go there & haul food back. A neighborhood of 3000 people needs 100 carts that haul 250 lbs each. Remove chaff & dust by tossing wheat in air when wind blows. Make a grain grinder with three, 3/4" diameter steel pipes, 30 in long. Wrap each pipe with duct tape to prevent

slipping, then bind them together with duct tape. Cut top out of a large can. Put 1 in grain in the bottom of the can, place on smooth hard surface like concrete. Sit with can between feet, wear gloves, move the pipes straight up & down about 3 in each time, rapid strokes. Sift to separate into flour & cracked wheat. Start gardens everywhere, if in the right growing season; if not, get ready to plant. Plant dried beans, popcorn, potatoes/sweet potatoes, seeds of winter squashes, cukes, pumpkins, watermelons from grocery stores. Cut off tops of carrots, place in saucer of water, grow greens. To build a garden fast - remove lawn turf, build 6 inch sides for 4 ft wide beds, make them as long as you want. Scoop soil from pathways into beds. Fill with straw, leaves, dirt. Organize community kitchens since cooking fuel will be scarce. Build outdoor bread ovens, solar ovens. Start compost piles. Container garden on pavements. You can grow almost anything in 6 in of soil. Grind popcorn for meal. Dandelions, purslane, chickweed, pig weed, lambs quarters, rose petals/hips = food.

HYGIENE. Wash hands often. Make a hand-washing solution – put a little liquid dish soap in an empty squeeze bottle, fill with water, shake. Pour solution on hands to wash. Wash dishes carefully; if water is scarce, wipe/scrape them clean, then wash. Water gardens with the wash water. Never drink or brush your teeth with unpurified water. Disease prevention and careful attention to sanitation is essential.

HOUSING. Consider combining households with friends/family. It will be hard for 1-3 person households or families with small children to do all the work necessary to maintain an individual household in these circumstances. Living in larger households for the duration of the emergency will help keep your quality of life from crashing completely. As a practical matter, mortgage/rents are "on hold" for the duration. If the courts are closed, & the financial system isn't open, no one can be legally evicted or their house foreclosed. If you have friends/family in rural areas, you may be better off going to them. If you have no transportation, walk or ride bicycles. Start soon.

SECURITY. Start neighborhood safety/help patrols. Organize opposition if anyone takes advantage of the situation. Resist attempts to interfere with necessary survival projects. Be wary of the tendency to resort to bad behavior/habits when under stress.

SEASONAL ISSUES. In winter, shelter with neighbors if you have no fuel for heat (more people = more heat). Cover windows to insulate. Do not use charcoal briquettes inside – they give off deadly carbon monoxide! In the summer, keep hydrated & stay in the shade!

NETWORK. If there is a civil emergency, look for libraries and find and copy plans for solar cookers, outdoor ovens, slow sand water filters, recipes for whole wheat, & much more. Bring your own paper & pencils/pens to copy plans & useful information. Volunteers/teachers needed.

Better Times Emergency Notes

DISASTER PREPARATIONS ON A LIMITED BUDGET

The time to build the cellar is before the tornado hits. If your resources are limited, anything you can do to stock more of the basic necessities of life helps you prepare for a disaster or emergency. Disasters happen. People lose their jobs, get sick, evicted. There are potential dangers like economic collapse, war, terrorism, and disease epidemics. Think carefully about the challenges you may face. Make lists of what you need and check them twice. If a disaster doesn't happen, you still benefit because you made these preparations. You increased the safety, health, security, and wellness of your family and community. You fulfill an important citizen duty. Don't procrastinate or wait to the last minute!

Got Free information? Look for free info at libraries, schools, on the internet. Libraries often offer free internet access, Talk with older people about how things were in the past. The other BETTER TIMES Emergency Notes cover issues that can help you prepare within your resources. Consult them for inexpensive ideas regarding water, emergency heating, and cooking. Enroll in free classes. Ask questions. Use maps and dictionaries. (Often.) Read the instructions. Use time constructively. Remember: A stitch in time saves nine. An ounce of prevention is worth a pound of cure. Waste not, want not. If you don't know, ask! To avoid fools, take steps! Nurture blessings in your own life and in the life of your community. Keep books in your home. Read them to your children. Learn many things. Practice many skills. Teach others. Do what you can, with what you have, where you are.

Got smart shopping? Look at flea markets/garage sales for stuff that would be useful in an emergency: extra pots & pans (such as a Dutch oven), blankets & winter clothing, towels, water & food containers, food processing equipment (grain and meat grinders, mason jars, pressure cookers), candles, matches, blankets, towels, rope, tools, camp stoves, flashlights, lanterns, rolls of plastic, fishing poles and tackle, etc. Stop throwing stuff useful stuff away: this includes plastic & glass containers & their lids, newspapers, plastic & paper bags, kitchen scraps, cardboard, lawn trimmings. Start a compost heap with your kitchen leftovers and lawn trimmings. Use it for fertilizer for a gardens. Think of your trash as a resource to be used rather than a problem to be disposed of.

Got plans? Planning involves no out-of-pocket expense. Decide now what your family will do during emergencies. If people aren't at home, or can't get home, where should the family gather? If you have to evacuate, where would you go? Prepare small "evacuation kits" for each family member. Pack them with a 3 day supply of food, water, a blanket, small battery powered radio, addresses, phone numbers, and other items that would be useful if you have to evacuate. Make sure you have paper copies of all your vital documents, including birth and naturalization certificates, bank statements, etc. If civil disorder threatens the area, it is best to stay home, avoid crowds and public gatherings, and become as invisible as possible. If the disaster is large and widespread, it may be days or weeks before help arrives. Don’t wait for someone to come “help” you. Help yourself and your neighbors.

Got community organizing? Resilience is a word that describes the ability of a community or family to successfully meet challenges. A resilient neighborhood is a better and safer place to live. If a major disaster hits your neighborhood, work together with your neighbors to increase the safety, security, health, and wellness of your family and community. "Neighbors" can include: friends, family, the people next door & on your block, churches, service clubs or other organizations (like Scouting or 4-H), schools, neighborhood associations,

government agencies, co-workers. Pool resources. Work on projects together. Plan what you will do during an emergency situation. Past experience in disasters says that trusting relationships that begin before a disaster endure through the event and help people to face grave challenges successfully. That history teaches us that a disaster is a hard time to establish such relationships, so NOW is the time to get to know your neighbors. Be ready to help others by organizing a community response to a bad situation. Take special care of those who are particularly vulnerable: people with serious medical conditions, the elderly, the young, those who have emotional or mental problems. Be aware of the tendency to resort to bad habits when you are under stress. Don't leave anybody behind, there's room for everybody in the boat.

Got water? It's cheap and so are containers to store it in. Make sure you have plenty. Start collecting empty bottles (soda pop, etc.) Wash with dish soap and rinse with a chlorine bleach disinfecting solution (see BETTER TIMES Emergency Notes #4). Don't rinse the bottle with plain water after rinsing with the disinfecting solution. Fill immediately with clean tap water, put the lid on, and store in a dark and cool place. Store as much as you can. Clean, large plastic trash cans with lids can be used to store water for washing and flushing purposes. Chlorine bleach is cheap, get several gallons in case you have to purify drinking water or need a disinfectant.

Got juice? The essentials of a cheap power system include a source of power (car alternator, portable generator, wind or solar power), batteries, an inverter (to change the battery's 12 volt DC power into AC power), and a way to distribute the power. Small inverters are cheap and will run a couple of lamps or a radio, or even a small TV (look at electronics or auto parts stores, or catalogs). They plug into the cigarette lighter of a car, a good quality extension cord that plugs into the inverter will bring the power into the house. When the battery gets low, the inverter automatically shuts off and the car can be started to recharge the battery. Small solar panels are available that can provide enough sunlight for a couple of hours of lights each sunny day. Emergency lights can be run directly from a battery (such as brake or backup lights removed from a car or bought for this purpose). Flashlights & battery powered lanterns are useful; for less money than you spend on batteries in a few months, you can get an inexpensive solar small battery charger and some rechargeable batteries ($2 - $6 each, depending on the size). (The cheapest source for a good quality inexpensive solar small battery charger is at www.ccrane.com .) A step down voltage converter (plugs into the cigarette lighter) can be used to run small "C" or "D" powered radios or CD players from a car battery. For all alternative power applications, an inexpensive volt meter will be useful. This flyer has only a bare minimum of information on this subject, use it as a source of ideas. Do further research in libraries or by talking to electricians. Got more energy ideas? Look for cheap candles at dollar stores & churches, buy lots of the tall ones in glasses (they last 3 to 6 days burning continuously and produce light as well as heat, don't leave them burning unattended or while you sleep). Put candles in front of mirrors and you get more light.

Got Food? The tighter the budget, the more you will have to rely on basic foods such as beans, rice, flour & canned goods that supply a lot of nutrition for the dollar. You can increase the health and quality of life of your family right now if you buy less prepared and packaged food and do more cooking from basic ingredients. Bonus points: you save money and people will ask, "How did you learn to cook like grandma?" Store as much food as you can. If a disaster doesn't happen, with extra food on hand, you'll spend less time in the grocery store.

Emergency Food Storage List for People with Limited Incomes

-- 30 cans of meat or fish

-- 8 pounds oatmeal

-- 40 pounds rice

-- 40 pounds flour

-- 15 pounds corn meal

-- 30 pounds pasta

-- 10, 26 oz cans of spaghetti sauce (or 30, 8 ounce cans of tomato sauce & some spices)

-- 30 boxes macaroni and cheese

-- 60, 15 oz. Cans of Vegetables (15 Oz. Cans)

-- 4, 3 pound cans shortening (or equivalent in oil)

-- 10 pounds sugar

-- 3, 32 ounce jars jelly or jam

-- salt, bouillon, pepper, some hard candy, spices, yeast, baking powder, baking soda, cocoa

-- 10 jars of peanut butter

-- 12 lbs dried milk (60 quarts liquid)

-- 12 lbs dried beans or peas

This list provides 30 days of nourishing meals with 2500 calories per day per person for a family of 4. Additional items that would enhance this diet include cream of mushroom soup, instant potatoes, syrup, sprouting seeds, tea, more canned meats, vegetables, fruit, & dried beans/peas, tomato/spaghetti sauce. From these ingredients you can prepare: donuts, chocolate cake, chili mac casserole, biscuits, macaroni & cheese, tortillas, chili & rice, bread, rice pudding, Spanish rice, pasta and various sauces, hush puppies, gluten steaks/meatless loaf, bean loaf, cookies (among the many possibilities). Measure portions carefully. If you don't include these foods in your diet, and this is what you plan to store, start cooking with them now. Don't wait for an emergency to start a new diet. This helps save on your current food bill too, and thus helps you to put aside more food now for an emergency later. If you can't buy it all at once, buy a little at a time until you have 2 or 3 months emergency supplies on hand. Store carefully so roaches and rodents don't get in -- look for food grade plastic containers such as 5 or 6 gallon buckets with lids. You can often get them cheap or even free at bakeries, donut shops, restaurants, or other places that serve a lot of food. Empty 2 liter pop bottles are another cheap storage container for dry goods like beans, rice, and flour. Rotate your supplies, use some of the flour, rice, beans or whatever, and then buy more. "Store what you eat, and eat what you store." Use this list as a guide, customize it to meet the needs and tastes of your family.

Got more food ideas? Start a garden! Growing food in your yard is like growing money. Buy produce directly from farmers or on sale at the stores and preserve it yourself by dehydrating or canning. (You can learn how to do this if you don't know how.) Dehydrators are cheap & the dehydrated foods can be stored double bagged in zip locks or in mason jars. You could dry food in the oven. Set it to 140 degrees, spread food in trays, prop the door open a little, check frequently. Consult your local home extension office or library for more information. You can grow tomato plants, peppers, and other such plants in containers inside your house, or on a porch or balcony. If you have pets, don't forget pet food.

Better Times Emergency Notes

Building Community During a Major Disaster

Normal life has a strong hold on us; it is what we are familiar with and understand. This "normality" can change suddenly, radically, and painfully, bringing death, destruction, and dislocation with little or no warning. Prolonged and extensive disasters are a difficult challenge to the safety, security, health and wellness of our families and communities. We may expect help to arrive almost immediately; this may not happen; circumstances can prevent it from happening.

Disasters happen. On April 5, 1992, the first of what became an average of 4,000 artillery shells a day fell on Sarajevo, a cosmopolitan European city of 500,000 people that had hosted the 1984 Winter Olympics. The siege continued for almost 4 years (the longest of the 20th century). The city lost electricity, water, natural gas, & telephone service. 10,000 people died, 50,000 wounded. By 1993, the price of wood was $200 per cubic meter, dandelions and nettles fetched high prices. People smuggled seeds into the city, & gardens were planted everywhere. Ham radio operators helped the city keep in touch with the outside world. For light, people used car batteries, candles, and homemade oil lamps (jars filled with vegetable oil, with shoe strings for wicks).

Throughout this traumatic event, the people of Sarajevo coped with dramatically changed circumstances by working together and continuing their lives as best they could under the circumstances. Many cottage industries and small businesses provided the goods & services that people needed under the new situation. Artists & musical groups staged plays & concerts; religious services continued, children went to school, doctors operated by flashlight. Everything was inconvenient -- people had to walk miles for water (they caught rain from roofs and drank melted snow), there was little public transportation. The city's markets stayed open. Prices fluctuated with the availability of home grown/made or smuggled goods. The simplest tasks became time consuming. Snipers and artillery added to the stress. The suicide and general mortality rates increased. Few buildings escaped damage. The city did not collapse and die in a chaos of disorder and violence. The traumatic circumstances brought people together in solidarity by the situation. The moral of this story: Some responses to disasters are better than others; when life hands you a lemon, don't whine, make lemonade.

During and after a disaster: (1) People may develop personality changes relating to trauma-related stress. They may experience anxiety attacks, have trouble sleeping and eating, feel on edge & brittle, be easily disturbed or upset, become over-protective of loved ones, experience emotional episodes (including crying), and suffer despair and a sense of hopelessness. They may feel so powerless to affect their situation that they are almost incapable of helping themselves. They may become angry and resentful, unable to make decisions, easily irritated, unable to focus on work, lacking the energy even for basic daily activities. They may be sad, depressed, and unwilling to confront the situation that brought about the disaster.

(2) People may experience strong feelings of solidarity & bonding with their neighbors and others who have suffered the same situation. They may become cooperative, generous, compassionate, helpful, and warm-hearted. People often demonstrate the ability to learn new skills fast, and exhibit a lot of ingenuity and creativity in working around obstacles and managing chaotic situations. Humans are known for sacrificing themselves to save others -- sometimes for members of their family, but also for complete strangers. We can work hard and smart when the need is there. Instead of giving into despair, we can become pro-active. People are adaptable, even when changes are coming fast and the stress is grave.

(3) Some people take advantage of the suffering, distress, weakness, or problems of others. They profiteer on scarce goods, refuse to cooperate on necessary neighborhood projects, hinder rescue and repair efforts, and/or turn violent and criminal. Some disasters have been followed by violence & looting, and theft generally increases. Goods donated by humanitarian organizations may end up in the marketplaces at inflated prices. People can be rude, arrogant, pushy, violent, or lazy in the absence of a disaster, and these traits may be intensified by the stress of a major traumatic event.

Got commonsense? Panic, paralysis, flight, and helplessness. Pro-activity, solidarity, cooperation, smart work. Crime, thuggery, profiteering, vicious competition. All responses to disasters are not created equal; some are more dangerous than others. If times get tough, encourage and support the good; discourage and avoid the bad, protect the weak & defenseless. The actions of individuals and neighborhoods can have dramatic consequences for the larger systems of society (for good or evil). The Scout precept -- "Do a good deed daily" -- as well as the religious, ethical, and philosophical traditions of many diverse cultures bear witness to this. Many good deeds done daily are seeds of a culture of life and love.

Special Needs of Children: Children are greatly affected by disasters; they will need extra realistic reassurances (don't promise what you can't deliver.) Expect them to be afraid -- 4 common fears are death, darkness, animals, and abandonment. Refusing to discuss such fears with children will only intensify their concerns; encourage them to talk about their feelings or otherwise express them through activities such as play acting or painting. Their feelings won't go away if adults refuse to talk about them, if repressed, eventually they will come out, usually in a negative way. Pretending that problems don't exist only makes them worse. Physical reactions like nightmares, vomiting, headaches, or emotional reactions like refusing to eat, getting upset easily, feeling guilty or neglected, are common reactions to severe stress. Kids may regress to earlier behaviors like bed wetting or wanting a special toy. When you talk with your children, listen to how they say what they say. Watch them at play -- with other children, and with their toys. Repeat information & reassurances many times; answer their questions as much as you can. Hold your child, provide comfort (touching is important for children during stress). Spend extra time with them before going to bed. Don't hesitate to seek help from friends, family, schools, religious organizations, or support groups. Caution: the stress reactions of your kids will be a source of stress for you. Don't take your stress out on your kids.

When a disaster happens: Take care of first things first. Immediate threats are the obvious & threatening: fire, freezing cold, medical emergencies, severe weather, industrial-chemical-pipeline explosions. Medically fragile people, the elderly, and families with young children are especially vulnerable. Check on your neighbors! Be realistic in your expectations. Things may not get back to normal instantly. It will take time for the situation to recover and the burden may be on each community to rescue itself. Encourage dialogue about what has happened. People's emotions may be roller-coastering; it will help (a lot!) to be able to talk about the event and how it has impacted their lives, for better or for worse. Encourage dialogue (organize opportunities for this to happen). Rumors abound in disaster situations, and should be judged guilty until proven true. Beware of spreading false information that creates public anxiety.

Analyze the situation using Simple Critical Infrastructure Maps. The fundamental threats in big disasters are the six ways to die – hunger, thirst, illness, injury, heat, and cold. There are levels of infrastructure to protect us from these threats – personal, household, village, town, and region. In response to big disaster, individuals form groups

which may become organizations. Groups need space to work, resources for their work, communications, and transportation. They need a shared map, a shared plan, and a leadership succession plan (if the leadership isn't performing, how is new leadership selected?). There are 6 typical problems maintaining infrastructure: neglect, time/wear, operators, externalities (fuel, parts etc.), economics, violence/disaster. 3 possible consequences of infrastructure problems: services become unavailable, services become extremely expensive, quality of service is degraded. Think about and then plan for these issues as you develop your response to what is likely a rapidly devolving situation.

Practice some relaxation techniques: such as – take several slow deep breaths, breathing in through your nose and out through your mouth, while thinking calm and peaceful thoughts (or prayers). Challenging events such as major disasters make demands on our "best natures". It's vital to determine the important actions to be taken in response to the disaster. People may have different ideas about what is important and should be tackled first (this is true in families, neighborhoods, businesses, governments). Understanding this potential for disagreement helps manage the situation. Leaders must be patient in their interactions with others; they must understand that they are as vulnerable to these stress reactions as anybody else. Be aware of the tendency to resort to bad habits when you are under stress. Remember that "haste makes waste." Wisdom, daydreaming, & risk taking can reveal options that you never felt possible.

Be pro-active and hopeful. If there are things that need to be done to help put things back to normal, then do them. Try not to be swamped by details (while remembering that often the devil is in those details). Keep your eyes on the big picture and what has to happen in order to ensure the health, safety, security, and wellness of your family and neighborhood. Think "outside the box", be open to creative solutions to shortages, failed public services, or problems in the marketplace. Even small actions that promote stability and preparedness can affect the ultimate outcome of this event, for better or for worse. What you and your family do (and what you don't do!) will be important for your own family and for your entire community. Artists, entertainers, musicians, and theater groups should expect that their services will be in great demand, ditto for plumbers, doctors, mechanics, gardeners, nurses, mothers, priests, tailors, engineers, electricians, and many other skills, trades and services. (Librarians will be major heroes!) There will be plenty of work to be done, and it will help if the work is as smart as possible. You won't be able to get through this safely and securely all by yourself: you will need your community, and your community will need you.

Morale is critical during hard times. Draw on all the resources available to you to bolster morale in yourself, your family, and your neighborhood. After attending to any immediate and pressing emergencies of the disaster, invite your neighbors for a potluck dinner. Use this as a time to talk with them about how your community will meet this grave challenge. Many people find strength in religious, ethical, cultural, and philosophical traditions. These beliefs can be structures of support to carry people through hard times. If your family has religious or devotional practices, do not neglect them under the pressure of events in a crisis. If your family doesn't have any religious or devotional practices, you should think about getting some.

Honesty is the best policy. Leaders must be prudent in their responses, because poor leadership can make a disaster much worse, aggravating an already bad situation. Authoritarian response is a dead end path of failure. The best and most effective leadership in a crisis is servant leadership. Bad news should not be concealed. Lies, half truths, making promises that can't be kept, and evading the issues or their consequences are sure and certain destroyers of leadership

credibility. (It is immoral to not warn the public of hazards/imminent dangers.) Beware of those who resort to politics and scape-goat in their disaster response. Those who do this run the risk of being suspected of bad faith or of attempting to shift blame from themselves onto others. The time for apportioning blame (if this can be done) is after the recovery is well underway, not during the on-going progress of the disaster.

"The world will be saved by Beauty." Civilization doesn't just happen by accident, we have to work at it. If we keep practicing, we will eventually get good at it. In the meantime, everybody must do their part to maintain community and support the common good, especially during a disaster. You will start re-creating a safe and secure community when you yourself decide that you will be a good neighbor. Like charity, building community begins at home, it starts with you. In a disaster, you may feel that you have lost control over your situation. Building community is something you can do, right here, right now, in the place where you are -- whether or not the electricity works, you have a job, or the buses are running. Nobody is an island. Think of your neighborhood as your village, and discover anew the truth that we have learned many times in history: united we stand, divided we fall, cooperation is as important as competition. (During a disaster, cooperation is much more important than competition.) Don't leave anybody behind, there is room in the boat for everybody. And let's remember this good advice as we rebuild: we can do better next time!

BETTER TIMES Emergency Notes

Community Food Projects during a major Disaster

Community Kitchen. If food or fuel become scarce, establish a community kitchen in a place convenient for those in need of assistance (schools or churches come to mind immediately, but you can feed 200-300 people out of a home). Organize cooking and serving teams. Invite people to bring food, cook it together and serve it cafeteria style so that all are fed. (This is a soup kitchen where some or all of the guests bring the food.) Arrange for meals to be delivered to those unable to come to the kitchen. (If fuel is scarce, this may be the most practical way to distribute food.) Generators could be used to power freezers to keep food frozen. Community bread ovens can be built from materials available in most communities, as well as solar cookers, outdoor wood stoves made from barrels, and non-electric hotpots (explained in the BETTER TIMES Emergency Notes on Food Preparation).

Community Food Processing. Governments or non-profit agencies may distribute emergency supplies in a food scarcity emergency. If the disaster is prolonged, it is likely that those distributions will be primary agriculture products (whole wheat, corn, soybeans, dried beans, rice, powdered milk, etc. Tasty and nutritious meals can be cooked from these foods, but many people do not have the knowledge or the equipment for home processing of these ingredients. The basic technology required is a way to grind the products. If manufactured grain grinders are not available, grinders can be improvised from steel water pipes.. Soy milk, tofu, tempeh, and other products can be made, and vegetable oils extracted from corn, soybeans, sunflower seeds, and other oil crops. If the weather is not cold, and a generator is available, making ice would be useful. (Fill containers like cottage cheese tubs or casserole pans with water, freeze, chop up into smaller bits.) It may be necessary to organize water fetching and purification teams, and a community food processing effort can do this too.

Urban Agriculture & Community Food Production. About 10% of the world's food is grown within cities. If a disruption of the regular food production and distribution system is prolonged, it will be necessary to increase this production considerably. Even if the problem happens during the winter, in many areas this can begin immediately in greenhouses and cold frames. Indoor greenhouses, with lights powered by car or marine batteries that are recharged by automobile alternators can be improvised, and seeds started for spring gardens (heat is an issue here). Seeds can be sprouted. Depending on local resources, other options include fishing (ocean, rivers, creeks, ponds, lakes), hunting, or foraging (very slim pickings in most areas during winter). Even densely populated cities have lots of space for community gardens. Possibilities include street medians, lawns, vacant lots, golf courses, and container gardening on roofs, porches, sidewalks, even streets. Compost heaps can be started immediately, both to help resolve the garbage situation, and to make fertilizer for gardening.

Rural-urban partnerships. Many cities are surrounded by farming areas, but there are many potential disasters that could wreak havoc with normal systems of food production & distribution. If the present food system fails, it will be necessary to weave new direct relationships between rural farmers and urban consumers. Farmers will need assistance with planting, harvest, and transportation; new direct market relationships with urban consumers would help with these essential activities. In the old days, cattle and pig went to market on the hoof; this may happen again if the transportation system is compromised by instability and disaster.

Networking ideas. Work with other agencies or organizations, such as community gardening organizations,

neighborhood associations, university extension departments, and food banks to help ensure that nobody is left out in the cold without food.

4 USEFUL EMERGENCY FOOD IDEAS: SOURDOUGH, GLUTEN, BULGAR, ORAL REHYDRATION

Easiest sourdough bread: Make bread as usual, add an extra cup of flour (you will have to adjust the amount of liquid and other ingredients accordingly). After the second rising, pinch off about one cup of the dough, and put in a covered non-metal container in a warm place. When you bake the next day, instead of adding yeast, add the dough you saved from yesterday's baking. This will take a little longer to rise, but it works. (Many cookbooks have other sour dough recipes.)

Gluten can be made from whole wheat kernels. Despite the name, gluten is a useful and nutritious food product that you can make without using fancy equipment.. It can be cooked in a variety of ways. 1. Mix six cups flour with water until it is the consistency of bread dough. If you don't have flour, grind whole wheat to make flour. Let this dough sit for 20 minutes. 2. In a sink, basin, or bucket, place a bowl, on top of that put a pie plate, and on top of that put a colander (pasta strainer). The bowl should be larger than the pie plate. 3. Take a handful of the dough, and run or pour cold water over it while you kneading it (if you are pouring water from a pitcher, you'll need an extra set of hands). Keep doing this with handfuls of dough. The water running off will be milky white with starch and have flecks of bran. The bran settles in the pie pan (dry it and save it, it has a lot of uses), and the white water in the bowl should be saved and used to thicken sauces, gravies, or soups. Keep kneading and rinsing until the water runs clear. What's left after the water rinsing is wheat gluten. Form into small loaves and steam for about 30 minutes or bake in an oven. Slice into strips and marinate for 10-12 hours. Use beef or chicken bouillon, add hot peppers, the "Scarborough Faire" spices (parsley, sage, rosemary and thyme), soy or teriyaki sauce, hot chili sauce, sesame oil, garlic, whatever you have handy and tastes good and familiar. Then bake it or crumble it and fry in hot oil. If you don't marinate it before baking, you'll want a good amount of sauce in the recipe. It's taste is bland, so it needs a liberal spicing, or a flavorful sauce or gravy. Sprinkle the bran on breakfast cereals (including oatmeal and creme of wheat), and add it to baked products or casseroles. Be creative with seasonings. The recipes below have ideas..

Chickless Caciatory: Add poultry seasonings, powdered chicken bouillon, cumin, thyme, rosemary, garlic, savory and salt to the freshly made gluten and bake in a loaf pan at 300 degrees for 45 minutes. In a fry pan, sauté onions, bell peppers and mushrooms, celery (whatever you have, if you are using dehydrated, re-hydrate in hot water before sautéing). Slice the gluten in 2 inch diameter pieces, and put in the pan. Slowly cook on both sides until it cooked all the way through. Cover with spaghetti sauce and let simmer for about 20 min. Serve over pasta or rice. Vegetable "liver" and onions: After making the gluten, flavor with soy sauce, garlic, onion powder and salt and bake at 300 degrees for 45 minutes.. Put some oil in a pan and sauté onions (cut in strips) and mushrooms. Remove the mushrooms and onions, slice the gluten in patties and slowly brown on both sides. Add a mushroom gravy (cornstarch variety is best) and simmer for about 45 minutes or until most of the gravy is absorbed by the gluten, turning often to avoid burning. Serve with the cooked onions and mushrooms. Scallops gluten: Season gluten with lemon thyme, pepper, garlic, cumin. Heat a deep fryer (hot enough for French fries). A deep fryer can simply be a heavy pot (such as a pressure cooker or Dutch oven) with oil in it. French fries are a perfect side dish. Form the gluten into balls, and deep fry. Serve with tarter sauce. Meatless Loaf: Make gluten, grind it, mix with chili powder, bouillon, garlic, onion powder, and a handful of oatmeal or cooked bulgur. Form into a loaf and put in a loaf pan. Cover with tomato

sauce. Bake at 300 degrees for 45 minutes. Chicken Fried Steakless Cutlets: Make a Meatless Loaf, don't cover with tomato sauce before baking. Let cool, slice, dip in milk and seasoned flour (do this 2 or 3 times, add black and/or red pepper and salt to the flour). Put some oil in a skillet. Fry with medium heat until brown on both sides. Make a white cream sauce flavored with some spices or herbs, or a brown gravy, or mushroom gravy, and serve with mashed potatoes.

Bulgur wheat: In an emergency, authorities may distribute bags of grain. One way to prepare whole wheat grains is to process it as "bulgur wheat". Bring to a boil one part rinsed whole wheat kernels plus two parts water, then simmer until the berries are tender (about one hour). Spread the berries on a cookie sheet and bake in a 225?° F oven, stirring occasionally, until dry (about one hour), or dry in the sun. Grind in a blender, or grain grinder, or crush with a rolling pin, to the consistency of cracked wheat. To make the bulgur wheat pilaf: sauté onions and garlic and bulgur wheat in oil. Add 2 parts broth, stock, water with bouillon, to one part bulgur wheat, plus dried herbs such as sage, thyme, rosemary, basil, oregano, parsley. Cooked or stir-fried vegetables and/or chunks of meat can be added. Be liberal with the seasonings. Bring to a boil, reduce heat, simmer until liquid is absorbed. Cream of Bulgur: Grind dehydrated bulgur to the consistency of flour, cook and use like Cream of Wheat.

Oral rehydration solution: In the event of severe diarrhea and dysentery, or loss of fluids due to excessive heat, make and administer an oral rehydration solution (common store names for oral rehydration solutions are Gatorade and Pedialyte). Give the dehydrated person sips of this drink every five minutes, until he or she begins to urinate normally. Keep giving the drink often in small sips, even if the person vomits. Not all of the drink will be vomited. Combine ½ tsp salt and 8 heaping tsp (or 2 handfuls) of powdered cereal and dissolve in 1 liter of boiled and cooled water. Powdered rice is best, corn meal or wheat flour or cooked and mashed potatoes can be used. Boil this mixture for 5 to 7 minutes to form a watery porridge. Cool quickly and give to the sick person. When using, make it frequently, especially in warm weather. Without refrigeration, it can spoil in a few hours. Another recipe for an oral rehydration drink is: one-half level teaspoon of salt, 8 level teaspoons of sugar, mixed with one liter of water. A half cup of fruit juice should be added if available.

Better Times Emergency Notes

Food Preparation and Safety

SAFETY NOTES FOR EMERGENCY COOKING. If there are problems with the food distribution system, work together with your neighbors to ensure community food security during the emergency. Set up soup kitchens in homes or public buildings. Organize potluck meals and community kitchens; food may be available, but fuel for cooking may be in short supply. For many people it will be safer to prepare food in community kitchens than to use emergency cooking methods in homes or apartments. Never use charcoal briquettes or Coleman-type fuels inside for cooking. Carbon monoxide poisoning is serious business Small propane camp stoves can be used indoors with proper ventilation, such as placing the camp stove in front of a window open 1/4 inch or an open door. Placing the stove in front of an open window/door keeps exhaust fumes from spreading through the room). Symptoms of carbon monoxide poisoning include headache, lethargy, blurry vision, room feels "stuffy". If symptoms occur, get fresh air into the room immediately or move everybody out fast. Pregnant women and unborn babies are particularly at risk. DO NOT use wood inside at house for cooking unless you have a fireplace or properly installed wood stove. If you need a campfire, build it in a safe place outside. Use bricks to make a stand for a pot or to hold a grill in an open fireplace or on a campfire. Don't leave open flames unattended.

Baking on top of a camp stove. (1) Place a cast iron skillet or cookie sheet on top of the burner(s). (2) Put something on top of this to raise the cooking pan up and allow air to circulate underneath. This could be a low cake pan, or empty tuna cans, or the trivet from your gas range. (3) Put the food to be baked in a covered pan on top of the "risers". (4) Make a tent from several layers of foil over the cake pan, so that air can circulate beneath it, and put a small vent hole in the top of the aluminum foil. Large cans or pot lids work as covers. Keep an eye on the food as it is baking. You may have to flip biscuits so that they brown on top. Chafing Dish cooking. Chafing dishes come in many different sizes and use small cans of jelled fuel for heat, some use candles or denatured alcohol burners. A fondue pot is a type of chafing dish. The small stand supporting the chafing dish can be used with a skillet or omelet pan, or a pot for soup or stew. It takes up to a half hour to warm a can of food with a candle. Buddy burners can be used with chafing dishes. "Buddy burners" and candles can be used with chafing dishes.

Solar cookers. Solar cookers are made with cardboard boxes, aluminum foil, duct tape, and glass. Such ovens can get to 350 degrees, hot enough to bake meats and casseroles. A solar cooker works by reflecting light onto a dark pot through a clear transparent cover such as glass or an oven baking bag, and insulating the pot so that the heat does not radiate out but rather cooks the food. Crockpot recipes will work in a solar cooker. Work with materials you have at hand to create an insulated container with a clear top that can be heated by the sun. Non-electric crockpot. Use a box or bucket big enough to pack 4 inches of insulating material on all sides, top and bottom. Line the inside with aluminum foil, and put insulating material on the bottom (such as newspapers, cloth, sawdust, hay). Bring the food to a boil, cover the pot (3 - 6 quarts) and put it in the container. Pack the top and the spaces between the pot and the sides of the box or bucket with insulating material, and put the lid on. Good for up to 4 hours cooking.. Food cooks faster in covered pots. Be thrifty with scarce fuels, combine methods (such as using a camp stove to bring beans to a boil, and then the non-electric crockpot to finish the job). Consult Scout manuals for other methods of cooking over open fires.

Work with your neighbors to ensure community food security.

FOOD SAFETY IN A DISASTER. Cold foods must be kept cold (below 45 degrees F.) to prevent spoilage. If the power goes off, open your refrigerator and freezer as little as possible. Wrap the freezer in blankets or newspapers, or stack bags of clothes or mattresses against the walls & on the tops. Shield it from direct sunlight, and don't heat the room it is in. Eat the items in the refrigerator first, the same day the power goes off. (Invite the neighbors for a disaster buffet potluck.) If you are frugal in opening the freezer, the food inside will stay below 45 degrees for 3-5 days. Be careful about storing prepared foods without refrigeration. If it is cold winter, put food in an insulated box (such as an ice chest) in an unheated room or porch. Pack it with snow or ice (if available). Put a thermometer in the box and check it several times a day to make sure it is staying below 45 degrees. Protect the cold box from sunlight. When cooking, estimate food portions carefully, as you may not be able to refrigerate the leftovers. Spoiled foods may not have an offensive odor, so while the presence of a bad odor is a sure indicator of spoilage, its absence may not be an assurance of safety. Don't take chances! If in doubt, throw it out.

Creamed foods, soft cheeses (cream cheese, spreads, cottage cheese), gravy, mayonnaise, salad dressings, pork, & poultry spoil quickly. Dispose of them if the refrigerator has been without power for 12 hours. Seafood, chopped meat, and poultry sandwich fillings are not safe after 4 hours without refrigeration. Hard cheeses will be fine at room temperature for several days. To preserve for longer periods: Dip the cheese into a salt solution (salty enough that an egg floats) and place on a rack to dry overnight. On the 2nd day, rub with salt and leave on the rack. Do this again a 3rd day. By this time a rind should be developing. If it feels dry and smooth, continue to the waxing; if not, rub with salt and let dry another day. Waxing: Apply 3 or 4 coats of wax (either with a brush, or by dipping into melted wax, melt the wax in a double boiler, which is a pot of water with a smaller pot inside), let the wax dry between each coat. Wrap with cheese cloth, and continue the process of dipping and drying until several layers later the cheese is completely covered with a smooth wax exterior. It will continue to age inside, but remain good. If you do find mold on hard cheese, scrape or cut it off.

Sour milk can be used in baking (corn bread, pancakes, waffles, biscuits, sour dough starter). Butter will keep for several days, and clarified butter will keep for months without refrigeration: To clarify butter: melt it slowly over low heat, boil slowly until the solids collect together in the bottom of the pan. The butter oil will be clear and golden. Sometimes a bit of scum floats up to the top; skim that off. Ladle off the clarified butter, leaving the solids in the bottom of the pan (you can pour the remaining bits of butter oil and solids through a cheese cloth to extract all the butter and leave all the solids behind). Store in an airtight container. Whole un-cracked eggs will keep for several days at a cool room temperature.

Emergency food preservation: meats and vegetables can be preserved by pressure canning. Fruits and pickles can be preserved by boiling water canning. Consult resources such as the Ball Blue Canning Book for the necessary techniques. Vegetables can be dehydrated. If electricity is not available, they can be dried in the sun. Place trays of thinly sliced vegetables or fruits in the sun, covered with screen (to keep flies and insects away from the food). They can be placed on trays on the dash boards and seats of a car, which is then parked with the windows rolled up in the sun.

EMERGENCY FOODS. Anticipate the needs of spring and summer by building greenhouses (depending on local climate) and preparing for community gardens: use sheets of plastic, PVC pipe, poles, lumber or windows scavenged from houses to

build greenhouses, egg cartons and other small containers can be seed starters, buckets can be planters. Start compost piles for fertilizer. Learn new skills and teach others. Network with groups such as gardening associations and agriculture and extension agencies. Forage for edible wild greens and flowers. Authorities may distribute emergency foods such as wheat and soybeans. Home processing of whole grains is labor intensive, so organize community processing centers. In an emergency, people may refuse to eat unfamiliar food; encourage people to eat, even if the food is unfamiliar to them.

Emergency grain grinder: cut three, 30" lengths of 3/4" steel pipe (such as water pipes), wrap each pipe with duct tape. Tape the 3 pipes together, so there is a "working end" where the pipes are level with each other and smooth. Cut the top out of a large can (a large juice can is ideal). Put 1" of clean, dry grain in the can, put the can on a smooth hard surface (such as concrete). Sit with the can between your feet, and put the bundle pipes in the can. Move the pipes up and down about 3 inches, with rapid strokes. It takes about 4 minutes of pounding to make 1 cup of flour. You can sift this using window screen (thus providing cracked wheat and flour) or thin nylon or cheesecloth. The finer the grind, the easier the digestion. Beans can be ground with this procedure. Wheat may be "parched" before grinding. Heat in a dry skillet, until slightly puffy (this can then be cooked with water and eaten as a porridge, or ground into flour for baking.) Sprouting the wheat or the beans makes grinding easier and enhances taste and nutrition.

Bulgur wheat: Bring to a boil one part rinsed whole wheat kernels plus two parts water, then simmer until the berries are tender (about one hour). Spread the berries on a cookie sheet and bake in a 225?° F oven, stirring occasionally, until dry (about one hour), or dry in the sun. Grind in a blender, or grain grinder, or crush with a rolling pin, to the consistency of cracked wheat. To make the bulgur wheat pilaf: sauté onions and garlic and bulgur wheat in oil. Add 2 parts broth, stock, water with bouillon, to one part bulgur wheat, plus dried herbs such as sage, thyme, rosemary, basil, oregano, parsley. Cooked or stir-fried vegetables and/or chunks of meat can be added. Be liberal with the seasonings. Bring to a boil, reduce heat, simmer until liquid is absorbed

Soybeans must be cooked before grinding for flour or grits. Soy flour may be substituted for up to 25% of the wheat (or other grain) flour in quick breads, and for up to 15% of the grain flour in yeast-raised breads. It increases the nutritional value of the recipe. There are two ways to make soy flour or grits:, dry heat (in an oven) which is typically used in Asia, and wet heat (boiling) which was developed in the West. Dry Heat Method: For both soy flour and soy grits, first soak the soybeans in water for 8 hours, drain, and then bake in an oven, solar oven, or in a covered oven/pan over a campfire or cooking stove; you want the equivalent of about 350 degrees for 15 minutes. Stir the soybeans, then bake again for 10 minutes (stirring them after 5 minutes). Grind finely to make soy flour, or crack coarsely to make soy grits. Wet Heat Method: (1)Dissolve a pinch of baking soda in five cups of boiling water, add 1 cup dried soybeans. Simmer over low heat for 25 minutes. Drain, rinse with cold water. Dry in the sun or in an oven at low heat until dry (sun drying will take a day or so). Grind to a fine flour. To enhance its nutty flavor, toast it lightly in a dry skillet over moderate heat, stirring occasionally. To make soy grits, grind the boiled and dried soybeans coarsely. To cook soy grits, add water and cook like rice, flavoring it with herbs and spices

Soy milk: Bring 3 cups water to a boil, then slowly add 1 cup soy flour (do not use toasted soy flour), stirring constantly with a whisk to prevent lumps. Reduce heat and simmer for 20 minutes, stirring occasionally. Line a colander with cheesecloth or nylon mesh (a nylon stocking works well) and place over a large bowl or pot. Strain the soy flour mixture through the lined colander. Stir

sweetener or other flavoring into the strained soy milk and use immediately or refrigerate. Weaning food for small children: Mix cooked finely ground soy grits with cooked rice and reconstituted powdered milk (30% soy grits, 60% rice, 10% milk powder).

Better Times Emergency Notes

How to make and use a hectographic duplicator

Folks over 50 years old may remember receiving hand-outs at school printed with purple ink. Those copies were made by a hectographic duplicator, which is a low-tech, inexpensive method of making multiple copies. A hectographic duplicator is a firm bed of gelatin made with a special recipe. A master copy made with hectographic ink or pencils is placed face down on the bed and the ink transfers to the gelatin. The master is taken off and blank sheets of paper are laid on the gelatin, producing from 30 to 50 or so copies. Hectographic copying has a long history of utilization in extreme situations such as prisoner of war camps, the Soviet gulag, and in civilian societies under tyrannical governments or foreign occupation. It does not need electricity and the materials are commonly available.

Recipe for the Gelatin Bed

English measure | Metric measure

-- Unflavored gelatin powder: 3.6 oz. | 100 grams

-- Water" 1-5/8 cups | 375 ml

-- Sugar: 1-2/3 cup | 385 grams

-- Glycerin: 2-3/8 cups | 715 grams

Mix the unflavored gelatin powder with cold water. A common US brand name is "Knox" and it is available at most grocery stores in 1 ounce boxes. The box contains four 1/4 ounce packets. To get 3.6 ounces, I used three boxes, plus 2 of the quarter-ounce packets and half of a third. While gently warming the water, add the sugar and stir. When the sugar is dissolved, add the glycerin. Stir until it begins to boil, and continue to stir while boiling it for one minute. Remove from heat and pour into a metal baking pan that is a little bit larger than a sheet of paper. Let the mixture cool for several hours, and it hardens into the gelatin press bed.

Cautions: This mixture boils at a higher temperature than water. Treat it as carefully as you would a pan of boiling oil. Don't splash or spill it. The mixture will increase in quantity as it boils so use a pan that holds about 3 times as much volume as the original mixture and stir with a long handled spoon. When you pour the liquid into the pan, use a spoon or some tissue paper to skim or blot up any foam. A very smooth surface = the best printing results. The gelatin bed is not edible! It will last a long time (months, maybe years.)

The Printing Master: Use hectographic ink, hectographic pencils, or ditto masters to make hecto masters. Hectographic ink and pencils are available from any supply source for tattoo artists, or you can make your own. Hecto inks are available in a variety of colors, although the most common is purple. If you use ink, you need an old-fashioned writing stylus, available from tattoo supply houses and art stores. A quill pen would work if you have one available. Dip the pen into the hectographic ink and write your message on a sheet of paper. Small brushes could be used to paint various colors onto the paper stencil.

Using a ditto master: Instead of typing on the paper, turn it around and type or write on the back of the ditto carbon. Your master copy is then on the "back" of the paper – non-mirror imaged – so that when pressed on the gelatin bed and the copies are made they will not be backwards. If you type on the front of the paper, then the copy on the back will be mirror-imaged, so the printed copies will end up backwards. Note that you must use ditto masters, ordinary carbon paper won't work.

Making the Copies: After the ink dries on your master, swirl a cup of water over the surface of the hardened gelatin pad and then drain that water. Use a clean sponge to wipe the surface and take up any remaining water. You want it to be

slightly moist, but with no water drops. If the gelatin pad is too wet, the ink on the master will run.

Lay the master copy face down on the gelatin pad and make sure all parts of the paper are touching the surface of the gelatin. Leave it there for several minutes – the longer it is left in place, the more copies you can make. Then carefully pull it off and set it aside. You may be able to use it again.

Take a clean sheet of paper and lay it down on the gelatin bed and smooth it in place, then pick it up at one edge and peel it off. Voila, a printed sheet! Continue the process until you have enough copies or the copies begin to fade. Online sources say that the sharpness of the copy can be enhanced if the paper that receives the print is slightly moistened with alcohol (use a sponge to do this).

To clean the gelatin bed, pour a cup of hot water onto the bed and swirl it around until the ink dissolves. Pour this off and immediately cover the pad with some cool water. Drain that, and use a sponge to wipe up any excess water. Lay a clean sheet of paper on the pad and take it off to make sure no ink is left. When the gelatin is dry, cover it with a lid or aluminum foil to preserve it for your next duplicating session. The pad can be reused many times, but each time you clean it, a small amount of the gelatin dissolves and washes away, so it will eventually need to be replaced. If you damage the surface somehow, don't despair. Use warm water to soften the surface and the sponge to smooth it. Or, you can re-melt the gelatin pad and let it harden again. If the surface dries out between printing sessions, use warm water to soften and re-moisten it.

Ink Recipes

These recipes come from a source contemporary to the hectographic printing era: Fortunes in Formulas for Home, Farm and Workshop. The Modern Authority for Amateur and Professional. edited by Gardner D. Hiscox and T. O'Connor Sloane (New York: Books, Inc., 1907; rev. ed., 1956).

Purple: Methyl violet, 2 parts | Alcohol, 2 parts | Sugar, 1 part | Glycerine, 4 parts | Water, 24 parts

Black: Methyl violet, 10 parts | Nigrosin, 20 parts | Glycerine 30 parts | Gum arabic 5 parts | Alcohol, 60 parts

Red: Fuchsin, 10 parts | Alcohol, 10 parts | Glycerin, 10 parts | Water 50 parts

A modern recipe using contemporary pigments is found in Recipes for Art and Craft Materials, Helen Roney Sattler, (New York: Lothrop, Lee & Shephard, 1973):

1 1/2 teaspoons water-based pigment, such as Prussian blue, iodine-green, methyl violet, and so on. (Do not use an oil paint pigment. Aniline dye is best but poisonous.)

1 teaspoon glycerine

4 teaspoons distilled water

2/3 teaspoon peppermint or lemon extract

Mix the pigment with glycerine until smooth and well blended. Add water and extract. Stir or shake until thoroughly mixed. Makes about 2 tablespoons-enough for several projects.

Sources:

Glycerin: commonly available in small bottles at drug stores, or search for "soap-making supplies".

Ditto Masters: local independent office supply houses or REPEAT-O-TYPE, 665 State Rt. 23, Wayne, NJ 07470 U.S.A, www.repeatotype.com

Hecto Inks and Pencils: www.spaulding-rogers.com or local tattoo supply businesses.

My information sources for the gelatin recipe, history, and printing process:

www.fell.demon.co.uk/steve/jelly.html | www.fell.demon.co.uk/steve/inks.html -| www.deadmedia.org/

Better Times Emergency Notes

Hygiene, Trash, Human Wastes

Hygiene. This is the first line of defense against the spread of disease and despair. If electricity is not available, household duties require the assistance of everyone. Persons with special needs (such as families with young children or the elderly) may need the help of neighbors. Attacking messes when they are "small" keeps them from becoming big problems If water is scarce, scrub pots and dishes with brushes (or clean sand, or newspaper) to remove food particles and grease, and then wash in hot soapy water

To make sanitizing and disinfecting solutions. . . Use ordinary unscented chlorine bleach (sodium hypochlorite, 5.25% in water solution, such as Clorox) to make sanitizing and disinfecting cleaning solutions. For **sanitizing**: For hard, non-porous surfaces, use 1 tablespoon liquid bleach in 1 gallon water, wet and then air dry, don't rinse. For porous surfaces (like a wood cutting board), use 3 tablespoons bleach per gallon, wet liberally, rinse and wipe dry. For **disinfecting**: Use 3/4 cup bleach in 1 gallon of water, small items can be soaked, surfaces such as floors or counters should be wet liberally and kept wet for 2 minutes. 1 tablespoon of powdered detergent may be added, but do not add anything that contains ammonia, as it reacts badly with chlorine. Rinse after disinfection. For toilets, pour 1 cup bleach into the bowl, brush, let stand for 10 minutes. Change the solutions frequently for heavy cleaning.

Washing Clothes. Use rubber or plastic tubs or buckets and a household plunger to wash clothes without electricity. Put water, detergent, and clothes in the buckets. Cut a hole in the lid for the plunger handle (the agitator). Soak the clothes. Insert the plunger handle through the lid, put the lid on the bucket, agitate, and voila, wash day without electricity. You can use the sink. If water is scarce, don't let the wash water to run down the drain (if the sewer isn't working, the drain may be clogged). Use a tub of clear water to rinse the clothes. Some clothes may require hand scrubbing Air dry by hanging on clothes lines or hangers. In winter, air drying clothes inside helps humidify the living area and that's useful. Hand wringing clothes is laborious work, you'll want extra hands to help; Use the wringer of a commercial mop bucket.

Personal Cleanliness. If water is scarce, use a bucket or tote instead of the tub for bathing. If you use a sink, don't let the water disappear down the drain, you'll need it for flushing the toilet or watering a garden. Put the tote in the bathtub and stand inside it. Use a camp shower, sprinkler bucket, or cups of water, or a wash cloth and a basin of water. Wash your hands regularly, especially after using the toilet; many diseases are passed hand to mouth. If water is scarce, pour a chlorine bleach disinfecting solution over your hands (mix this in a jug, and have it ready for use). Cornmeal or cornstarch can be used as dry shampoos (sprinkle liberally in the hair, and then brush vigorously). Use only boiled or otherwise purified water for brushing your teeth or cleaning contact lenses. If you usually shave, continue to do so unless a scarcity of water or lack of razor blades make this impossible. On sunny days, you can have hot water for washing by painting food grade plastic buckets (with lids) black, filling them with water, and putting them in the sun. (This can be a source of free heat; put several into the sun, and bring them in to help keep a room warm.) You can paint 2 liter pop bottles black to obtain smaller amounts of hot water.

Maintaining normal routines is important. Don't skip your daily wash, even if you have to use just a basin and wash cloth! It boosts morale and prevents disease. Be proactive in your community to ensure public health.

Trash. If normal services are interrupted, trash is a serious urban health danger. If you don't take care of it, the rats and flies

will, and you won't like that. The primary rule is: Be careful what you throw away and how you throw it away. Do what you can, with what you have, where you are is a traditional saying that bears remembering. People can respond creatively to disruptions of normal supplies and services. When you begin to think of your trash as less of a disposal problem and more of a useful resource, you're getting to the point.

Throw away less stuff. Bottles and cans have other uses once they have been emptied; food and shredded paper can be composted. If stores are closed, you'll find uses for cans. Sort what you throw away; a big problem with recycling is the practice of mixing different kinds of trash. Don't mix wet and dry trash! You will create a stinky mess that will be attractive to flies and rats. Keep toxic items such as spray paint cans separate. Don't put disposable diapers in with other trash. Separate it, bag it, stack it, and cover it with a tarp so it can't get wet.

Compost the organic trash. Mix shredded dry organic materials (such as newspapers, leaves or sawdust), with wet and green organic trash (lawn clippings, kitchen/garden scraps -- no meats or fats -- and dirt. Keep this compost heap covered with dry material, and slightly damp. If it starts to stink, you probably need to add more dry material or dirt. As the compost rots, it generates heat. You can capture some of this heat as hot water by running a garden hose through the compost heap(s).

Don't put disposable diapers into latrines, compost heaps, or bury them in the ground. If trash collection is disrupted, switch to cloth diapers. Disposable diapers in a disaster situation are a disaster in and of themselves. They can't be burned (institutions can be fined for burning them in their trash incinerators). If you bury them, you could end up digging up your entire yard and you will have a backyard full of diapers that will never decompose. Bag and stack them if you must, but cloth diapers are actually less hassle than fly-infested bags of smelly "disposable" diapers.

If disruptions of trash collection are prolonged, you may be tempted to organize the burning of trash, but this should be done in conjunction with public authorities such as fire or police departments. Be pro-active in organizing your neighborhood to take care of its trash. Don't wait for the flies and the rats to start working on it. It's best to think of your community's trash as a resource that can be used to help people get through tough times.

Disposal of Human Wastes. The breakdown of a city's sewage system is an immediate threat of the spread of disease. Improper disposal of human wastes causes epidemic diseases that kill people. Immediate intervention is required. Do not use public spaces such as parks or lawns for human waste disposal on the surface of the ground. Do not bury human waste in snow. If the sewer works, but the water doesn't, use water that has been used for washing to flush the toilets. The "California System": "If it's yellow, it's mellow; if it's brown, flush it down".

Chemical toilets (such as porta-potties) are a temporary solution, but something must eventually be done with the sewage in the storage chamber. If you have access to a gas station or RV park, or if trucks can come and pump the tanks, you can dump into a holding tank; this service may be limited by the availability of fuel and electricity.

To make an emergency toilet, put a toilet seat on a rigid plastic bucket. In the bottom of the bucket, place some sawdust, peat moss, or dried leaves mixed with some dirt. After each use, add more of this material so the waste is covered. When the bucket is full, you have 2 options: (1) Dig a hole in the ground about six feet deep and 2 or 3 feet across. Empty into the hole, and cover completely with dirt. Cover the hole with a board weighted down with bricks or rocks. When this has been filled to within 2 feet of the surface, fill it the rest of the way with dirt. Disposal holes must be at least 8 yards away from a source of water

such as a well, pond, or stream. (2) empty into a compost heap, and cover completely with natural materials. (This compost should be aged for at least one year before using, and it must be monitored to ensure that it heats up properly so the disease pathogens are killed.) An alternative is to put a small amount of water in the bucket, and empty it each time it is used for solid wastes. After rinsing, disinfect with a chlorine bleach disinfecting solution.

The primary problems of outdoor pit latrines are flies/mosquitos, odors, and the spread of disease, none of which are minor nuisances. Manage these by: (1) covering the pit with a slab of concrete or plywood; this slab must fit tightly to the pit walls so that there are no gaps or holes between the latrine cover and the edges of the pit, (2) installing a capped and screened vent pipe that rises at least 18 inches above the roof of the latrine, and (3) using a tight fitting seat cover inside the latrine. Paint the vent pipe black and place on the sunny side of the latrine. This heats the air inside the pipe, causing it to rise and draw air out of the pit, minimizing odor. If toilet paper is not available, many common papers can substitute, such as newspaper or phone book paper. Some cultures use water for cleansing.

Better Times Emergency Notes

YOU NEVER MISS THE WATER UNTIL YOUR WELL RUNS DRY.

If the water system has been disrupted, assume the water is impure unless announced otherwise. 90% of the surface water on Earth is unsafe to drink without purification. Many life-threatening diseases and parasites can be spread by impure water. Do not take chances with water!

If the city water system is disrupted and pressure is declining: (1) close the main shutoff valve. If the gas and electricity are still on, turn off the hot water heater. (2) Open the faucets, one by one, collecting any water that comes out. Do this until all the faucets in the house have been opened and their water drained into containers. (3) Open the drain valve on your main water line. If there is no valve, disconnect a water pipe at the lowest point in your system, and drain the water. To tap the water heater, close the cold water inlet pipe (on top of the heater). Open a hot water tap and let the water run until it stops. Attach a hose to the drain cock in the base of the heater, open the valve and drain into a container. The plumbing of large buildings contains a lot of water. The building maintenance supervisor would know how to access this water. Waterbed water is not safe to drink due to the toxic anti-algae treatments, but it is a great source for water for flushing toilets. Treated swimming pool water is a judgment call based on what it has been treated with.

Wells. Many cities have artesian wells in parks and other public places. Studies indicate that ground water that has filtered through 2 meters (a little more than six feet) of sand or loam is free of bacteria, parasites, and other water-borne problems, but there could be problems such as a leaky sewer pipe or industrial contamination with the water. Unless announced otherwise, purify the water.

Rain. Most houses and buildings have gutters that collect and channel rain to down spouts. When it rains, let the water run for about 10 or 15 minutes, and then catch the runoff from the down spouts in barrels or buckets. (If the roof is in bad repair, cover it with tarps or plastic.) Rainwater can be caught on flat roofs by tarps that channel the water into buckets. Rainwater is pure, but if the roof or gutters are in bad condition or dirty, purify the water before drinking. You can dig emergency cisterns into the ground at run-off points. Line them with plastic, bricks, or wood. Depending on the lining, this water should be purified before drinking or cooking.

Streams, rivers, lakes. All surface water must be purified before drinking. Just because animals and birds may drink it doesn't make it safe for humans. Water-borne diseases & parasites are grave threats from such water, even if it looks sparkling clean and pure. Snow and ice melt. Fresh, clean, just-fallen snow can be melted and used without further purification. Older snow must be purified. Don't eat snow; you'll have a net water loss due to the energy required to melt the snow. Use a candle, a camp stove, wood stove, or the sun. Two ways to melt snow with the sun are: (1) Pack clear containers (smaller containers, like a 2 liter bottle with the top cut off) with snow. Place them on a black background in full sun. (2) Put two poles in the ground and drape a couple of black trash bags so their ends are in a bucket. Put some snow on the black plastic. Orient this so the snow is exposed to full sun. The melted water trickles down the plastic into the bucket. Rivers. Dig a hole at least 3 feet deep below the level of the water, about 12 feet from the river's edge, in a spot that is only a foot or so above the level of the river. You may need to shore up the sides of this hole to keep it from collapsing. Water will seep into this hole from the river, and will be relatively clean water, but it must be purified first.

Emergency purification of water . Water to be purified by these methods

should be as clear as possible. If the water is cloudy or dirty because of suspended solids, let it sit in buckets for a day or so to allow the solid materials to settle to the bottom and/or filter through cloths or sand.. Siphon clear water from the center and middle of the bucket, leaving the solids and the water just above them in the bottom. Put this water through several layers of coffee filters or clean cloth. Treat it by one of these methods. Make purified water taste better by pouring it back and forth between two clean containers.

Boil for 10 minutes. "Boiled" means a rolling boil, not simmering. At higher altitudes, increase the boiling time to 15 minutes. To improve the taste, add a pinch of salt to each quart of boiled water and pour it back and forth between two containers.

Treat with chlorine. Use plain, old-fashioned chlorine bleach (the label says "sodium hypochlorite at 5.25%", Clorox bleach is this strength, don't use scented or colored bleach). Add 8 drops (1/8 teaspoon) to each gallon of water.. Mix thoroughly and let it stand for 30 minutes. It should have a slight chlorine odor. If it doesn't, repeat the procedure.

To purify with iodine, use "2% U.S. Pharmacopoeia (USP) strength" (ordinary household or medicinal iodine). For clear water, add 20 drops per gallon, 40 drops if the water is cloudy. Cover and let it stand for 30 minutes.

If you are using **water purification tablets;** follow the directions on the label.

Bleach and iodine kill micro-organisms, if there are chemical pollutants in the water, they will remain.

Distillation. Put 3 tuna cans on the bottom of a large pot and place a smaller pot on top of the tuna cans. Put unpurified water in the larger pot (make sure the smaller pot does not float off of the tuna cans.) Turn the lid upside down and place it on the large pot. Bring the pot to a boil. The vapor will condense on the under side of the upside-down lid and flow down the lid to drip into the smaller pot. To hasten the process, you can put a bit of cool water in the lid, but make sure the cool water can't drip through the lid into the water below.

Better Times Emergency Notes

Keeping warm in a winter weather emergency
For when there is no electricity or natural gas due to a utility shut-off or natural or man-made disaster.

"The time to build the cellar is before the tornado hits." Don't wait for a winter emergency to decide what to do. Plan now and get things together before the power fails. Useful items include: extra blankets and towels, candles, flashlights and batteries, matches, battery powered radio, propane camp cooking stove, propane or kerosene heater, extra fuel, aluminum foil, extra food, hats and gloves, power inverter, marine battery or extra car battery, battery charger, buckets with tight-fitting lids, 2 liter bottles filled with water. If power failure is likely, keep your house warmer than usual to store heat in the structure of your home and its contents.

Bundle up your body! Wear several loose layers of clothes. Don't forget a hat, even when you are indoors! If you must go outside, beware of wind and wet. Keep dry. Wet clothing loses its ability to insulate, and can suck heat right out of you. Stay out of the wind as much as possible. Make sure your head, hands, and feet are protected. Clean clothes keep you warm better than dirty clothes.

Don't try to heat the entire house. Gather everybody into 1 or 2 rooms and don't forget pets. The kitchen and an adjacent room are a good choice. Close doors and hang blankets over doorways. Use plastic sheets, blankets, quilts, aluminum foil & newspapers over windows. Look for leaks and drafts and use cloth, newspapers, caulk, or weatherstripping to close them. (However, don't seal the room so tight that no fresh air can get in. Even if it is cold, you need fresh air to stay alive.) Insulate floors with blankets, newspapers, and rugs. Get Neighbors together in 1 house or apartment. Each human body radiates about 100 watts of heat. We're all familiar with the way a crowded room gets warm, so put that to work for you to stay warm during a winter emergency.

Safety first! Ventilation and attention to safety details are required for open flame heaters such as kerosene or propane heaters. Store fuels like propane and kerosene safely outside of the house or apartment.

Place the propane or kerosene heater in front of the ventilation opening (such as a window open 1/4 inch). If you place it away from the ventilation, the fumes will first fill the room before they exit from the window. Carbon monoxide and smoke detectors can save lives!

Never use charcoal briquettes or Coleman fuel camp stoves inside a house or garage for cooking or keeping warm. People die every year from carbon monoxide poisoning when they fire up charcoal briquettes inside the house to keep warm. There are no exceptions to this rule.

Never run an electrical generator inside a house or a garage. Always put it outside. Make sure it stays dry and let it cool down before re-fueling it.

Carbon monoxide poisoning is always a risk with open-flame heating indoors. If the room seems "stuffy" and you begin to feel headachy and lethargic and/or your vision gets blurry – get everyone out of the room and ventilate it with fresh air immediately. Pregnant women, children, and unborn babies are particularly at risk of carbon monoxide poisoning.

Beware of fire! Place a fire extinguisher where it can be quickly used. If you don't have a fire extinguisher, get a couple of large boxes of baking soda and a bucket of sand. Don't leave candles or open flame heaters burning unattended or while you are sleeping. Make sure candles are in secure holders that can't be knocked over. Keep them away from small children.

Don't keep a gas cook stove burning 24 hours a day for heat. They aren't designed for that. Turn the burners on to warm things up for a couple of hours if you need to and then turn them off. Wait a while before you turn them back on. Turn the oven on, at a moderate temperature, for 3 or 4 hours & then turn it off for a while. Don't leave the oven door open to heat a room. That burns out the thermostat and then the stove won't light. While the oven is on, make something good to eat to help you stay warm.

Refrigerator and freezer issues. If the temperature is below 42 degrees, take the food from your refrigerator and freezer and put it in an ice chest or other box with a tight lid. Put it outside in a covered place, such as a porch or shed. During the day, keep it in the shade. If it is below freezing most of the day, the frozen food will stay solidly frozen too. However, if frozen food thaws, cook and eat it, or cook it before you re-freeze it. Do not simply re-freeze frozen foods that have thawed; cook them first.

Lights and alternative power. Emergency lighting can be candles, flashlights, and lanterns. To increase the illumination, put lights in front of a mirror. DO NOT go to sleep with candles or lanterns burning. The flame of one candle can generate enough heat to keep a person from freezing to death. Make sure there is nothing burnable close to the candles.

Use a car battery for lights and radios. Brake or back-up lights, electric wire, and a car battery can be an emergency light source. This will cause a car battery to deteriorate faster, but in an emergency, sometimes such risks are worth it. Marine, RV, or golf cart batteries are better choices than car batteries for emergency power. They are designed to be drained slowly and recharged. If you use this set-up indoors, remember that batteries are filled with toxic, corrosive acid. Make sure the kids can't get to them. Large batteries (car, marine, etc.), if used indoors must be in a room that is well ventilated. Keep them well away from open flames.

You can use a **power inverter** to convert DC battery power to AC power that operates lights, radio, a small television or CD player. DC lights/radios run directly off the battery. A 300 watt inverter runs one or two 100 watt light bulbs and a small radio. A 600 watt inverter powers the equivalent of six 100 watt light bulbs. However, it's best to use compact fluorescents lights with an inverter because they use less electricity. You can get a solar battery charger for small batteries (AAA through D) for about $20 from www.ccrane.com/more-categories/batteries-chargers/solar-powered-battery-charger.aspx.

When the power goes out, turn off all lights except 1 & unplug electrical appliances. Turn off the heating system. When the power comes back on, there may be power surges that can damage equipment. Leave one light on so you know when the power comes back.

The sun is your friend! Open the curtains when the sun shines directly through the windows. If the windows are dirty, clean them – more light will pass through them and thus you will have more heat from the sun. Cut pieces of cardboard so they are the same sizes as your south facing windows. Cover the cardboard with aluminum foil. Place them outside the south windows straight out horizontally from the window ledge so that the light which hits the ground in front of the window is reflected into the window. As the sun moves in the sky, and light no longer shines directly through a window, cover it with curtains and extra blankets/auto sun shades.

"Store" daytime sunlight for night-time heat by placing bottles of water (or buckets with tight-fitting lids) in direct sunlight coming through your windows. This warms the water. When the sun stops shining on the bottles or buckets, their stored heat will be slowly released. Paint the bottles or buckets black to store more heat. This is free hot water for bathing or washing dishes!

To keep warm at night, bundle up. Use extra blankets. Sleep more than one person in each bed. Wear a cap to bed. Make a “tent” of blankets or sheets over the bed (like the old fashioned “canopy beds”). Or you can make a tent in the middle of a room, and gather the family inside. DO NOT use open flame heating inside a tent.

The best place for babies is on their mother's bodies, in their arms or using one of the many ways of carrying a baby and still having your hands free. Check on your elderly and vulnerable neighbors to make sure they are OK.

Food and drink can keep your warm! Drink a lot of water, and eat frequent meals with lots of carbohydrates. Soups, casseroles, bread, biscuits and gravy are comfort foods for stressful conditions that also give you extra fuel to stay warm. Besides natural gas stoves (which work when the power is out), you can cook inside with propane camp stoves, a wood burning stove or fireplace. You can warm food over candles or cans of Sterno or chafing dish fuel. You can cook outside on a gas grill. Don’t pour any heat down the drain in the form of hot water! Let hot water cool to room temperature before draining, and you get more heat and humidity in the house. If the air is really dry, put a pot or kettle of water on the stove and keep it at a low simmer.

Newspapers are great for emergency insulation. Just ask anyone who’s been homeless. They can be wrapped around legs, arms, torso, taped over windows, laid on the floor, or layered between blankets. More layers = more insulation. Auto sun shades can be hung over the inside of windows to reflect heat back into the room.

Beware of the tendency to resort to bad habits when under stress.

Better Times Emergency Notes

HOW TO STAY COMFORTABLE AND SAFE DURING THE HOT SUMMER
with little or no air conditioning

Stay hydrated. Drink at least a cup of water every 20-30 minutes during extreme heat periods in the summer, even if you aren't thirsty. Avoid soft drinks, caffeine, and alcoholic beverages. The idea that an ice cold soda pop is the perfect solution to thirst is a delusion encouraged by advertising. The more soda pop you drink, the more thirsty you will be, the hotter you will feel, and thus the more uncomfortable you will be. Soft drink advertisements are LIES! "Sugar free" drinks are as bad as the sugared versions.

Cook outside to avoid increasing the heat and humidity inside your house. Eat small, light meals, spaced throughout the day, rather than 2 or 3 big heavy meals.

Dress for the season. Wear shorts and a light shirt. Loose fitting clothes are cooler and more comfortable than tight fitting garments. Go barefoot or wear sandals. Natural fabrics are cooler than synthetics. At night, use light cotton sheets on your bed. Minimize indoor fabrics, as fabric increases interior humidity.

If the heat becomes oppressive, **dowse your head, arms, and feet with cool water,** or take a cool shower. Or go outside and dowse yourself with a water hose. Keep a spray bottle of cool water handy, and give yourself spritzes of cool water. Dip cloths in cool water and wrap around your neck, wrists, and ankles.

Shade is your friend. Keep the sun's heat from hitting windows, doors, walls. Shade the outside of the windows. Indoor curtains are not enough (although they help). Once the sun hits the glass and window frame, the heat gets inside the house, even if you have curtains. Use auto sun shades to make a cheap outdoor window shade. Duct tape two or three of them together (depending on the size of the window). Hang them on the outside of the windows. An roll-up window shade works fine. One or more curtains inside will help. Choose white or another light color (sheets are do-able and cheap). Shade the doors. Shade your walls with plants. It takes many years to grow a tall tree, but vines like Morning Glories grow fast.

If you have no air conditioning, **ventilate your house at night.** Keep the house closed up during the day until the inside and outside temperatures are the same. Then open up the windows and doors. If practical for your situation, during the day only open windows and doors that are shaded. At night put box fans in the south and west windows to pull hot air out of the house. Put box fans in north or east windows to draw in cooler air. Open every window and door to facilitate cross breezes. In the morning, close your windows and doors when the temperature outside is the same as the temperature inside.

Keep the air moving around inside. Use fans to create breezes during the day and the night. Moving air makes you feel 10 degrees cooler than the actual temperature. Use fans even if you have an air conditioner. With fan breezes inside, you can set the thermostat higher than would be the case without the fans, and maintain comfort..

Minimize heat buildup inside the house. Watch out for anything that creates heat inside the house:

-- If you have a dishwasher, don't use it or at minimum don't use the heat dry at the end of the cycle. Take cool showers.

-- Many electronic devices such as "instant on" televisions draw current all the time, and thus create heat all the time. Plug them into an electrical outlet strip and turn it off and on with the switch on the strip. This will eliminate those unnecessary "hot plates" that add heat to the indoor climate.

-- Don't use the clothes dryer, hang your clothes on a line outside to dry.

-- If you smoke, do so outside.

-- Turn your computers off when they are not in use.

-- COOK OUTSIDE!

-- Replace your incandescent lights with compact florescent bulbs.

Shade the outside parts of your air conditioner. If the air conditioner is in bright sunlight, it will work less efficiently. Shade the compressor or the outside part of a window AC with an awning. Don’t block the air intakes.

For more energy conservation ideas, visit our website www.energyconservationinfo.org .

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09161 Water Resilience

One could argue that a fractured, ad hoc, haphazard mishmash of random, inconsistent, and stove-piped projects, administered by a hodge-podge of 36 congressional committees and more than 20 agencies in accordance with outdated and inadequate laws constitutes a national water policy. A de facto one. But with so many ignored aha moments followed by ever-more-frequent and disastrous uh-oh moments, it seems we could use a policy that's not quite so dependent upon sandbags and fire hoses. -- *Elizabeth de la Vega* -

Sustainable Water Use is Resilient Water Use

Sustainable water use starts with demand destruction. Now is the time to become a true water conservative! Water is a precious resource – do not waste or pollute it!

Every municipal water system is required to produce an annual report regarding the quality and purity of its water. Get a copy of that report and study it. It is possibly available on line. Contact your municipal government (like a city council person) or water department if you can't find it.

Find out where your city's water supply comes from, how much it uses each year, what happens to water discharged from the city's systems (including its storm sewers), and what the recharge rate is for the watershed or watersheds your city draws on. Is your city using water that is renewed each year by rainfall? Or is it mining ancient waters from underground aquifers or using surface waters faster than they are replenished by the hydrological cycle?

If you suspect a particular issue with the water as it comes from your tap, have it tested. Governments have been known to lie about the results of tests and not inform people of hazards.

If your water tastes bad, or if you are concerned about the purity of your municipal water supply, you may want to use a household water purification system. These are available in a range of sizes and prices and there is literally something for everyone's budget and situation.

Don't buy bottled water. It comes with its own environmental cost and there's no good news there. It's expensive and should only be used in emergencies or when there is no other choice and you are thirsty.

Stop your personal contribution to water pollution.

Everyone lives in a watershed and everyone without exception is responsible for stopping their own personal contribution to the pollution of their watershed.

Do not dispose of hazardous liquids by pouring down the drain or storm sewers. One quart of oil can contaminate 250,000 gallons of water. All hazardous liquids should be taken to a hazardous waste collection center.

Do not flush old medications, both prescriptions and over the counter medicines. Take them to a hazardous waste collection center. If there is no hazardous or medical waste collection center in your area, the American

Pharmacists Association recommends that you dispose of the medications in your regular trash: (1) remove the label with your name or ink over it. (2) Place some water and salt in the pill container, then add something like ashes or cat litter. (3) Seal the container with duct tape. (4) Put it into the trash on the day your trash is collected, concealed under or in something so that if scavengers look at your trash it won't be noticed. Another alternative is to speak with doctors or nurses. Sometimes non-expired unused medications can be redirected by medical personnel toward people without medical insurance or organizations providing medical treatment in third world countries.

Pick up trash around streams and lakes and shorelines. Organize friends and organizations to help.

Never flush cigarette butts, condoms, tampons, or other solid trash down the toilet. Nothing should go into the toilet except for human waste and toilet paper.

Minimize your use of batteries and recycle used batteries by taking them to a hazardous waste disposal site.

Recycle used motor oil.

Don't use chemical fertilizers, pesticides, or herbicides on your lawn or garden.

Use natural cleaning products in your home. Don't pour harsh cleaning chemicals down your drains.

Emergency Water Storage.

You need at least a half gallon of drinking water per person per day.

If it's hot, or you are doing heavy manual labor, you need more.

Children, persons who are ill, and nursing and pregnant mothers need more water.

You need pure water for cooking and hygiene.

So the general resilience recommendation is to store one gallon of water for each person in your household for at least two weeks.

Water storage is one of the most important energy storages in your life. If something happens to the food supply, it takes six weeks to starve to death. That's a lot of time to make other menu arrangements. If the water supply is compromised or disrupted, you can die of dehydration in only a few days.

Death by water-borne disease, from drinking polluted water, can be agonizing and rapid. It is a primary cause of death in disaster situations.

Storing water increases the water resilience of your life.

Your first line of water storage "defense" is your hot water heater. Depending on its size, it may hold 20 to 50 gallons of water. If there is an emergency, turn off the water supply to your house or apartment. Learn how to do this in advance of an emergency. You can then tap your hot water heater for water. Open a hot water tap somewhere in the house and then open the tap at the bottom of your hot water heater to draw water out of the tap.

If you are a household of four, you will need 56 gallons of water storage. If you have a 40 gallon hot water tank, you will need to storage an additional 16 gallons of water to meet your goal.

Don't buy bottled water. Instead –

re-purpose some of the glass bottles you can easily find just about anywhere (mason jars, wine bottles, etc.) as water storage.

Wash them.

Sanitize the bottles with a solution of one teaspoon of unscented bleach in a quart of water. Swish the sanitizing solution around the interior. Drain and let sit a few minutes.

Rinse with clean tap water.

Fill with tap water. If you are using tap water from a water utility that treats the

water with chlorine, no further treatment of the water is necessary.

Store the water in the dark, and replace it with fresh water every six months.

The only aspect of life in these United States that has converted to the metric system is the beverage industry. One gallon equals 3.78 liters. If you use wine bottles, just figure 4 liters, which gives you a little more than a gallon. You'll be glad of the extra if you ever have to tap your stored water.

Wrap the bottles in newspaper and store them in boxes for easy handling. If you are using wine bottles, you can probably get free boxes from liquor stores that will fit your wine bottles, complete with cardboard dividers to inhibit breakage.

A standard 750 ML (milliliter) wine bottle is just a bit less than 1/5th of a gallon. So you would need five 750 ML wine bottles to equal one gallon, 60 bottles for a two-week supply of 1 gallon/day/one person if you had no other water available (like a hot water heater).

A standard four-liter jug of wine is 1.05 gallons. Store 14 four-liter jugs of water for each person in your household. This would give you almost 15 gallons of water. For a family of four, that's 60 bottles, 15 cases total. One innovative storage solution would be to arrange the cases, two cases tall, along a wall. Drape with cloth, and use to display household treasures, books, equipment, etc. Another possible storage area is under a bed.

A less space-intensive water storage solution is a 50-gallon barrel in a closet.

For small living spaces, stock collapsible water storage containers and fill them if it appears that you are at risk of a serious emergency (war, civil disorder, weather, etc.).

Do not use milk or juice bottles for water storage. Yes, if you insist you can use 2 liter plastic pop bottles. The iPermie position is that we should break our dependence on plastic. It is better however to store water in used soda pop bottles than to not store water. If you use plastic, wash and disinfect them the same as you do for the glass bottles.

Emergency Water Supplies

You are unlikely to be able to store enough water to see you through a long term emergency. If there is a water crisis, you have to immediately go into root-hog-or-die mode to find more water. You'll have friends and neighbors without water, so its imperative that community efforts be quickly mounted to secure water supplies.

If the water supply is compromised or pressure is declining, shut off your connection to the municipal water system. The pipes of your house (or building) and the water heater(s) contain many gallons of water. If the pressure in the municipal system is declining, that water may drain back into the pipes unless you turn off the water.

Many areas have artesian wells. Some neighborhoods have backyard wells. Make an effort to find out if there are any such wells in your neighborhood in advance of a water crisis.

All surface water should be considered contaminated – lakes, streams, rivers, swimming pools, etc. This water can be used, but it must be purified.

When it rains, you can harvest a considerable amount of water if you prepare to do so. Use whatever containers can be found to collect water. Expedient/emergency cisterns can include –

-- Holes in the ground lined with plastic or bricks (dig at corners where rain spouts or roofs channel water)

-- Wading pools

-- Swimming pools

-- Bath tubs

-- Hot water heaters

-- Truck-bed liners

-- Trash cans

-- Tarps

-- Fish tanks

-- Soda bottles

-- Totes

-- Ice chests

-- Refrigerators

-- Chest freezers

-- Cattle water tanks

-- Cellars/basements

-- Built cisterns (ferrocement)

-- Waterbeds

Let it rain hard for about 15 minutes to wash off the roofs, then begin collecting the rain water, or put containers out to collect rain directly. Look for places where water streams off the roof and put your container there to catch the rain. That is better than just putting containers out in the open to catch water. The structure of roofs concentrates rain from hundreds of square feet. Those points where water comes off the roof in a flood are the places for your expedient water harvesting containers.

Emergency Water Purification

Water-borne disease is not a pretty way to die. You need methods to purify water.

The cheapest method is to keep a jug of unscented chlorine bleach on hand. One gallon of bleach will purify 16,000 gallons of water.

Another choice is a commercial water filter/purifier. Get the best quality that you can afford and as many replacement filter cartridges as you can.

Always pre-treat water by removing as much turbidity as you can. Turbidity refers to the cloudiness or dirtiness of water. Your commercial filter is a precious resource that has a limited life. That is, it will only purify a certain amount of water and then it must be serviced, typically by replacing filter elements. While you should get extra filters for replacements, you should clean the water as much as possible before putting it through the filter. That way the filter will not prematurely degrade due to the extra dirtiness of the water.

Settling and pre-filtration are the primary ways to remove turbidity – the cloudiness that dirty water gets – as well as contaminants like dirt and other particles of "stuff." Settling is simply filling a bucket with dirty water and then letting it sit for several hours or overnight, so the heavier and larger particles mixed in with the water settle to the bottom. Skim off anything that floats.

Once the water settles, do pre-filtration. If you have a siphon, siphon the water from the top — don't start the siphon by sucking on it and running a risk of getting a mouthful of the contaminated water. Before a crisis, it's a good idea to buy and store several siphons that can be started by mechanical means. A second alternative is to pour the water, taking care to not stir up the junk that settled at the bottom of the bucket. Make a pre-filter of several thicknesses of cloth. Put the water through this, either by siphon or pouring. Slowly.

Chlorine bleach can purify water. Use plain, old-fashioned, unscented chlorine bleach, the label says "sodium hypochlorite at 5.25%."

Add 1/4 teaspoon to one gallon of water. Mix thoroughly, and let it sit for 30 minutes.

Boiling can purify water.

Boil water for 10 minutes. "Boil" means a rapid rolling boil, not a few bubbles drifting up. Start timing when the water is rapidly boiling, not when a few bubbles drift up. If you are at higher altitudes, increase the boiling time to 15 minutes.

See the printable flyer in document 09151 for more water ideas.

Slow Sand Filtration

Because one never knows when punctuated equilibrium will hit us and take the system as we know it down for the count, be prepared to build household and community water treatment structures that can provide permanent use if city water systems go down and are not restarted.

The primary method low-tech method that is available is slow sand filtration. Document 09151 Printable Flyers has a URL for instructions on building a slow sand filter for home use. The basics are that water is allowed to slowly trickle through a couple feet of sand. After about three weeks of such trickling, a biological layer develops on top of the sand. This biologically active layer is the water purifier, together with the filtering effect of the sand. It takes at least three weeks to get going. Once it is working, it can provide a continuous supply of purified water. The author of the instructions recommends boiling the water after sand filtration unless you can test the water to ensure the filter is working correctly.

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09171 Air Pollution

Like a man who has been dying for many days, a man in your city is numb to the stench. — *Chief Seattle*

While the particulars of the air pollution problem in any given area may vary, the problem is universal.

Air pollution contributes to the ongoing degradation of the ecologies in which we live. It is harmful to human life and all the creatures with whom we share the planet.

The consequences of air pollution to humans include:

-- Asthma
-- Lung cancer
-- Coughing, throat irritation, chest pain
-- Ear infections
-- Carbon monoxide poisoning
-- Headaches
-- Type 2 Diabetes
-- High blood pressure
-- Breast cancer
-- Increased risks of heart attacks and strokes

During the "London Fog" of 1952, thousands of people in London, England died because of a toxic combination of smoke from coal fires, industrial pollutants, and weather circumstances. This helped spark a movement to regulate and eliminate sources of air pollution. While substantial progress has been made, the air remains polluted in many parts of the world. Air pollution contributes to mortality, illness, a general degrading of the quality of life, and is destructive of the natural ecologies.

Besides the pollution of the outdoor air, dirty indoor air is a problem. Sometimes the air inside our dwellings is worse than the exterior atmosphere.

Protect yourself from indoor air pollution.

Don't smoke and don't allow others to smoke in your house. Marijuana smoking is not an exception to this. No, using a bong does not make marijuana smoke less dangerous. By cooling the smoke, it allows you to suck it deeper into your lungs, where it can do even more damage. If you must use marijuana, make brownies. cookies, fudge, or cupcakes, don't smoke it.

Get **carbon monoxide, smoke, and radon detectors** for your home.

If you use a wood burning stove, install and **regulate it so that smoke does not enter the house** but instead exhausts through the chimney. That pleasant smell of a wood burning fire is actually a signal of indoor air pollution.

Get rid of dust mites, mold, and mildew. This is a matter of basic cleanliness and maintenance inside the house. Make sure there aren't any leaks around the plumbing that can provide a fertile ground for mold and mildew. If mildew or mold forms on frequently wet areas (like bathrooms), get rid of it immediately. Wash bed sheets once each week and use a dust-proof cover for the mattress. If you have carpets and fabric-covered furniture, vacuum them regularly. Keep the interior humidity below 50%.

Make sure any **open flame heaters or stoves are properly vented** to avoid accumulations of carbon monoxide gas in the living areas.

Use paints, finishes, and materials that are low in volatile organic compounds. When possible, avoid bringing items made from artificial materials into the home. Avoid anything made with formaldehyde. This list can include carpets, particle board, cheap paneling, pressed wood products (cabinets and furniture). Most products made with formaldehyde can release fumes for as long as eight years, with the worst emissions in the first year. Extreme heat or moisture can accelerate the emissions and restart emissions after the eighth year. Wrinkle free/permanent press clothing items are another source of formaldehyde. This is another reason for buying used clothing in the after market – after repeated washings, the formaldehyde residues will wash out of clothing. You'll need to iron more. Isn't that better than soaking up formaldehyde through your skin? That "new car smell" that people love? It's caused by the out-gassing of chemicals used in making a car and many of them are toxic.

Don't use scented candles or sprays to hide odors. Find the cause of the odor and eliminate or clean it to stop the odor at its source.

Use **less toxic, more natural cleaning products** in your home.

Clean the filters on ventilation equipment regularly and replace as necessary.

Use lots of plants that clean air in your home. The rule of thumb is two plants per 100 sq. ft. of living space. The best plants for cleaning your indoor air are (in order starting with the best):

The NASA List

-- Areca Palm (Dypsis lutescans), ranked "best indoor air cleaner and humidifier."
-- Lady Palm (Rhapis excelsa), ranked "second best indoor air cleaner."
-- Bamboo Palm (Chamaedorea seifnzii), benzene, trichloroethylene and formaldehyde
-- Rubber plant (Ficus robusta), especially good with formaldehyde
-- Dracaenas (Dracaena deremensi), combats pollutants associated with varnishes and oils
-- English ivy (Hedera helix), filters airborne fecal matter particles, mold, and formaldehyde
-- Dwarf date palm tree (Phoenix roebelini), filters chemical toxins in the air
-- Ficus alii (Ficus macleilandii)
-- Boston fern (Nephrolepis exalta), mold and toxins
-- Peace lily (Spathiphyllum), filters formaldehyde, benzene, trichloroethylene, toluene, xylene

Other plants good at filtering indoor air:

-- Dracaena (Dracaena marginata), filters xylene, tricholoroethylene, and formaldehyde
-- Weeping fig (Ficus benjamina), cleans formaldehyde, benzene, trichloroethylene
-- Spider plant (Chlorophytum comosum), cleans benzene, formaldehyde, carbon monoxide, xylene
-- Golden pothos (Scindapsus aures), great for filtering formaldehyde
-- Gerber daisy (Gerbera jamesonii), filters trichloroethylene, benzene
-- aloe vera, cleans formaldehyde and benzene
-- Snake plant, or Mother in Laws Tongue (Sansevieria trifasciata 'Laurentii'), best for formaldehyde
-- Azalea (Rhododendron simsii)
-- Chrysanthemum/Pot mum (Chrysantheium morifolium), filters benzene

Protect yourself from outdoor air pollution.

Monitor the air quality index for your area. If you don't know where to find that information, try a Google for "air quality index" of your city. See also http://www.airnow.gov for reports on 300 cities.

On days when the air quality is poor, **limit outdoor activities** if possible.

The hotter it is outside, the worse the air quality (generally speaking). Stay inside if you can manage it when it is hot outside. Alternatively, do your outdoor activities earlier in the morning when it is cooler and the air is less polluted.

If you walk or ride a bicycle, avoid doing so along heavy traffic roads.

If you are working, playing, or exercising outside during bad air episodes, and feel a tightness in your chest, or if your eyes get teary and/or red, don't push it. Stop and go inside.

Eat foods that are high in oxidants that remove free radicals which help cancer-causing substances do their evil work on your body.

During periods of heavy air pollution, drink plenty of fluids (water especially) to keep your respiratory system hydrated.

Do your part to stop air pollution.

Use less energy. All forms of fossil fuel energy production and distribution pollute the air as a consequence. The less energy you use, the lower your contribution to the air quality problem.

Drive less. Walk, take public transportation, ride a bicycle, carpool more.

Encourage your local and regional governments to **convert fleets (public transit, school bus, police cars, etc.) to run on natural gas**, which has fewer pollution emissions than gasoline or diesel powered engines. NB: This recommendation is based on current information about the emissions of natural gas engines. It does not take into consideration issues with natural gas production. There are some indications that if those are taken into consideration, due to the problem of methane releases associated with natural gas production, it may be more dirty than coal! Before acting on this, check the current research to find out if more data has become available on emission problems associated with natural gas production.

Never fill your gas tank during the day. **Always fill up at night.**

Don't use **two-stroke engines** for mowing lawns, trimming, leaf blowing etc.

Buy **wind generated electricity** from your utility.

Oppose any proposals to **build coal-fired generating plants** for your utility.

Don't burn wood for heat unless it is an emergency or you have no other alternatives. If you must burn wood, use an efficient wood stove.

Plant trees, which help to clean the air.

Support public policy initiatives and proposals that **lessen the amount of pollution** in the air.

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09181 Assessing and Mitigating Hazards Specific to a Situation

It does not do to leave a live dragon out of your calculations, if you live near him. -- *J.R.R. Tolkien, The Hobbit*

Assessing the risks of your specific life situation is essential to the observation required for good permaculture design. If you live on the Great Plains of the United States, you don't need to understand and implement hurricane preparations. You would be unwise to ignore preparing for tornadoes, severe windstorms, hail, and prairie fire (depending on exactly where you live and the circumstances of your dwelling).

In general, universal risks include –

-- Weather/climate problems
-- Earth issues (earthquakes, mudslides, sinkholes)
-- Crime/violence
-- Disease
-- Pollution (water, air, food)
-- Risks relating to invisible structures (governments, state failure, etc.)
-- Animals
-- Flooding
-- Fire
-- Accidents
-- Peak Oil
-- War
-- Technology
-- Environmental
-- Economic
-- Systemic Crisis/Failure (temporary or permanent collapse of civilization)

By observation, you decide which of these risks apply in your situation and to what degree, since all risks are not created equal. In analyzing these hazards, it may be useful to classify them based on the danger the risk represents and the likelihood of it happening.

-- Risks with major personal/household impact, low probability of happening.

-- Risks with minor personal/household impact, low probability of happening

-- Risks with major personal/household impact, medium probability of happening.

-- Risks with minor personal/household impact, medium probability of happening

-- Risks with major personal/household impact, high probability of happening.

-- Risks with minor personal/household impact, high probability of happening

The "high probability of happening" risks, both major and minor, should receive the most attention. None of the other risks should be completely ignored.

Each hazard needs a plan:

-- Can I eliminate or avoid this risk?

-- If not, how much can I reduce this risk?

-- How can I minimize the risk of damage from this risk?

-- If the hazard is something like a tornado, which can't be avoided if it occurs, how do I protect from this hazard?

-- How do I recover afterwards from the damage of the hazard?

Apply this process rigorously to each hazard on your list. Drill down to the level of detail that makes sense for each hazard. Don't leave anything out.

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09191 Mutual Aid

By mutual confidence and mutual aid - great deeds are done, and great discoveries made. – *Homer*

We are not put on this earth to see through one another, but to see one another through. – *Unknown*

Mutual Aid is the title of a book by Peter Kropotkin. About the book, Wikipedia says –

> Written partly in response to Social Darwinism and in particular to Thomas H. Huxley's Nineteenth Century essay, "The Struggle for Existence," Kropotkin's book drew on his experiences in scientific expeditions in Siberia to illustrate the phenomenon of cooperation. After examining the evidence of cooperation in nonhuman animals, pre-feudal societies, in medieval cities, and in modern times, he concludes that cooperation and mutual aid are the most important factors in the evolution of the species and the ability to survive . . .
>
> . . . Kropotkin pointed out the distinction between the direct struggle among individuals for limited resources (generally called competition) and the more metaphorical struggle between organisms and the environment (tending to be cooperative). He therefore did not deny the competitive form of struggle, but argued that the cooperative counterpart has been under emphasized: "There is an immense amount of warfare and extermination going on amidst various species; there is, at the same time, as much, or perhaps even more, of mutual support, mutual aid, and mutual defense . . . Sociability is as much a law of nature as mutual struggle."

Mutual aid is one of the essential aspects of permaculture. In the first section, we talked about how a forest can persist for long periods of time without a gardener to make interventions. The wastes of some are food for others – everything gives and everything receives. We've returned to this concept frequently as the iPermie pages have turned.

While it could be said that our entire approach to permaculture is about mutual aid, in this chapter, we will consider mutual aid as it relates to disasters, in particular, systemic disasters. Mutual aid can mark the difference between life and death in such events.

We think of disaster response as a government responsibility. The events of recent years question the prudence of relying on the government to come to our assistance.

Government budget cuts **reduce the resources available** to agencies responsible for disaster relief.

Nonprofit agencies doing disaster relief also **have had to cut budgets** because of declines in contributions.

If the **disaster is above a certain threshold,** such as the Katrina hurricane -- or if there are **several large-scale disasters in progress** at different geographic locations at the same time -- **government and private agencies may**

simply be overwhelmed by the events and unable to respond adequately, even with the best of intentions and organizational development.

Government authorities may turn criminal. During Katrina, police shot unarmed African Americans attempting to evacuate New Orleans through a mostly white suburb and some were killed. Caretakers abandoned people in nursing homes who were not rescued by local authorities. Government authorities put people at risk while they squabbled about responsibilities and turf. The 20th century teaches us that **we can't trust the government to tell us the truth.**

The evidence is clear that we rely on government aid during a disaster to our mortal peril. If the government's cavalry shows up in the nick of time, great. If not, we need alternative, close-to-the-ground structures, that can go into action immediately during a crisis.

Getting there the firstest with the mostest.

In a crisis, those who get there the firstest with the mostest have the best chance of influencing the outcome, for good or for ill. Here is a process that you can use to prepare to respond effectively when the times call for prompt grassroots action to save and protect human life and community:

Prepare yourself and your household first.

Then, find and develop a core leadership group to form a mutual aid disaster response organization, and give yourselves identity, competency, authority. This can be your permaculture education and action group. Or it could be the beginning of a permaculture education and action group.

Work on your shared map, shared plan, and leadership issues.

Find the knowledge and instructions you will need.

Develop the essential organizational infrastructure, both physical and social, and practice using it.

Become involved with your community.

Localize and Regionalize.

Be ready to act without hesitation or uncertainty at short notice.

By implementing this program, you can plant and nurture the seed of a spontaneous emergent order that can cope with a perilous situation that may be mushrooming out of control. Good design will enable you and your community to build new structures amidst the collapsing ruins of the old that both replace the old failed systems and protect you and your neighborhood from their falling debris.

Prepare yourself and your household first. Observe and analyze/evaluate your own household's vulnerabilities. Design your responses. Implement your plans. One of the roots of authority is authenticity. Walking your talk gives you credibility in a crisis.

Find and develop your core leadership group and give yourselves identity, competency, authority. Where do you find these people? Start with those you already know from work on permaculture issues. What's that you say – you aren't already working with other people on permaculture issues? You have managed to work your way this far into iPermie, reading through hundreds of thousands of words, and still you resist the permaculture call to community?

Believe it or not, I understand that. We live in a gravely damaged cultural ecology that teaches us to be afraid of connecting with others. It's not for nothing that the motto of the ruling aristocracies is "divide and conquer." Their job is much easier if we remain disunited and fearful of each other.;

It's a hard lesson to learn, but permaculture is not a solitary, individualistic affair. Permaculture incorporates cooperation and community – mutual aid! – the title of this chapter. Communities of compassion and mutual responsibility and interdependence are, I

think, the missing factor in many people's ideas about permaculture. For the iPermie approach, community is as necessary and important as the permaculture ethics, the principles of redundancy, diversity, and stacked functions, and the utility of forest gardens, spiral herb gardens, and edible landscaping.

The time to develop trusting relationships is before a crisis hits. Start with people you know and trust. If you aren't working through an existing organization, start one.

There are four primary sources of an organization's emergent authority in a crisis:

-- *The human rights to participation & association.* Everyone has an inherent natural right – and responsibility! – to participate in your own life and to freely associate with others for mutually agreeable goals.

-- *Practical work in advance of need* to identify challenges and opportunities and develop plans to mitigate dangers and adapt to changing circumstances;

-- *Your willing ability to freely share* this expertise and situational awareness with others (servant leadership!), and

-- *Your competent group discipline* to work together on common tasks.

Appearances count! Make an authoritative-looking picture ID for each member of your group. Get everyone an orange vest, like hunters wear. How do you make a picture ID? Get "passport size photos" of everyone. Make an identity card template on a computer. Print it out, customized with each person's identity info and your organization's name. Put their photo on it and have it laminated at a copy shop. Punch a hole in the top, run a cord through it, hang it around your neck.

Work on your shared map, shared plan, and leadership issues. Use the Shared Critical Infrastructure Map system. http://www.resiliencemaps.org

The time to identity threats, find resources, and design contingency plans is before the crisis hits. Make multiple copies, and spread them around. Plan for best and worst cases, and points "in between."

Find the knowledge and instructions you will need. To establish credibility in a crisis, provide practical knowledge and instructions that help people protect themselves and their families and adapt to changing circumstances.

While computer files and CDs are useful to transfer and distribute info, in some emergencies they may not be usable. **Get paper documents and books for critical information.** Make copies of printable flyers to distribute in advance of need. You need enough to saturate your neighborhood and extra to share elsewhere. Make copies of the Civil Emergency flyer for every household in your neighborhood, & one set of the other printable flyers for every 10 households.

Develop the essential organizational infrastructure, both physical and social, and practice using it. Get a small copier, a generator/inverter, and make a hectographic duplicator. Get a radio system (CB, Family Radio Service, or Ham) and test it regularly. Conduct drills to test your designs and practice your responses.

Become involved with your community. Don't be a stranger to your neighbors. Know them as well as possible under the circumstances. Where appropriate, join neighborhood non-governmental organizations/institutions and patronize locally owned businesses. Introduce yourself! Trusting relationships built in advance of a crisis are likely to carry through the emergency as trusting relationships. Know who the troublemakers are too. Getting your neighbors involved with mutual aid in case of disasters could be the first step to introducing them to permaculture.

Localize and Regionalize. If your Mutual Aid group is concentrated in your neighborhood, help start similar groups in

other areas of your municipality/region and network with them. If your Mutual Aid group is scattered over a region, members should establish mutual aid groups in their local residential neighborhood. In a crisis, your areas of practical cooperation will be the household, neighborhood, and municipality. Before the crisis, you can work effectively at the region and even higher levels, but the most productive will likely be the individual, household, neighborhood, municipality levels. Support community/regional projects that increase resilience, protect infrastructure, and reduce the brittleness of vital systems.

Be ready to act without hesitation or uncertainty at short notice. Get there the firstest with the mostest!

Essential design disciplines and principles.

Here is a basic review of permaculture design principles and strategies to use in designing mutual aid disaster plans.

Observe carefully and thoroughly.

Trust yourself.

See everything as part of a whole.

Solutions grow from place.

Never do anything for only one reason.

Do only what is necessary, but do what is necessary.

Design and act on a scale appropriate to the circumstances.

Incorporate redundancy, responsibility, and resiliency everywhere.

Work with the edges, promote/protect bio-diversity.

Nothing you do (or don't do) is without consequence(s).

Energy follows patterns set for it; everything works both ways.

Everything needs something else. Seek a harmony between giving and receiving.

We start small or we don't start at all.

Make the least change for the greatest effect.

Design from patterns to details.

Cycle everything.

Prefer biological solutions where possible/practical.

The problem often contains the solution.

Don't let the perfect become the enemy of the good.

First things first, second things second, etc.

Design so that all can participate in their own rescue.

Think and design “outside of the box.”

Don't be afraid of manual labor.

Incorporate personal, household, and community responsibility everywhere.

Use a 4-step design plan – Observe, Study and Evaluate, Design, Implement (follow that with critique and practice.) OSEDI!

Don't abandon your morality and principles.

Don't leave anyone behind for the wolves to devour.

The best designs care for people, care for the planet (with a particular focus on your immediate neighborhood), and have a care for the future.

In a crisis, cooperation is more important than competition.

Never seek a good end by immoral means.

Simple rules produce complex behavior.

Complex rules produce stupid behavior.

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09201 Mitigating deterioration in a community.

Community deterioration is a cooperative endeavor between the larger "mega-forces," individuals living in that community and the leadership they elect. In a fascinating article that looks at altruism, Stuart W. Twemlow, M.D. of the Menninger Department of Psychiatry, Baylor College of Medicine and his colleagues outlines the systemic spiraling cycle of deterioration within a community that contributes to its further demise.

These cycles can be seen, for example, in economic job loss, which intensifies the demand for chemical distractions, which promotes drug trafficking, which increases the incidents of violent crime.

Crime increases fear, which increases isolation and detachment, out of concerns that one will be victimized. Trauma and stress shrinks the mind set to our most immediate concerns, and broader perspectives such as community cohesion and compassion, become viewed as too distant to contemplate. Self-concerns and those of one's own immediate family become sole priority. – *Dr. Kathy McMahon*

The process of deterioration in a community is well documented. It is studied both by social scientists and by businesses and politicians that want to benefit from the deterioration or even the total destruction of a community.

It's not always a random one-thing-leads-to-another-it's-nobody's-fault situation. Sometimes community deterioration is deliberately set in motion so that land can be bought cheap from the present owners and converted to other uses by those with access to political power.

Dr. Kathy McMahon, a/k/a the Peak Oil Shrink, has an interesting way to describe the beginning of the process in her essay, Pathways to Community Collapse: Can We Intervene?, available online at http://www.peakoilblues.org/blog/?p=1375. She writes –

> In the home, it is the "pair of socks on the living room floor" that begins to communicate to the residents, however unconsciously, that "no order need reign here." In the community, we might see broken street lights, potholes that aren't repaired, or litter blight. In the early stages, people stop celebrating occasions that were symbolically significant. They cancel the yearly town cookout for "lack of funds." Religious practice and community involvement decline. Drug abuse and domestic violence start to increase. Violence invades the schools. Dropping out of the education system becomes "cool."

McMahon goes on to note **14 key elements of community deterioration:**

-- Personal power comes from violence.

-- Immediate gratification is the rule.

-- Stable family and political systems go missing.

-- Powerlessness, despair, anomie are omnipresent.

-- Escapism rules.

-- Bully-victim-bystander relationships proliferate.

-- Denial and scapegoating are common.

-- Police become corrupt.

-- Social welfare programs are cut

-- Population redistributes

-- Crime pays and this is obvious and flagrant.

-- The vulnerable are abused and rejected

-- Gender, ethnic, and religious conflicts multiply.

-- Anti-intellectual attitudes prevail.

At some point in this process, any identifiable local community dies and what is left is simply a collection of human beings inhabiting a particular section of real estate, without any beneficial connections with each other and with many negative and harmful connections with each other.

Intervene Early if Possible.

The place to intervene is as early in the process as can be managed. As with any disintegrating system, the longer the devolution continues, the harder it is to make positive changes. Often, the political solution is to bulldoze the neighborhood and sell it to businesses who make good campaign contributions. Indeed, this process may be initiated by corrupt alliances between businesses and politicians who want to get the lands of the poor without paying market prices in a way that will evade existing community defense mechanisms.

In the early 2000s, the Oklahoma Department of Transportation wanted to build a freeway through a low income neighborhood in Oklahoma City. During the run-up to the actual decision, when community support was divided in the affected neighborhood, crack houses began to proliferate in the area. Curiously, the police could not do anything about the problem. The consequent degradation in the quality of life in the neighborhood drove people to support the freeway project because “at least it would get rid of the crack houses” – by paving them over with 10 lanes of freeway.

Start by picking up the trash.

When in doubt about a place to begin an intervention to reverse a declining neighborhood, start by picking up trash. Litter is always a major problem in deteriorating neighborhoods and it is an easy problem to deal with. One person or family picking up litter can lead to a neighborhood crusade against litter, which in turn can be the nucleus of a community organization to deal with other issues of the area.

It’s important to start small, and to pick something like litter that can be easily accomplished, so that the first experience of the nascent group is positive. Litter doesn’t talk back. Picking up litter is not a controversial activity. Supplies (such as trash bags) may be available from your city or from non-governmental organizations.

Organize the Community

Community organizations – civil society – are primary defenses against community deterioration. One powerful tool for organizing is to develop a coalition of organizations in a given area. See 07051 Community Organizing for more details.

Pursue Relationships

The most effective community organizations are built on relationships, which begin with the telling of individual

stories and deep listening. This process cannot be rushed. It takes time but it is well worth the investment.

Build Resilience.

Use the Seven Habits of Personal, Family, and Community Resilience, found in 09151, as a checklist to build the capacities of your community organizing efforts.

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09211 Evacuation or shelter in place?

It wasn't raining when Noah built the ark. – *Unknown*

"Should I stay or should I go" was the title of a popular rock song from the early 1980s that has nothing to do with evacuation but it does sum up the question that must be answered in the event of disaster.

Permaculture and resilience thinker Vinay Gupta notes that in 90% of disaster situations, staying home in the right answer. Even if it is a big disaster, within 30 days the situation tends to normalize. In perhaps 9% of situations, you need to go 20 miles away (because of a flooding, brush fire, etc.) The other 1% covers war and serious insurrection, which is the worst case.

If the problem is flooding or hurricane, you will have to evacuate and if a hurricane, you may need to go further than 20 miles. Hurricane Katrina caused the evacuation of 90% of the residents of southeast Louisiana. Thousands of people were left behind in New Orleans alone, many of them were the poor and elderly. They were literally abandoned by their governments which should be a lesson for us all to heed:

When the going gets rough, you cannot depend upon the government to help or rescue you. Maybe they will, maybe they won't. Your race and economic class will likely have something to do with whether or not you receive aid in a timely manner.

A few months later, Hurricane Rita threatened Texas, and the evacuation of Houston and Galveston became a disaster in and of itself, with travel times for the 240 miles from Houston to Dallas as long as 24 hours. Even so, over 48 hours, about three million people managed to evacuate from the Gulf of Mexico, in the midst of great suffering and problems.

If you must go. . .

If you are at risk of a hazard likely to cause evacuation, **plan your evacuation in advance and do not wait until the last minute to leave.** If you do not own a motor vehicle, you need to find someone to travel with and do that in advance of need.

You must take everything with you that you will need during the evacuation – food, water, and fuel. Reports from all major evacuations in the United States over the past two decades indicate almost immediate problems with supplies of food, fuel, and water along evacuation routes.

The Just In Time inventory system only has limited amounts of products in its pipeline in any given area, based on the expected normal demand. Any surge in demand will empty the stores and supply pipelines quickly. The traffic involved with evacuations will complicate resupply.

Typically, governments bring buses, airplanes, and trains to evacuate people without cars. If you will depend on these systems, go as early as possible and take food and water with you.

Because of the many problems with evacuation, which immediately makes you a refugee, unless it is an overwhelming disaster like a hurricane or military attack, flood, chemical accident,

or fire, most of us should try to stay home and shelter in place unless circumstances or the authorities demand evacuation. If ordered to evacuate, or if a common sense evaluation of the circumstances dictates evacuation, don't delay. Leave immediately.

Bug-out Bags

"Bug-out" is a slang phrase for "evacuation," that has connotations of "going somewhere fast without much notice." Because of the potential complications of evacuation, everyone needs a "bug-out bag" for each member of the household, including pets. There may not be much lead-time to prepare so the time to get your bug-out bag together is before the evacuation alert sounds.

Japanese advice – http://www.bbc.co.uk/news/world-asia-pacific-12759840

The official US government advice for a bug-out bag includes the following --

-- Water, one gallon of water per person per day for at least three days, for drinking and sanitation. Water is heavy. It weighs 8.35 lbs per gallon. Three gallons of water is 25 pounds. If you evacuate in a vehicle, take more water. If you evacuate on foot or in public transportation, you will not be able to bring as much because of the weight.

-- Food, at least a three-day supply of nonperishable food

-- Battery-powered or hand crank radio and a NOAA Weather Radio with tone alert and extra batteries for both

-- Flashlight and extra batteries

-- First aid kit

-- Camping gear

-- Whistle to signal for help

-- Dust mask to help filter contaminated air and plastic sheeting and duct tape to shelter-in-place

-- Moist towelettes, garbage bags and plastic ties

-- Wrench or pliers to turn off utilities

-- Manual can opener for food

-- Local maps

-- Cell phone with chargers, inverter or solar charger

-- Prescription medications and glasses (take all of the meds that you have on hand with you since resupply may be problematic)

-- If you have a baby – Infant formula and diapers

-- Pet food and extra water for your pet

-- Currency and coins

-- Important family documents such as copies of insurance policies, identification and bank account records in a waterproof, portable container. You can use the Emergency Financial First Aid Kit (EFFAK) (PDF - 977Kb) developed by Operation Hope, FEMA and Citizen Corps to help you organize your information. http://www.citizencorps.gov/downloads/pdf/ready/EFFAK_2010_FEMA.pdf

-- Emergency reference material such as a first aid book or free information from www.ready.gov. (See Publications)

-- Sleeping bag or warm blanket for each person. Consider additional bedding if you live in a cold-weather climate.

-- Complete change of clothing including a long sleeved shirt, long pants and sturdy shoes. Consider additional clothing if you live in a cold-weather climate.

-- Household unscented chlorine bleach and measuring spoons.

-- Matches in a waterproof container

-- Feminine supplies and personal hygiene items

-- Mess kits, paper cups, plates, paper towels and plastic utensils

-- Paper and pencil

-- Books, games, puzzles or other activities for children, a deck of cards.

It is a lot to carry.

Over the shoulder bags and backpacks are useful methods of packing a bug-out bag. Another possibility is a "bug-out bucket," where you pack one or more 5-gallon plastic buckets with a tightfitting lid with these items.

Pack foods that don't need preparation – things like peanut butter crackers, trail mix, nuts, jerky, hard candy, etc.

The federal government's official recommendations for a disaster kit are at http://www.ready.gov/basic-disaster-supplies-kit.

Sheltering in Place

To shelter in place, you need stockpiles of food and water so that if necessary you can simply stay home or in your neighborhood and avoid whatever troubles may be contributing to the crisis.

Shelter in place may be required because of a terrorist action or chemical spill. In those cases, you need to take several actions immediately:

Shut down all heating and air-conditioning equipment that draws in air from the outside. Close all windows and doors including fireplace dampers.

Select a room as a safe room (choose the room with the fewest windows and doors). You need 10 sq feet or room for each person, so that you don't have to ventilate the room. With that much space per person, the household can stay in the sealed safe room for up to five hours without worrying about ventilation.

Place plastic over the interior of any windows and ventilation ducts and seal it to the wall with duct tape. Place a damp towel on the floor along the doorway to close that opening. Duct tape the door to the door frame.

Do not use any open flame heating in a sealed room. If it is cold, bundle up with blankets and extra layers of clothes.

Here is a government flyer explaining shelter-in-place procedures for chemical spills: http://www.emd.wa.gov/publications/pubed/shelter_in_place_flyer.pdf

Shelter in place due to nuclear attack or radiological hazard.

In the event of a nuclear attack, or a radiological hazard caused by terrorist incident or industrial accident, you may need to shelter in place because of high levels of radioactivity.

The life-threatening hazards of nuclear attack are of two types – the immediate effects of the nuclear blasts and the radiological affects of the fallout.

If you are outside of the blast area, and downwind of nuclear explosions, you are at risk of fallout. Sheltering from nuclear hazards is more complex than from a chemical hazard, mostly because with a nuclear hazard you will need to remain sheltered for perhaps two weeks or longer, depending on the exterior levels of fallout.

You need as much solid material between you and your household and the exterior world as can be managed. One foot of concrete or three feet of dirt reduce the radiological hazard to one thousandth of the exterior level. Even if not perfect, however, any shelter – such as just remaining inside a house in an interior room with no windows or exterior doors – is better than nothing. Interior rooms on the mid-level floors of multi-story buildings are good shelters, since distance as well as solid mass lessens the risk of fallout. Turn off all ventilation equipment, close fireplace dampers, put plastic over windows and seal doors for the entire house or building as indicated in the Shelter in Place section for chemical accidents. The purpose of this is to keep the actual fallout dust from entering the home or the building. If sheltering in a basement, pile dirt over any windows and along the foundation of the house.

The book, Nuclear War Survival Skills, by Cresson Kearney, has information on how to prepare emergency shelters and has plans for constructing an expedient fallout detection device that can be made from materials found in a home. The book may be read online at http://www.oism.org/nwss/ or purchased through the website or through usual bookstore channels.

Plan in advance.

Don't wait until the last minute to plan. Planning takes time and in an emergency, time is scarce.

One of the oddities of our telecommunications system is that you may not be able to reach a local number but you may be able to call numbers out of the area. Everyone in the family should have the number of a friend or family member who lives in another state. If people become separated during an emergency and cannot connect through local numbers, they should call the out of state contact to leave their location and status and any other important information.

Cell phones will go out of service quickly, due either to excess demand or as an effect of the catastrophe. Make sure everyone has a landline number they can call or be reached at during an emergency.

If people become separated, and an emergency occurs that prevents people from going home, or which requires immediate evacuation without time for everyone to get together, plan a rallying point outside the area where all family members will head for.

If children are in school, talk to school authorities in advance to find out what their evacuation instructions are. If they don't have any instructions, insist on the development of such plans and publicizing them to the parents so that the parents know where their children will be taken in the event of an evacuation.

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09221 Essential Equipment and Supplies for Resilience

Great ideas need landing gear as well as wings. *Unknown*

This is not a suggestion to go out and buy all this stuff. They are basic lists of useful stuff. Not everyone has the resources to buy every tool on the planet. Not everyone has the room to store every tool on the planet. Everyone can be part of a community that can find the resources to buy and the space to store this equipment and make it available to members of its community.

These lists are in addition to the items listed in 09211 for a household bug-out bag.

Equipment

Hand Crank Grain Grinder.

Water Purifiers with spare cartridges or filters

Battery Powered Radio (AM-FM-Shortwave)

Flashlight

Rechargeable Batteries

Solar Battery Chargers

N-95 face masks

High quality respirator and replacement cartridges

Detailed maps of your region

Water siphons

Fuel siphons

Winter/cold weather sleeping bag

Tents

Basic tool kit (pliers, needle-nose pliers, wire cutter, Phillips and flathead screwdrivers, crescent wrench, vice grips, hammer, set of metric wrenches, set of English wrenches, Allen wrenches, hex wrenches)

Saws – hand saws, carpenters saws, hack saws, extra blades

Power saws – jig, skill, saws-all, chain, miter extra blades

Knife and saw sharpening equipment

Garden tools (wheelbarrow, shovel, hoe, rake, pitch fork, spading forks, seeders)

Plumber's snake

Bicycles and/or adult trikes

Air pumps for bicycle tires

Bicycle patch kits

Bicycle/trike trailer

Buckets with lids

Rope

Solar cooker

Miscellaneous Supplies

Duct and gorilla tape

Rolls of clear plastic

Matches

Polypropylene underwear (or other layers of thermal underwear)

Ponchos/raincoats

Warm weather gear

Bleach – 1 gallon of bleach will purify 16,000 gallons of water.

Seeds

Selection of nails and screws

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09231 Unplugging as a resilience strategy

So we Unpluggers found a new way to unplug: an independent life-support infrastructure and financial architecture - a society within society - which allowed anybody who wanted to "buy out" to "buy out at the bottom" rather than "buying out at the top." If you are willing to live as an Unplugger does, your cost to buy out is only around three months of wages for a factory worker, the price of a used car. You never need to "work" again, although there are plenty of life support activities to keep you busy, and a lot of basic research and science to do. Unplugging is not an off-the-shelf solution, it's a research career! – *Vinay Gupta, The Unplugged*

The first principle here is simple: There is safety in numbers.

It's not for nothing that our economic and political aristocrats are such masters at the divide and conquer game. They keep power by keeping us divided.

If you are one family in your entire neighborhood exploring permaculture and sustainability, you are constantly at risk. Your own government makes it as hard as possible for you to live more sustainably.

If you are one of one hundred families in your neighborhood exploring permaculture and sustainability, you are in a much safer situation.

There is safety in numbers. There is security in community. The future of sustainability is community.

In that regard, Unplugging, as a community-building movement, is a great strategy to promote resilience. Communities of mutual aid, alternative economics, energy storages, all the aspects of Unplugging work well to increase resilience. The best thing about it is that it can start with individual households and grow outwards from those very small, tiny even, seeds.

As the movement develops, we will need ways to share experiences. Every small group of Unpluggers just getting started should not have to reinvent the process on its own. I don't actually know all the details of how an apartment building-scale system of biogas digesters providing cooking and heating fuel would work. Once that has been developed, however, that information has to be shared. There's no point in people reinventing the wheel or the flat tire. Fortunately, thanks to the internet, it is easy to share information worldwide anonymously and in many countries, constitutional law protects the right to share such information.

While the principle is certainly true that we should "obey the law," that generalized principle of obedience doesn't apply when the law is unjust. All laws that forbid the activities of sustainable living are unjust to people and unjust to the planet and its eco-systems. As Gandhi said many years ago –

> As long as the superstition that unjust laws must be obeyed exists, slavery will exist.

Al unjust laws need replacement with rational legislation. That depends on achieving a critical mass in the permacultured population so that we cross over a tipping point.

Until that happens, discretion will sometimes be the better part of our ecological valor. We will need to be wise as serpents yet harmless as doves.

Unplugging is a serious, not a cosmetic, break with the present state of reality. The existing system has many defenses and does not hesitate to bring them to bear on those who do not conform. I have learned this the hard way, as Oklahoma City code enforcement has hammered away against my attempts to use edible landscaping and organic, sustainable garden methods.

Imagine the scene in the permit department of the City of Normality, U.S. of A. if a group of Unpluggers wandered in to seek a permit to route their humanure into biogas digesters in the basement of an apartment building they recently bought as a housing cooperative, for the purpose of making methane which will provide cooking and heating fuel for the building.

Just mentioning the word "biogas digester" could easily cause a city inspector's head to explode.

The first thing they're going to say, after they recover from the shock of hearing the words "biogas digesters in the basement of our apartment building" is that there is a city ordinance requiring that all toilets be connected to the city's sewer system.

Then they will reject the plans. So long, see you later, don't come back soon.

In an era where we Facebook and tweet even the most trivial happening, you can't update your status to say "INSTALLED BIOGAS DIGESTER IN THE BASEMENT" or tweet that without running the risk of state suppression of your sustainable lifestyle issues. You probably shouldn't even tweet that you shower in a tote so you can pour the water on your garden.

So some things have to be kept quiet until such time as critical mass occurs and we can change the foolish local, state, and federal laws that mandate unsustainably brittle structures at constant risk of failure for the most basic activities of life in the city.

Part of the observation phase is to gain an understanding of what can be done legally and can be tweeted/Facebooked, and what should be done quietly and without asking permission of authorities. It is nearly always easier to get forgiveness than permission.

Anything the authorities don't know about your activities can't hurt you or the planet. They're busy. They operate with restricted budgets. If you keep quiet, you will be able to get away with an amazing amount of sustainable activity right under the noses of your local authorities. In this matter, the largeness of a city is your friend.

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09241 Resilience Inventory

If small holes are not mended, great holes will cause great mischief.
When a horse comes to the edge of the cliff, it is too late to draw rein.
When a boat reaches midstream, it is too late to stop the leaks. – *Miscellaneous proverbs*

This inventory is organized around the "Six Ways to Die" categories of hunger, thirst, injury, illness, heat, cold.

1. Thirst

If the water supply stopped, how soon before you and your household are out of water?

What emergency sources of water can you access? (Rivers, streams, creeks, wells, ponds, tanks, water heater, swimming pools, household water storage in barrels or bottles, etc.)

Do you have water purification equipment and supplies? Describe in detail.

Do you know how to improvise a water purification system? Describe the methods you are familiar with.

Do you know how to improvise a rainwater harvesting system? Describe the systems you know how to improvise.

2. Hunger

If the conventional "just in time" food system collapses, how long before you and your household are out of food?

What edible plants grow wild in your area during the year? Can you recognize them? Have you ever eaten any of them?

List the locations where agribusiness corporations and farmers store large amounts of primary agricultural products in your area. (E.g., wheat, soybeans, corn, etc.)

List the large food warehouses, distribution centers, and food processors in your area.

Do you grow any food? If so, what and how much do you grow?

What happens with your refrigerated and frozen foods if the electrical grid collapses? Do you have canning equipment, jars, lids, rings, and the knowledge (or at least the instructions) to use them to save your frozen foods?

List any direct food buying you do with farmers (roadside stands, farmers markets, etc.)

3. Illness

Are you up-to-date on vaccinations and dental care?

List any chronic medical issues that need regular treatment. Do you keep at least 90 days supply of your meds on hand? What alternatives to the conventional system can you use if the industrialized medical system breaks down and/or is not available?

Do you have any medical or dental issues that need treatment?

How's the condition of your body? Are you overweight? Is your lifestyle sedentary or active? If sedentary, do you

exercise or walk or do other manual labor?

4. Injury

Have you been trained in basic first aid and CPR procedures?

List the basic first aid supplies you have on hand.

What is your risk of social unrest? Describe any sources of social unrest in your area and locate them in relation to the geographies of your life.

What is your risk of crime? What are the crime rates in the geographies of your life?

What is your risk of extreme weather events (tornadoes, hurricanes, etc.)?

What is your risk of extreme earth events (volcanoes, earthquakes, mudslides)?

What injuries are your greater risks?

What ideas do you have on mitigating your injury risks from all of these potential safety issues?

5. Heat

What is your risk for extreme heat?

How long do these periods of extreme heat last?

If you can't access air conditioning during extreme heat, how will you manage the situation to prevent heat stroke?

Do you know the symptoms of the varying degrees of heat injury and how to apply first aid in those situations?

6. Cold

What is your risk for extreme cold? What is the typical duration of extreme cold in your area?

Do you have a method(s) to keep warm in the event of power grid failure?

Do you know how to recognize the symptoms and treat hypothermia?

Do you have extra blankets on hand?

7. Miscellaneous

Do you have an emergency plan for each of the major risks/hazards in your life?

Do you have bug-out bags or buckets or supplies? If so, list the inventory.

Do you have a place to go if you must evacuate your residence?

How will you contact family/household members if you become separated during an emergency?

Do you have an emergency power system? Generator? Solar battery charger? Rechargeable batteries?

What is your plan for emergency lighting?

What do you do if there is a general collapse of technological civilization?

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09251 Resilience Design Opportunities

"It seems to me that it's a bad move to get into a contest between optimism and pessimism.
"The steadying requirement is for hope. That no matter how bad things get, a man of good will and some ability can always do something to make it a little better. *Wendell Berry*

Design a bug-out bag or bucket.

Given the comments and information in 09211 regarding evacuation and sheltering in place, design a bug-out bag that meets your needs (and those of your household if you do not live alone.)

Evacuation strategies.

Design an evacuation route from your residence or place of work/school to your anticipated evacuation location. Design multiple routes to get there. If you can't drive, how do you travel?

Shelter in place strategies.

How can you improvise a shelter in place against contaminated air (due to an industrial accident or terrorism)?

How can you improvise a shelter in place against radiological hazard (due to war or terrorism)?

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09261 Additional Resilience Resources

We line up and make a lot of noise about big environmental problems like incinerators, waste dumps, acid rain, global warming and pollution. But we don't understand that when we add up all the tiny environmental problems each of us creates, we end up with those big environmental dilemmas.

Humans like to blame someone else, like government or corporations, for the messes we create, and yet we each continue doing the same things, day in and day out, that have created the problems. Sure, corporations create pollution. If they do, don't buy their products. If you have to buy their products (gasoline for example), keep it to a minimum. Sure, municipal waste incinerators pollute the air. Stop throwing trash away. Minimize your production of waste. Recycle. Buy food in bulk and avoid packaging waste. Simplify. Turn off your TV. Grow your own food. Make compost. Plant a garden. Be part of the solution, not part of the problem. If you don't, who will? – *Joseph Jenkins, The Humanure Handbook: A Guide to Composting Human Manure*

Besides books, you need **detailed printed maps for your area.** Many states have an atlas book with maps showing every road in the state, including dirt roads in rural areas and all streets in cities.

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Section 10: Health

Respect your body. Eat well. Dance forever. -- *Eliza Gaynor Minden*

Very simply, we subsidize high-fructose corn syrup in this country, but not carrots. While the surgeon general is raising alarms over the epidemic of obesity, the president is signing farm bills designed to keep the river of cheap corn flowing, guaranteeing that the cheapest calories in the supermarket will continue to be the unhealthiest. -- *Michael Pollan, The Omnivore's Dilemma: A Natural History of Four Meals*

The best six doctors anywhere
And no one can deny it
Are sunshine, water, rest, and air
Exercise and diet.
These six will gladly you attend
If only you are willing
Your mind they'll ease
Your will they'll mend
And charge you not a shilling. *Unknown*

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10051 Cleaning and Sanitation
Alternatives to toxic cleaning products.

10061 Kitchen Sanitation
Download at www.ipermie.net

10071 Addiction
Better alternatives to two packs/day.

10081 Humanure management
If it's yellow it's mellow. If it's brown, flush it down. Not hard to understand.

10091 Health and beauty products
Toxics lurk in products that convey chemical visions of beauty. We pay a price in cancer and other disease for our obedience to commercially stimulated definitions of beauty.

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10011 Your personal health

The First wealth is health. – *Ralph Waldo Emerson*

Your personal health is the most important function in your lifestyle design. As your health goes, so goes the quality of your life.

A health plan for your life begins with an observation of the present state of your health. Doctors are big on charts, where they record everything that has to do with your health. You can make your own chart. Keep a record of the ongoing status of your health.

Each time you get blood work done, record the results.

If you get sick, whether or not you go to the doctor, record your symptoms and treatment(s), even if you treat yourself. Record your responses to the treatment(s).

Get your blood pressure checked regularly and record that information.

Diet

Many functions and systems in your design support your personal health. One of the most critical systems is your diet. Your body needs healthy food in the right amounts. "Nothing to excess!" is the motto here.

Avoid food, water, and air pollution.

The unfortunate truth of modern life is that we swim in a stew of chemicals. There is a war of scientific evidence in progress about the impact of these chemicals on our bodies. I think the common sense approach is to avoid all of these chemicals as much as possible. No one can be 100% free of chemical pollution, but there is much that we can do to lower our risks:

Consult 02381 for information on which vegetables and grains should always be eaten organic and for other information on avoiding food pollution and food-borne illnesses.

Stock your house with two houseplants per 100 square feet to keep your indoor air clean. 09171 has other suggestions for avoiding the problems of air pollution.

Avoid plastic as much as possible. If you buy food in plastic packages, when you get home remove it from the plastic and repackage it in glass, metal, cloth, or paper. Never heat food in any kind of plastic in the microwave, even if the dish is labeled "Microwave Safe."

09161 has information on avoiding and reducing your exposure to water pollution.

Physical Activity

A second critical system in support of your health is physical activity. Modern urban life is mostly sedentary. People abhor even the thought of manual labor and avoid it like the plague. That's not good for our bodies. Everybody should get some aerobic activity in their life. If your daily activities don't provide that naturally, you'll need a program of exercise to meet this critical health need.

Companionship

The third critical systemic support for personal health is companionship. Our mental and emotional health is as much a part of our personal health plan as anything in our diet or medical care. Being part of a community of companionship, compassion, and care, with many beneficial connections of interdependence and mutual responsibility, is important for your personal health.

Health Issue Response

Prompt attention to health issues – whether it be a developing chronic condition, a disease, or an injury – is often critical to successful treatment outcomes. While some medical issues resolve themselves with time, many others don't. Few of them will benefit from waiting for treatment.

Be an informed health customer.

You are in control of your health care.

Don't take anything for granted with your health care. Ask questions of your medical provider about any treatment he or she proposes. Ask about alternatives and about the prices. If the doctor wants to prescribe test procedures, like CT Scans, don't go with his or her first suggestion. First, shop around and ask for prices. If a particular provider won't quote a price, go elsewhere. Read extensively on the internet about any medical condition you get. These are the kinds of things you'd do if you shopped around for a car or house repair. Why shouldn't you do this for your health care? If your health care provider objects to these common sense activities, find another health care provider.

Beware of doctor-caused disease.

People die every day from diseases caused by medical treatments. Every day doctors, nurses, and other professionals in health care make mistakes that kill and maim people. This suggests a need for conservatism when contemplating medical care.

Stay out of hospitals as much as possible. If you are in the hospital, do not allow any health care professional or worker to touch you without washing their hands in hot soapy water. **Use of an alcohol hand cleanser does not give the same protection as washing the hands in hot soapy water.**

If a medical professional gives you medications to take right away, always ask what each pill is and what it is for. If you are uncertain about anything, refuse to take it and ask to speak with your physician about it or research it on the internet.

Be as wary of high pressure sales techniques in doctor and dental offices as you would if you spoke with a used car salesman. Such techniques signal danger. My advice is to find another medical professional and get a second opinion. This is a particular problem in the dental industry.

The bottom line take-away is that your personal health is critical for your good life. Pay attention to the details of your health care and take nothing for granted. Eat good, clean, and wholesome food. Avoid the chemical stews of modern life as much as is practical.

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10021 Useful health resources

I believe that the community - in the fullest sense: a place and all its creatures -
is the smallest unit of health and that to speak of the health of an isolated individual
is a contradiction in terms. -- *Wendell Berry, The Art of the Commonplace: The Agrarian Essays*

Attitude

Your attitude about your health is a most important resource. Will you be a puppet of industrial medicine? Or will you see your health in its holistic context and take responsibility for understanding your health care needs? That is up to you. It takes no money, no degree, no nothing other than your own interior resolution that you are in charge of your health care. You are the boss. You are not a pawn or slave of the industrial medical care system.

Independent sources of health knowledge.

Internet search systems are your friends. Do internet searches regarding every aspect of your health care. If your doctor gives you a diagnosis, check out independent information sources. If your doctor prescribes a treatment, research it. Be discerning of what you read – internet publication is not a guarantee of veracity and your mileage may always vary.

Ask detailed questions of your medical provider.

Some of my personal sources for health care information include:

http://www.webmd.com/

A good source for conventional medical care information and advice.

http://www.about.com

Use the various sub-sites like health, nutrition, diabetes, etc. to research specific situations and treatments. This is a great source of information for managing and treating addictions, especially their Smoking Cessation resources.

http://www.mayoclinic.com/health-information/

The Mayo Clinic's online health guide is another source for conventional medical care information and advice.

Alternative Medicine

http://altmedicine.about.com/

With the usual thoroughness of an about.com site, a survey of options in what we call "alternative medicine".

American Red Cross first aid recommendations

http://www.i4at.org/surv/emergncy.htm

Essential basic info on emergency first aid.

Access to Medicinal Herbs (aloe vera, mints, chamomile, etc.)

Herbs have a long history of use in treatment of medical and psychological issues. Many modern drugs have herbal roots. The allopathic medical system is good for what it does, but people can do more to care for themselves.

Home remedies for teeth and gums

http://possumsal.homestead.com/teeth.html

Dental care is one of the most problematic aspects of health care. It is expensive, little charity care is available, and dentists may advise treatment for you based on what is best for the dentist, not necessarily what is best for you the patient. Dental pain is often caused by an infection. If dental pain is present, and dental care is not available or unaffordable, see a medical doctor and request an antibiotic prescription for dental pain. This doesn't solve the underlying problem, but it will quickly relieve the pain symptoms.

How to make your own herbal remedies.

http://www.doityourself.com/stry/herbalhow

How-to instructions to make infusions, macerations, decoctions, tinctures, tonics, infusions, cremes, salves, and syrups.

A word about herb lists.

There are lots of lists of medicinal herbs on the internet. They always reflect the knowledge and resources of their compilers. Some of the herbs they include are hard to find and difficult to grow. In other words, your mileage may vary, use with discretion.

Ten Most Useful Medicinal herbs to Grow

Aloe vera, Great Burdock, Pot Marigold (Calendula), Chamomile, Echinacea, Yellow Gentian, Tea Tree plant, Peppermint, Ginseng, Sage

http://www.altmedicinezone.com/herbal-medicine/create-your-very-own-backyard-pharmacy-the-10-most-useful-medicinal-plants-for-your-garden/

18 of Nature's Most Potent Herbs

Marijuana, California Poppy, Blood Flower, Tansy, Hyssop (Korean Mint), Alfalfa, Catnip, Sage, Blackberries, Wild Quinine, Navajo Tea, Red Clover, Sweet Marjoram, Burdock, Feverfew, Sweet Violet, Winter Savory,

http://webecoist.momtastic.com/2008/09/30/most-powerful-potent-medicinal-medical-plants-in-nature/

17 Best Medicinal herbs

Black Cohosh, Wild Yam, Motherwort, Sage, Blue Vervain, Ginseng, Schizandra, Hawthorne, Dandelion, Vitex, Licorice, Ginger, Dong Quai, Nettle, Lady's Mantle, Raspberry leaf, Oat Tops

http://www.wholeliving.com/134831/17-best-medicinal-herbs

10 Best Researched Herbs

Garlic, Hawthorne, Ginko Biloba, Ephedra, Licorice, Bilberry, Echinacea, Milk Thistle, Astragalus, Ginseng.

http://www.all-natural.com/top-ten.html

Interesting list of 65 medicinal herbs (from a commercial seed company)

http://www.everlastingseeds.com/medicinallist.html

Bob's List

These are the medicinal herbs I grow --

-- Aloe Vera,
-- Sage,
-- Echinacea,
-- Alfalfa,
-- Chamomile,
-- Catnip,
-- Winter Savory,
-- Blackberries,
-- Sweet Marjoram,
-- Feverfew,
-- Ginger,
-- Comfrey,
-- Lemon Balm,
-- Horehound,
-- Lovage,
-- Thyme,
-- Lovage,
-- Mints (Orange, Apple, Chocolate, Peppermint),
-- Lemon verbena
-- Lavender

Veterinary Medications

Many people do not have insurance and thus do not have good access to medical

care. If they need an antibiotic, they first must find and pay a physician for the prescription, then they can buy what they need.

Veterinary medications like antibiotics are exactly the same as the medications for human beings. The pills and capsules may be a different strength, but penicillin or amoxicillin sold for veterinary use is identical to the same drugs sold for human use. The difference is that you don't have to have a prescription to buy the veterinary antibiotics.

Here is a website with some basic information about using veterinary antibiotic drugs to treat human people:

http://www.truthistreason.net/guide-to-veterinary-drugs-for-human-consumption-post-shtf

Self-diagnosis and treatment may work well. . . OR. . . it may not work and may delay getting the correct treatment. Because the United States rations medical care based on the ability to pay, many people these days cannot access adequate medical care and thus have restricted choices. Some readers live in nations with more humane medical systems than the United States.

Bottom Line for Health: Nutrition and Active lifestyle

There can be little doubt that good nutrition and an active lifestyle are primary methods of avoiding illness and injury in the first place. Don't leave it until late in your design game. Priority issues go first in design.

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10031 Psychological and Emotional Health

Health is the greatest possession. Contentment is the greatest treasure.
Confidence is the greatest friend. -- *Lao Tzu*

This is a large topic that can be complicated by so many factors that just listing them would be a work the scope of the entire iPermie project. Furthermore, I am not a psychiatrist nor a psychologist. Therefore . . . consider this simply a lay person's musings on common sense emotional and psychological health.

Don't worry. Be thoughtful. Do something useful. Be happy.

Worrying and fretting about problems doesn't do much that is useful to solve or mitigate problems . . . while on the other hand . . .

. . . Being thoughtful and doing something useful about problems is enormously liberating and that leads to happiness.

Let's take climate change as an example.

It would be hard to find a bigger problem. The actions of any one individual will not resolve the problem, not for the world as a whole, nor for an individual at risk of global climate chaos. Nevertheless, there are useful and productive things that people can do that will help the situation. As we contemplate the issues –and the emphasis is on a calm and considered contemplation, not on worrying and fretting – we come to an understanding of what we as people can do. We don't stop with thinking. We don't give in to despair. Instead, we proceed to designing our response and then we implement what we decide to do.

Happiness in the face of overwhelming issues can be found in productive work that is the result of intuitive thinking.

Embrace solidarity and participation.

Everyone has the right to participate in their own life and has a corresponding duty to do so.

That's a primary goal of this iPermie project. The Excess Consumption System Design default is for you to be blown this way and that way by manipulatory invisible structures so that you do nothing more than consume, excrete, waste, and then consume, excrete, and waste some more.

By actively participating in the design – and the operation – of the systems of your lifestyle, you withdraw your consent and support from the Excess Consumption System Design and invest your effort and resources into solutions.

In the context of full and complete participation in our lives is a process of awakening and cultivating our sense of human solidarity. Selfishness is the name of the modern game and we see the disastrous results of this abandonment of solidarity everywhere we look.

Solidarity is not hard to understand. The simple formulation is – "leave no one behind for the wolves to devour."

Solidarity is the process of viewing other people as our sisters and brothers, so that an injury to one is an injury to all, and a blessing to one is a blessing to all.

Solidarity and participation are fundamental to good psychological health.

Live in communities of caring and support.

Solidarity and participation lead to communities of caring and support, which are important for our individual psychological and emotional health.

No one is an island. No one is self-sufficient in and of and by themselves.

If we aren't already in a community of caring and support, by our personal praxis of solidarity and participation we can build new ones or find communities to join. Praxis is action grounded in knowledge combined with reflection and evaluation. Pop quiz! How many references to praxis does this make in iPermie? What does the frequency of reference suggest about its importance?

In this context, "community" takes its broadest possible meaning, beginning with nuclear and extended families, based on biology or voluntary consent and adoption, and going on through organizations rooted in territory (neighborhoods), religion (churches, synagogues, mosques, temples), occupation (jobs and professions), community service (lodges, organizations, schools, etc.) What works for you is good for you.

You don't have to be brave and valiant and "leadership material" to praxis solidarity and participation. You just have to be yourself, a real human being, whatever that means in your life – so that you can be interested in others and involved with your life and your community. If you don't think you are any of those things, just pretend that you are interested in yourself and others and your community. After enough pretense, it will become your reality, sooner than you think.

Yes, you can be a tough straightforward masculine guy and still be interested in others and your community and your own self. Touchy-feeliness is optional.

Forgive yourself and others.

We all make mistakes. We do wrong things against ourselves and others. We may call it sin or speak of screw-ups. We can create problems for ourselves and for others. We therefore need ways to get out of the holes that we dig for ourselves. When we dig holes for others to fall into, we need ways to help them out also. We need ways to process those events, to make atonement (at-one-ment), to heal hurts and injuries, to redress wrongs. Sometimes we find these methods via institutions. Others are more simple and direct. "Forgive us our trespasses, as we forgive others who trespass against us."

Always look at the world holistically.

See yourself not in isolation, which is not a natural way of looking at yourself, but in your entire context. You are not an island. You live in a context, a series of situations. Learn to open your eyes (also your mind, your heart, your entire being) so you can see what can be seen, hear what can be heard, and understand what can be understood. Does this take practice? Does it require praxis? You bet it does. It is a project for a lifetime. The journey en route is interesting, if not always peaches and cream.

Manage your anger or it will manage you.

There are undoubtedly advanced souls who have mastered their anger, but even Jesus drove the money changers out of the Temple and he seemed quite angry at them for what they were doing. He had some choice rhetoric for the religious hypocrites of his era who persecuted the poor.

So accept anger as part of your life and learn how to control it. Don't let it control you.

All anger is not created equal. There are some situations, where grave injustice and harm has occurred, where some amount

of anger is not only necessary, but healthy. It becomes a problem, however, when we allow the anger to control and consume us, so that it leads not in productive directions (the resolution of the harm or injustice) and instead creates even more harm and injustice.

Don't seek good ends by evil means.

The end versus means argument has been around as long as there have been philosophers to debate the question. I prefer a common sense approach. It's hard for me to distinguish between me and my journey because I see myself in my whole entire context (holistic vision). If I choose an evil path, in an attempt to reach a good destination, I can only do that by embracing and becoming that evil that I choose for my journey. If I do that, how will I recognize a good end when I see it?

This doesn't mean that I would not lie to the Gestapo if asked about the Jews hiding in my basement. It does mean that I won't kill people for access to petroleum. Lying to the Gestapo to protect hidden Jews from persecution is not an evil act. It is an act of moral beauty and wisdom. Living a life that demands that my nation kill others in foreign countries for the sake of cheap petroleum is, well, not so morally beautiful.

In conclusion . . .

Don't worry.

Be thoughtful and intuitive.

Do something useful.

Be happy.

Embrace solidarity and participation.

Live in communities of care and support.

Forgive yourself and others.

Always look at the world holistically.

Manage your anger or it will manage you.

Don't seek good ends by evil means.

Easier said than done? Of course, that's the nature of life. Like anything else, if we praxis, we get better at what we praxis.

Practice misery and worry and you will get plenty of misery and worry.

Practice solidarity and participation and you will get plenty of solidarity and participation.

The system of manipulation and domination that keeps the powerful in control communicates a narrative of powerlessness and threat to all us peasants. By keeping us continually on edge – frightened and divided – they increase our dependence upon them for a sense of safety. Thus they can manipulate our consent for ever-more-coercive measures of social control.

We use permaculture to design systems to make it easier to live healthier, more balanced lives in unity with the planet and our fellow human beings. We declare our independence from that sick social and cultural domination as we praxis our way into communities of joy and abundance. They fight with money. We resist with time. They will run out of money before we run out of time.

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10041Health Hazards

Women who work at home have a 54% higher death rate from cancer than women working away from the home.
A 15 year study concluded that it is directly linked to the toxic household chemicals in the home.
Columbia University College of Physicians & Surgeons

This article is a lay person's discussion of the subject. It is not medical advice. Always consult a medical professional that you trust about health questions and issues in your life.

Illness and Injury are two of the "Six Ways to Die" identified by permaculture thinker and polymath Vinay Gupta. The two concepts cover a broad range of conditions and causes –

-- Contagious diseases

-- Diseases where we don't know the cause

-- Hereditary diseases and conditions

-- Iatrogenic disease (conditions caused by medical treatment)

-- Consequences of lifestyle and bad diet.

-- Accidents,

-- Injuries consequent to natural disasters, social unrest, war, crime

-- Chemical pollution

Often we think of medical care in the same way we think of auto repair. If something goes wrong, we get it fixed. Unfortunately, the analogy breaks down quickly since if an automobile breaks down too much, it can be replaced with another vehicle. This is not the case with our human bodies. If we break down too much, we die.

The best thing to do with disease is to avoid getting sick in the first place.

Maintain a healthy body by eating a proper nutritious diet, getting enough exercise, and avoiding bad habits like smoking, excessive drinking, and doing toxic recreational drugs.

This is not a panacea, you may live a good healthy lifestyle and still fall prey to a life-threatening illness or injury, but maintaining a healthy body and personal habits doesn't hurt your chances of avoiding serious illness. It gets us away from the automobile metaphor and looks at our body and life as a whole system.

Lifestyle Disease

The way people live often causes disease. Average consumption of sugar is more than 135 POUNDS per person per year in the United States. Sedentary lifestyles that avoid manual labor drive obesity, heart disease, and diabetes. Smoking kills millions with lung cancer and emphysema and COPD.

Injury

The thing to do about injury is to avoid getting injured in the first place. I don't know what more can be said than that. The proverb "Look before you leap!" has a long and venerable history and our mothers all have a long list of things that they never wanted any of us to do.

The potential for injury should be an aspect of the observation and evaluation that goes into your design work. To the

best of your ability, your permaculture goal is to design yourself an injury-free lifestyle ("care for people," and "care for the planet," since injuries cause damage and require resources to redress). Alas, our circumstances are rarely within our total control. That's why they call them "accidents."

Chemical Pollution

We swim in a sea of chemicals, many of which are toxic to the ecology and to people. The research available about the consequences of chemical exposure is incomplete. Studies indicating dangers may be suppressed or not done for economic reasons. The best thing to do is follow the precautionary principle and avoid personal contamination by potentially toxic chemicals. While no one should become neurotic about this, we don't have to go out of our way to drink a toxic cocktail every day. Some common sense precautions include:

Study your water system's report on the quality and purity of its water. If there are problems, get a water purifier for your dwelling.

Avoid dry-clean-only clothing and use non-toxic cleaning methods for any such clothing you already have.

Follow the Environmental Working Group's recommendations on which vegetables to "always eat organic." http://www.ewg.org/foodnews/

Avoid plastic as much as is practical in your situation. Never heat anything made of plastic in the microwave, even if the container says "microwave-safe."

Don't smoke. Don't go into any room or building with second hand tobacco or marijuana smoke.

Use non-toxic home cleaning products. Use the Environmental Working Group's database on cleaning products to determine which products are safe for use in your home. http://www.ewg.org/guides/cleaners

Use non-toxic health and beauty products. Many commercial health and beauty products contain questionable chemicals. Check the Environmental Working Group's recommendations to find safe products. http://www.ewg.org/skindeep/

Doctor-caused disease.

An often overlooked problem with medical care is that medical treatments can cause disease. This includes side effects of drugs and serious medical mistakes made by doctors and other medical personnel. I know people who went into hospitals for relatively minor procedures and came out dead or irrevocably maimed by antibiotic resistant infections they caught in the hospital.

People should be as cautious about their medical care as they are with their money. Doctors and nurses should be carefully questioned about diagnosis and treatment alternatives. Four questions should always be asked:

-- Is this the only alternative?

-- What are the risks, side effects, and possible unintended consequences of this treatment?

-- What happens if I don't treat this in the method you want?

-- How much does this cost?

Never allow medical personnel to bully or rush you into making a decision that you are not sure is in your best interest, or in the best interest of those you care for.

Most doctors and medical personnel have good ethics, but not all. Medicine is big business. Doctors sometimes recommend procedures and treatments because the doctor or clinic or hospital makes a lot of money on the procedure, drug, or treatment. It's not ethical, it happens.

Don't hesitate to ask for a written quote if you are paying cash and the procedure will be expensive.

When people take their cars to mechanics, it is not unusual to ask for a written quote. The same is true of plumbers, carpenters,

and electricians. Yet, when it comes to medical care, all-too-often people hesitate to ask and don't understand that as with anything else, you can negotiate prices and costs with medical professionals.

Unlike most stores, which have set prices for products, in the United States, **medical care prices for treatments vary based on the social and economic class of the patient.**

Persons covered by insurance plans, either privately paid or government sponsored, pay less for medical care and drugs.

Persons who do not have insurance plans pay higher prices unless they can negotiate a better deal.

You would think that those with the least ability to pay (the people who have no insurance and thus must pay cash) would pay the least. That's not the way medical care works in the United States. Persons living in other countries with more rational and human systems of medical care are lucky to not be faced with these kinds of situations.

Insurance companies use their pricing power (the large number of people covered by their plans) to negotiate prices with hospitals and doctors. "Give us a discount or we will send our insured patients elsewhere." So the hospitals and doctors oblige the insurance corporations.

The same thing happens with government programs like Medicaid and Medicare. They pay discounted prices. Given the fact that medical care providers –

-- can't shift the costs onto other insurance plans, and

-- can't shift the costs onto government plans,

– there is only one place those costs can be shifted and that is onto the wallet of the cash-paying customer.

People who don't have insurance need to negotiate their own deals with hospitals and insurance. If your medical providers aren't interested in negotiating, then find someone who is. There's a lot of competition among medical providers. Pick up the phone and start calling. Meanwhile, write a letter of complaint to your state's Board of Medical Ethics about the discrimination practiced by any medical provider who charges you more because of your social and economic location (a person who has no medical insurance).

You don't have to buy the Cadillac. You might do better with the Metro.

In medical care, as with everything else, there is often a range of options. Sometimes they can be ranked "Cadillac" or "Metro." The Metro option is likely to be much less expensive.

For example, dentists are masters at getting patients to spend thousands of dollars for crowns and bridge work. A partial denture might be a better choice financially and work just fine for many people.

You will likely find a better deal on dentures, both full and partial, if you can find a denturist that will deal directly with you. Denturists are the people who actually make dentures. You may pay only half the price charged by dentists for your dentures or partials if you get them directly from a denturist. In most states, however, dentists have a lot of political power and the law forbids denturists from selling directly to the public. Even so, you can likely find one or more denturists who do this – the trick is to find out who and where they are. Given the price dentists charge for dentures, if money is an issue for you it is worth the time and effort to find a denturist and do business directly with him or her.

Watch out for high overhead doctors and dentists.

When you go to a doctor or dental appointment, scrutinize the office. Avoid highly decorated offices in expensive locations. You and the other patients pay for all the overhead. That expensive location and fancy decor has nothing to do with the quality of medical care.

Expensive locations may not have the best medical care. The more high rent the premises, the faster a doctor must work just to pay the overhead. The faster a doctor works, the greater the possibility of mistakes.

Look for doctors, dentists, and other medical professionals in offices located in less expensive, less trendy locations, with smaller offices and more value priced decorations.

Do your part to stop the spread of contagious disease.

If you have a contagious disease, stay home. Don't be a "trooper" and go to work and spread your illness to others. Call in sick, stay home, get well. Spreading contagious germs is irresponsible behavior.

Design a healthy life.

Your permaculture design for your life should consider the health hazards that present in your life and design ways to avoid, mitigate, or manage them. Look for beneficial connections that will integrate well into the activities of your life. Also look for negative connections and eliminate those chains of causality from your life to prevent illness, injury, or death.

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10051 Cleaning and Sanitation

I am thankful for a lawn that needs mowing, windows that need cleaning and gutters that need fixing because it means I have a home.... I am thankful for the piles of laundry and ironing because it means my loved ones are nearby. -- *Nancie J. Carmody*

One person's "clean" is another person's "ugly mess". iPermie isn't here to suggest the level of cleanliness you should pursue in your living arrangements. Some people work well in a cluttered environment, others don't. You have to come up with something that works for you and the people with whom you live and work.

Instead, let's look at some low cost alternatives to the expensive and toxic cleaning products found in the big box stores. Cleaning your house and kitchen should not result in pollution for the environment.

Clean as the mess occurs.

No mess gets better on its own. Typically, with time a mess gets worse because, e.g., it dries, hardens, bakes in, gets scattered, etc., all of which makes the eventual cleanup harder. Be prompt in cleaning messes and save yourself time, aggravation, and effort. Then you don't need such powerful concentrated toxic cleaning agents.

This document doesn't repeat anything in 10061, which is a government publication that discusses natural methods of sanitation in the kitchen. That publication recommends the use of chlorine bleach, hydrogen peroxide, and vinegar to sanitize kitchen food prep areas.

Use natural sponges and cloths.

Avoid sponges and brushes made with plastic or polyester, as part of a general permaculture-recommended avoidance of plastics. Many manufacturers treat commercial petrochemical-based sponges with triclosan, which can produce a carcinogen when it interacts with water treated with chlorine. Once used, petrochemical-based sponges can breed bacteria and are hard to sterilize and keep clean. The processes that manufacture petrochemical sponges are toxic to the ecology.

The secret to using cloths for cleanups is to rinse them immediately after using them. Don't let whatever it is you've wiped up harden onto the fabric. Rinse them and hang them over the edge of a laundry basket or on a hook so they dry and don't mildew.

Loofas: the better scrubbing alternative

Loofas (sometimes spelled loofah or luffa) are a natural sponge. They grow on a vine. It's in the same plant family as pumpkins. You can grow them in your garden or indoors in a pot. Pick the sponges after they dry, peel them, and cut them into usable sections. They last longer than petrochemical sponges. They can be sterilized easily in boiling water, or using a solution of hydrogen peroxide or hot vinegar. You can use a sanitizing solution of bleach if your not avoiding it because of its toxicity. Hang them up between uses so they dry. Use loofas for general cleanups and for washing dishes. Over time and use, they become softer and people often switch them from washing dishes to washing bodies. Eventually, they end up in the compost

pile, after literally months of use for each sponge. No petrochemicals involved! From nature they come, and to nature they return. What's not to like about that?

Formulas for natural alternatives cleaning products.

The Environmental Working Group has a database of information about commercial cleaning products. Use it to check out the toxicity and environmental impact of common commercial household cleaners: www.ewg.org/guides/cleaners The site has a guide to healthy cleaning which reviews a number of products that are not harmful to the environment.

All-Purpose Cleaner

Add1/2 cup vinegar and 1/4 cup baking soda (or 2 teaspoons borax) into ½ gallon water. Use as needed to clean tile, counters, sinks, mirrors, windows.

All-Purpose Spray Cleaner

Make a solution of equal parts vinegar and water. You can add lemon juice. If it is a tough cleaning situation, warm the solution just this side of hot.

All-Purpose Spray Cleaner Version 2

In a spray bottle, mix 1 tablespoon non-sudsing ammonia, 1 tablespoon laundry detergent, 2 cups water.

Furniture polish

Mix 1 cup olive oil and ½ cup lemon juice. Spread a small amount on a soft rag and use that to apply to the furniture. Switch to a dry cloth and polish dry.

Fabric softener

Add one cup vinegar to the rinse. It naturally softens fabrics and removes soap residues.

Scouring powder

Use baking soda, full strength, anywhere you would use a chlorine bleach cleanser powder. Rub with a damp sponge, rinse and wipe clean. If it is a tough job, make a paste of water and baking powder, spoon it on the area that needs cleaning, and let it sit for 15 minutes before rubbing clean and rinsing.

Toilet Cleaner

Flush the toilet, add undiluted vinegar at the rim so it runs over the surface of the interior of the bowl. Brush clean.

Another method: add a half box of baking soda, let it soak over night. Brush the next morning and flush.

Third method: add a cup of baking soda and a cup of vinegar. After the water stops bubbling, brush it clean.

Mold remover

Mix one part hydrogen peroxide (3%) with two parts water. Put in a spray bottle. Spray on moldy tiles and let sit for an hour. Rinse and wipe clean.

Cleaning waste baskets and food storage containers

Soak overnight with warm water and baking soda. Rinse and wipe clean. If necessary, use one of the spray cleaners listed here.

Drain Cleaner

Pour ½ cup baking soda down a drain, followed by 1/ cup vinegar. Let sit for 15 minutes then pour in a couple of quarts of boiling water. Do not use this method if you have already used a commercial drain cleaner.

Oven cleaner

Moisten the walls, top and bottom of the inside of the oven with a wet cloth or sponge. Mix 3/4 cup baking soda, 1/4 cup salt, and 1/4 cup water into a paste, and spread this over the interior of the oven. Let this sit overnight. Remove it with a spatula and wipe clean.

Sticker remover

Wet with vinegar, wait 15 minutes, wipe off. Also works for price stickers and labels.

Window cleaner

Mix 2 teaspoons of vinegar with 1 quart of water. Use crumbled newspaper, squeegee, or cloth to clean.

Tarnish remover

Spread some ketchup onto a damp cloth and rub tarnish on metal pots and pans gently in a circular motion. Also works to remove the tarnish from sterling silver. Cover sterling silver items in ketchup and let sit for 10 minutes. Rinse with warm water and hand dry.

Hardwood floor cleaner

Boil a pot of water and add six black tea bags. Let steep for ten minutes and cool (you can add cool water). Pour into your mop bucket and mop the hardwood floor as usual.

Toilet cleaner 2

Pour a bottle of your favorite fizzy soft drink around the rim of a toilet bowl so it covers the entire interior surface. Let sit for an hour. Use a toilet scrub brush, flush and voila, clean toilet. And to think that some people actually DRINK soft drinks!

Dish rinse/toothbrush cleaner

Add 2 tablespoons of hydrogen peroxide to your dish rinse water to give an extra disinfection to the rinse. Dip your toothbrush in a cup of hydrogen peroxide and swish it around to disinfect, then rinse before using. What, you don't wash your toothbrush? You should. Regularly. We store them in bathrooms where fecal coliform bacteria floats around in the air.

Mirror and household chrome cleaner

Wipe with isopropyl alcohol, and then with a damp cloth.

Design Considerations

As you design your life, keep in mind the importance of cleanliness.

Include sufficient storage or reduce the amount of possessions so that there is a place for everything. Practice so that everything is in its place. The popular custom of having a place for everything, but then keeping everything someplace else, should be avoided.

Don't design any hazards into your life. It is a type 1 error to make a design decision that could introduce new hazards into your life.

Download the Kitchen Sanitation public domain PDF published by Ohio State University Extension at www.ipermie.net. It discusses ways to clean and sanitize your kitchen using natural products.

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10061 is a publication from Cooperative Extension on Kitchen Sanitation. Download this document at http://www.ipermie.net.

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10071 Addiction

I have absolutely no pleasure in the stimulants in which I sometimes so madly indulge.
It has not been in the pursuit of pleasure that I have periled life and reputation and reason.
It has been the desperate attempt to escape from torturing memories,
from a sense of insupportable loneliness and a dread of some strange impending doom. – *Edgar Allan Poe*

About addiction, Wikipedia sayeth . . .

> Historically, addiction has been defined as physical and/or psychological dependence on psychoactive substances (for example alcohol, tobacco, heroin, caffeine and other drugs) which cross the blood-brain barrier once ingested, temporarily altering the chemical milieu of the brain. Broadly, addiction is defined as the continued use of a mood altering addictive substance or behaviours despite adverse consequences. Some defining characteristics of addiction include impaired control over the substance/behaviour, preoccupation with the substance/behaviour, continued use despite consequences, and denial.

Addiction can be viewed as a continued involvement with a substance or activity despite the negative consequences associated with it. Pleasure, enjoyment or relief from actual or perceived ailments would have originally been sought; however, over a period of time involvement with the substance or activity is needed to feel normal. Some psychology professionals and many lay people now mean 'addiction' to include abnormal psychological dependency on such things as gambling, video games, food, sex, pornography, computers, internet, work, exercise, adrenaline, idolizing, watching TV or certain types of non-pornographic videos, spiritual obsession, self-injury and shopping.

I am an addict.

When I was 16 years old, I started stealing cigarettes from my father, Winstons was the brand. I can still sing the Winstons advertising jingle from the days when cigs could be advertised on television and radio.

I smoked for decades. At the end of my active smoking days, I smoked two packs of cigarettes every day. When I smoked, cigarettes were important to me. I would borrow money to buy cigarettes if I was broke. Cigs were more important than food.

I paid no attention to the consequences of cigarette smoking. I didn't care about the smell, the effect on my lungs, the impacts on others, or the cost. I thought of cigarettes as my friend. Cigarettes had been with me, through good times and bad, for decades.

I would have to call that relationship at best abusive. It wasn't something I did "for myself," it was something I did "to myself."

Eventually I started trying to quit. After a day or so of quitting, I would feel miserable, but proud of the fact that I hadn't smoked for a day. I would decide to "reward" myself with "Just One Cigarette." The next day, I would be doing so good that I would need two rewards, one in the morning, and one in the evening. On the third day, my thinking was that it wouldn't really do any harm to have five reward cigarettes – one in the morning and the evening, and one after each meal.

The cycle would begin all over again.

Within a few days, I would be back to two packs/day.

I was not able to finally quit smoking until I realized that I was in fact addicted to cigarettes. It wasn't just a bad habit I had picked up along the way. It wasn't just a behavior problem. I was psychologically and physically dependent upon regular hits of nicotine.

Once I understood that, I came to believe that I could no longer smoke Just One Cigarette. The whole Just One Cigarette schtick is a delusion I told myself to avoid the facts. I know just as surely as I know that the sun rises in the east and sets in the west that if I ever smoke Just One Cigarette, I voluntarily choose to go back to two packs of cigs/day.

Breaking out of the daily regular use of cigarettes was one of the hardest things I have ever done in my life. Even though I remain an addict, I never have to go through the misery of quitting smoking again – as long as I don't smoke Just One Cigarette. My motto is NOPE! Not One Puff Ever!

The other good news is that I don't spend my days in misery because I don't smoke cigarettes. The first week was hell, the first month less so. Now I don't experience daily urges to smoke and I live my life without needing cigarettes.

I do what the non-smokers do. I don't smoke.

Every addiction story, whatever the focus of the addiction, will be somewhat similar to this. The focus of the addiction becomes primary in a person's life. The addict ignores the negative consequences. Quitting is hard, sometimes brutal, but gives great benefits.

Inventory your health and determine if you have addictions. Take care of them sooner rather than later, and you will be more healthy.

Seek a community of support to help break your habit. The best known communal system for alcoholism is Alcoholics Anonymous, whose 12 Step system has been adapted for use by groups treating many other addictions. There aren't as many quit smoking groups that meet in person. You can find a tremendous amount of help on the internet. One of the best portals is the About.com Smoking Cessation pages at http://quitsmoking.about.com/. I used that site extensively when I quite smoking.

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10081 Humanure Management

Thermophilic composting requires no electricity and therefore no coal combustion, no acid rain, no nuclear power plants, no nuclear waste, no petrochemicals and no consumption of fossil fuels. The composting process produces no waste, no pollutants and no toxic by-products. Thermophilic composting of humanure can be carried out century after century, millennium after millennium, with no stress on our ecosystems, no unnecessary consumption of resources and no garbage or sludge for our landfills. And all the while it will produce a valuable resource necessary for our survival while preventing the accumulation of dangerous pathogenic waste.
-- *Joseph Jenkins, The Humanure Handbook: A Guide to Composting Human Manure*

In the United States, we pay large amounts of money and create a complicated infrastructure to supply us with pure water. Then we urinate and defecate in it and flush it away to go through another round of cleansing and purification. It is not logical.

It is a system so fraught with legal and emotional issues that it is a difficult target for rational thought and design. In most areas, anything sustainable you want to do with humanure at the present time other than flush it down the toilet will likely be illegal, so "mum's the word," as they say, about your plan. Loose lips expose the compost toilet to government persecution! What the government inspectors don't know can't cause you grief. Do not give in to the superstition that unjust laws should be obeyed just because they are laws.

Here's a true example. A few years ago I contacted the plumbing inspection department of Oklahoma City government to find out if it was legal to install a composting toilet. It took several calls to find out the situation. No one really wanted to talk with me. Finally, I guess they got tired of me calling back, so they called back and told me that –

(1) It is legal to install a composting toilet in OKC.

(2) By law all toilets must be connected with a sewer system or septic tank, so a composting toilet must be connected to a sewer system or septic tank.

That of course destroys the purpose of the composting toilet, a fact readily admitted by the city plumber who spoke with me. It would be funny if it wasn't such a tragedy for the ecology of this area.

In cities, the first strategy, within reach of nearly everyone, is harm reduction:

If it's yellow it's mellow; if it's brown, flush it down. In other words, don't flush urine. This reduces the amount of fresh clean water wasted with our sewer systems.

Never flush anything down a toilet other than water, humanure, and toilet paper. Never flush:

-- Menstruation products

-- Medications

-- Condoms

-- Cigarette butts and ashes

-- Live fish, baby alligators, or snakes

-- Toxic cleaning solutions

Replace conventional flush toilets, which use five gallons of water per flush, with low-water flush toilets. Ignore the jeers and jabs from the uninformed who complain about having to flush twice to cleanse the bowl. While there were problems with the first generation of low-flush toilets, those have been resolved.

Most toilet bowl cleaning products are toxic waste. All of these items cause problems downstream. We get an "out of sight, out of mind" mentality from the media. That isn't a very permacultural way to think about important issues.

Instead of using, and thus flushing into the watershed, harsh chemical cleaners, use natural products like vinegar, baking soda, borax, lemon juice. Clean your toilet regularly to prevent build-up of scale.

A second level of improvement is to save your urine and use it to irrigate plants. Urinate into a bottle or bucket. Dilute one part urine with ten parts water. Fertilize plants by pouring on the surface of the soil. It doesn't take long to get over the ick factor. Urine is inherently sterile (unlike feces which can be loaded with pathogenic bacteria) and so unless the person has a bladder infection, it is fine for this purpose. If you don't have your own garden or container plants, then do some guerrilla fertilizing of public flower beds and shrubberies. Don't tell anyone.

Another urine strategy is to urinate into a sawdust or shredded leaf "toilet," which is a bucket filled with either sawdust or shredded leaves. Keep adding leaves and sawdust as necessary, and when full, add to your compost pile.

The above strategies are relatively accessible to just about everybody. Going further, and composting your feces, is more complicated. Jenkin's book, Humanure Handbook, is the first and last word on the subject. It is available free on line (see the additional references section of this section). If you plan to compost your feces, read the book and follow his instructions to the letter.

A likely urban and campus solution

Besides composting, feces and urine can be processed into methane and fertilizer via a home, building, or neighborhood-scale biogas digester. Given the need of urban areas for energy, and the imperative to diversify urban energy sources, building-scale methane digesters that process a building's sewage load on-site into energy that is used on-site is one of the optimal design solutions.

Humanure is way too valuable to waste via our present habit of flushing it away into an expensive and resource-intensive purification system.

If your Unplugged group buys an apartment building to renovate as a housing cooperative, biogas digesters in the basement to process the building's humanure into energy and fertilizer is a good ecological choice. Don't tell the city! Don't tell your friends who aren't part of the cooperative. Don't tweet or FB or otherwise brag online about the greenity of your building's sewage disposal. Any of these activities may cause municipal persecution and that's something to be avoided.

At the local political level, campaigns to legalize compost toilets are important. We need larger scale structures to resolve municipal humanure problems. Besides building-scale systems, neighborhood biogas digester systems can work well. Depending on the neighborhood, an area biogas digester system could work with a district heating system. It would create jobs too.

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10091 Health and Beauty Products

Modern cosmetics contain a host of dubious ingredients which would be more at home in a test tube than on our faces. These synthetic ingredients are inexpensive, stable and have a long shelf-life. Manufacturers love them, but the results from long-term use could be deadly. The same poisons that pollute the environment, from dioxins to petrochemicals, can be found in the average bathroom cabinet. Many cosmetic ingredients have been shown to cause cancer in laboratory animals. *Kim Erickson, "Drop Dead Gorgeous"*

Your skin is the largest organ of your body and does an excellent job of protecting you from hazards outside the body. The skin is not impervious. It is porous. It can soak up substances splashed, dashed, washed, or rubbed on your body. Just as we are cautious about what we put in our bodies, we should be careful regarding what we put on our bodies.

Let's take nail polish as an example. Underneath your nails are numerous blood vessels. Since your finger and toe nails are porous, nail polish finds an easy direct route into your body for whatever the polish contains. Alas, many nail polishes on the market today contain formaldehyde, toluene, and dibutyl phthalate (DPH).

The Environmental Working Groups Cosmetics Database describes toluene as --

> A volatile petrochemical solvent and paint thinner, toluene is a potent neurotoxicant that acts as an irritant, impairs breathing, and causes nausea. Mother's exposure to toluene vapors during pregnancy may cause developmental damage in the fetus. In human epidemiological studies and in animal studies toluene has been also associated with toxicity to the immune system and a possible link to blood cancer such as malignant lymphoma.

About Dibutyl Phthalate, it says:

> The State of California and other authoritative bodies have classified dibutyl phthalate (DBP) as a reproductive and developmental toxicant, and the European Union banned the use of this ingredient in cosmetics and personal care products. In animal studies, exposure to DBP during gestation causes infertility, cryptorchidism and problems in sperm development, adverse effects similar to human testicular dysgenesis syndrome. Prenatal exposure to DBP has been associated with anatomical changes in the reproductive system development in baby boys. In adult men, DBP has been correlated with changes in serum hormone levels, lower sperm concentration and motility, and decreased fertility

Formaldehyde:

> Formaldehyde is a carcinogenic impurity released by a number of cosmetic preservatives, including diazolidinyl urea, imidazolidinyl

urea, DMDM hydantoin, quaternium-15, 2-bromo-2-nitropropane-1,3-diol, and sodium hydroxylmethylglycinate. . . The International Agency for Research on Carcinogens (IARC) has classified formaldehyde as 'carcinogenic to humans,' and the U.S. National Toxicology Program has classified it as 'reasonably anticipated to be a human carcinogen,' based on emerging evidence in humans and robust evidence in animals (IARC 2004; NTP 2005). Occupational exposures to formaldehyde gas are linked to nasal and nasopharyngeal cancers (IARC 2004; NTP 2005). Animal studies confirm this link, and also suggest an association between formaldehyde in drinking water and stomach and gastrointestinal cancer and leukemia (NTP 2005).

This information is from Skin Deep: The Environmental Working Group's Database on Cosmetics, found online at http://www.ewg.org/skindeep/. See the EWG's database on sun screen products, at http://breakingnews.ewg.org/2012sunscreen/.

The important take-away is that no one should operate on some kind of nebulous faith that somewhere, someone is watching out for your safety and personal health when it comes to these products. According to the Environmental Working Growth, present public health laws allow:

-- Almost any chemical as an ingredient in personal care products.

-- Misleading and incomplete labeling of ingredients.

-- Unsubstantiated claims about product benefits.

-- No required safety testing of products or ingredients.

Therefore, the best practice is to carefully scrutinize the ingredient list of every product you use on your body. "Every product" certainly means "every product without exception."

If there is no ingredient list, find another product. Check public databases like those of the Environmental Working Group for information about each ingredient. Google and other internet search programs are your friends.

Before you go to an appointment at a spa or salon, get a list of the ingredients of all the products they will use on your hair or skin. Fact check those ingredients and if you find something you don't like, tell the spa or salon people you need another less toxic option. Don't accept assurances of safety from employees of these establishments. While they mean well, their uninformed and self-interested comments are no substitute for your independent research.

The average woman uses 12 health and beauty products every day containing 168 different ingredients, many of which are hard to pronounce.

The average man uses six products daily with about 85 different ingredients, many of which are hard to pronounce.

The Environmental Working Group tested five women. The women each tested positive for between 25 and 45 different industrial chemicals in their bodies.

It is your body. Don't contaminate it needlessly.

Consider using natural alternatives to expensive and possibly toxic commercial health and beauty preparations.

Shampoo

This product became popular only in the early 20th century. For centuries people simply used soap to wash their hair. As city water purification systems multiplied in the 20th century, water supplies became more alkaline (what we call "hard water") so soap didn't get as sudsy.

Shampoo was first presented as a way to get suds in hard water. It is a detergent, like dish washing or laundry detergent. Modern shampoos have lots of ingredients with unpronounceable names, which is not a good sign. It comes packaged in plastic, also not good. It can be surprisingly expensive for what you get. Washing with shampoo strips your hair of its essential protective oils. That requires the use of a conditioner, with ingredients with unpronounceable names, packaged in plastic, and surprisingly expensive.

The natural alternative is simple. Mix one tablespoon of baking soda with one cup of water. Put it in a jar. Screw on the lid. Give it a good shake to dissolve. Get your hair wet with water and pour on some of the baking soda mix. Massage into your scalp and hair and rinse. Some people make a paste in their hand with 1 tablespoon of baking soda and a little water and rub that into their scalp and hair. Always follow the baking soda solution with a clear water rinse.

Next is another natural treatment: rinse your hair with a weak mixture of apple cider vinegar in water. This untangles the hair follicles, seals the cuticle, and balances the pH of your hair. All you need is about one tablespoon of apple cider vinegar in a cup of water. Pour it on your hair. Let it rest a few moments and rinse your hair. No, the apple cider vinegar doesn't make your hair smell like vinegar. Once its washed out, there's no smell.

If you haven't deplasticized your life, you could put the water and baking soda solution in an old shampoo bottle and the apple cider vinegar solution in an old conditioner bottle.

See http://simplemom.net/how-to-clean-your-hair-without-shampoo/ for more information about her "no-poo" methods of hair care.

http://babyslime.livejournal.com/174054.html has a wealth of information about the problems of shampoo and natural alternatives, including information on natural trouble-shooting problems like dandruff, greasy, itchy hair. She lists herbs good for hair care. To treat your hair with herbs, make a tea with the herb. Let it cool. Use it like a rinse. You can add a drop or two of scented essential oils to the apple cider vinegar/water rinse.

The longer you use this kind of hair wash, the less you will eventually need to wash your hair.

See also:

Motown Girl – Do-it-yourself natural hair care at http://motowngirl.com/ . See her recipe page at http://motowngirl.com/index.php/homemade-hair-recipes.html.

Some people, who buy soaps from local artisans, wash their hair with natural soap. The hardness of your local water supply will have something to do with how well this works for you.

Soaps

Soaps sold in supermarkets are cheap and you get what you pay for. They disappear quickly when used. They may have extra non-pronounceable ingredients, which is rarely a good sign. Fortunately, most areas now have artisan soap makers with a wide variety of better quality natural soaps available. Even though the retail price of these soaps is more than supermarket soaps, "a little bit goes a long way." In other words, even at a higher retail price, the "cost per wash" is less from the local artisan than the supermarket bar, because the local soaps last so much longer, even if used every day. Ingredient lists are simple, easy to understand, and natural. Buying them supports local companies, not international corporations. People are naturally cynical about such claims, but the superiority of locally made – or home-made – soaps is easily proven.

Making your own soap is easier than you may think. The About.com website about soap-making is a good introduction -- http://candleandsoap.about.com/od/soapmakingbasics/a/How-To-Make-Soap.htm .

Makeup, lotions, and other body care products.

When it comes to makeup, as with other body care products, accurate knowledge about the ingredients is critical. There are many recipes for home-made body care and makeup products which don't have unpronounceable ingredients. Google and other search indices are your friends in this matter. For example:

Homemade body care products

http://pinterest.com/gracedukes/homemade-bodycare-products/

How to make body care products

http://www.green-blog.org/2011/01/09/how-to-make-body care-products/

Six natural skin recipes

http://www.organicauthority.com/delicious-beauty/body-care-6-homemade-natural-skin-care-recipes.html

Homemade beauty products (including deodorant and mosquito repellent

http://ourlifesimplified.com/house/other-recipes/beauty-products/

Take control of your life.

In this area as with everything else concerning iPermie, our goal is to help you take control and ownership of your life away from the default system design of gluttony and selfishness. Understanding your options, and acting in accordance with beneficial design principles, empowers you to increase the quality of your life and to resist the structures of subjugation and domination that keep us under control.

When it comes to beauty, the essential issue ultimately is psychological. No one needs makeup or other commercial products in order to look or feel beautiful. The idea that they are essential, or that without them, we are somehow less than who we really can be, is a delusion fostered by decades of advertising brainwash. It has nothing to do with beauty and everything to do with protecting the profits of transnational health and beauty product corporations. Use them if you enjoy them but use them because you enjoy them, not because you think they are somehow essential to beauty. Use safe cosmetics and beauty products. Don't risk cancer for the sake of a certain "look."

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10101 Health Inventory

If you don't take care of your body, where will you live? -- *Unknown*

General

What is the general status of your health?

Is your lifestyle sedentary, moderately active, or active?

Are there any inheritable conditions in your family?

What operations have you had and when?

Illness

Do you suffer from any chronic illnesses/conditions? (Medical situations for which there isn't an actual cure which you manage with medications.)

How do you manage these conditions?

What acute illnesses have you had in your lifetime?

Medications

List any medications you take regularly, either those prescribed by a doctor or those that are over-the-counter or alternative in their nature

Medical Care

What access do you have to medical care? Do you have insurance? List all medical providers with whom you have a patient relationship, both in the regular medical system and in the alternative system.

If you don't have any regular patient-provider relationships, where do you go for health care?

Do you use any alternative forms of medical care?

Do you use any herbs in your medical care? What is your source of these herbs or herbal preparations?

Risks

What risks of illness and injury do you experience from your environment? Detail these risks and their sources if they can be identified.

Give a brief summary of the medical history of your family.

Indicators

See your doctor and get some blood work done.

How is your blood pressure? Where does it range?

Fasting blood sugar? A1C test results (a measure of the average of your blood sugar over the previous three months)?

Cholesterol (total, HDL, and LDL)

Weight, height, and Body Mass Index

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10111 Health Design Challenges

The greatest wealth is health! – *Virgil*

Design a small container medicinal herb garden.

Use a maximum of six plants. This involves answering the question – what are the six most useful herbs for you in your context? What beneficial connections exist between this design project and other aspects of your lifestyle design?

Design a mutual aid system for wellness.

How can you involve your family/household/friends in wellness so that everyone supports everyone in your common goals of wellness?

Make a list of beneficial health connections you need in your lifestyle design.

For example –

Access to organically produced food reduces food pollution which is good for your health.

Not owning a car means that you will walk more and that is good for your health. Alternatively, using a car only when that is the only way to get somewhere means that you will walk more and that is good for your health. Both options reduce the amount of pollution and that is good for your health. Not driving reduces the risk of automobile accidents, also good for your health.

List as many such beneficial connections as you can. Use the list during your design work.

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10121 Additional Health Resources

The physician who teaches people to sustain their health is the superior physician.
The physician who waits to treat people until after their health is lost is considered to be inferior.
This is like waiting until one's family is starving to begin to plant seeds in the garden.
– *The Yellow Emperor's Classic of Internal Medicine*

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Section 11: Education

The complexity of our present trouble suggests as never before that we need to change our present concept of education. Education is not properly an industry, and its proper use is not to serve industries, either by job-training or by industry-subsidized research. It's proper use is to enable citizens to live lives that are economically, politically, socially, and culturally responsible. This cannot be done by gathering or "accessing" what we now call "information" - which is to say facts without context and therefore without priority. A proper education enables young people to put their lives in order, which means knowing what things are more important than other things; it means putting first things first. -- *Wendell Berry*

We are shut up in schools and college recitation rooms for ten or fifteen years, and come out at last with a bellyful of words and do not know a thing. --*Ralph Waldo Emerson*

The Indian schools were like jails and run along military lines, with roll call four times a day...The schools are better now than they were in my time. They look good on the outside. More modern and expensive. The teachers understand the kids a little better, use more psychology and less stick. But in these fine new buildings Indian children still commit suicide, because they are lonely among all that noise and activity. I know of a ten-year-old girl who hanged herself...When we enter the school we at least know that we are Indians. We come out half red and half white, not knowing what we are. --*Lame Deer, Lakota Medicine Man*

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11011 Education versus getting a degree
The difference between "getting and education" and "getting a degree."

11021 Should I stay in college
Parsing the pro-college propaganda. Following the money. Finding the best deal for your life. Which may not be college. Unpleasant facts about student loans.

11031 Self education opportunities
Many places to learn many things for free.

11041 Home schooling for families
Ideas and resources for abandoning the dysfunctional patterns of modern education.

11051 Education Design Opportunities
Work on your personal education plan for your life.

11061 Additional Education Resources
The classics of deschooling and unschooling.

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11011 Education versus Getting a Degree. Do you want an education or are you only interested in a degree?

I have never let school interfere with my education. *Mark Twain*

"Getting an education" and "getting a degree" are not necessarily the same thing.

You can get a degree AND get an education, or . . .

You can end up with a degree and not much actual education.

You can get an education and not earn a degree.

Getting an education may include earning a degree. A degree is not necessary to get an education.

A degree proves that you can survive four years or more at an institution.

Acquiring a degree is a matter of getting your ticket punched an appropriate number of times.

Degree requirements are as much about employing professors as they are about educating students. The last time I was in school, even though I was a music major, I was not allowed to take a course in music software to satisfy a degree requirement for a computer class. Instead, the school demanded that I take a course in word processing and spreadsheets, which I had been using for a decade in business.

The problem, as explained to me, was that the music software class was taught in the music department while the word processing class was taught in the computer department. The computer department was not about to give up its turf of three hours tuition of my total college bill.

You may want a career in a field where a degree is a requirement. You have to get a degree, but you can choose how you do that. If you want to avoid debt (always a good plan), you can alternate work and school and get through without borrowing money.

But if a degree isn't actually a requirement for your proposed career, you may want to think twice about whether a college education is actually worth the expense. See 08111, "The Borrower is the slave of the lender," for more information about the costs and benefits of college education.

If a degree is a requirement for your proposed career, and the job and earning opportunities for that career are not the best, beware of borrowing much money to pay for such a degree. You may be better off working on different career plans.

Or you may abandon the idea of a career and instead simply embrace life, with a plan to earn enough to sustain yourself from a variety of possible income streams.

There are many ways to learn in the modern world. Classroom instruction in a college or university is only one of them, and it may not even be the best option if the goal is to actually learn something useful so that you can earn a living.

Isn't it interesting that with all the lists of schools these days, no one rates schools based on their ability to actually educate students?

You are in charge of your life. This is your personal good life design. It's not your parent's design. It's not your friends' design. It is a description of where you want to go in your life. Education is a matter of finding the skills and information you need in order to implement your design for your life.

An education is the ability to successfully direct your own life, to your own design.

When it comes to the big academic business of college –

Take nothing for granted.

Assume nothing

Use the "hermeneutic of suspicion" regarding all pro-college propaganda. Hermeneutics is the art and science of interpreting written texts. A "hermeneutic of suspicion" is a way to say "let the buyer not only beware, but actually be suspicious of what people tell you."

The need for "Unschooling."

Human beings enter life as learners. Alas for most of us, as we grow and develop, school systems, whose goal is to graduate obedient and productive worker-drones, destroy curiosity and initiative. Any education that happens in the course of that training is incidental to the actual purposes.

We organize schools like regimented military organizations. The curriculum has as much to do with politics as it does anything else. The anxiety that the fear of failure produces in students drives them away from actual education and toward behaviors and strategies that fool teachers into thinking the students know what they actually don't know so the students can earn "good grades."

Since this is all that most students have ever experienced from day one in kindergarten to their high school graduation, the attitudes and behavior developed in coercive school systems carry over into college.

Education and Your Career Design

The question of what education you need begins with observation of your goals and purposes for your life.

What do you want to do with your life? If you want to be a doctor, a nurse, or follow another profession that requires credentials, you will have to go to college. Many people have achieved enormous success without going to or finishing college or even completing high school.

So we come back to the question of what you want to do with your life, which has a lot to do with what your passions are.

Still not sure? Well just dive in and start accumulating knowledge. Find jobs, work, blog, read lots of books. Cast your net widely. Accumulate experiences. Observe your life and journal it. Work on the design for your life – "what you do for a living" is only one aspect of the permaculture design for your life. Aim for multiple income streams in order to ensure you always have some money coming in.

Out of this activity, you come to some idea as to where you want to go. Maybe you start to be more intentional and directed in your learning.

Suppose you decide you want to work on urban structures that make it easy for people to buy food from local farmers.

What does this involve? You need to know about –

-- Local food production/market gardening.

-- Commercial distribution systems

-- Laws, city ordinances, and regulations governing food production and distribution.

-- Marketing

-- Community organizations

So you start to learn about these things. Maybe you join a community garden or spend a summer as a worker on an organic market farm. You could intern at a food cooperative or bag groceries there as a job. You join community organizations and learn about cooperatives. Over time you develop a knowledge and experience base, plus community connections, that can facilitate your invention of your own job organizing better local food opportunities for people in cities.

Integral to this design process are these components –

-- A **design for your personal educational program**. This plan sets forth everything you intend to achieve by your educational activities.

-- **Knowledge and skill sets.** As part of the design process, you discover what knowledge and skill sets you need..

-- **Praxis,** which involves practicing your skills and putting your knowledge to work by initiating projects and activities. Then you reflect on what you did and practice some more, followed by more praxis, and etc.

-- Network with others and **create communities of support**.

-- Market yourself and your ideas

This process will be easier if you do it in the context of your own learning community. This is a group of peers involved with self-educating who come together for mutual support. This is a good stacked function for your permaculture education community.

Don't assume that going to college and getting a degree is the same thing as learning what you need to know in life.

Don't assume that going to college and getting a degree are the only ways to have a good life.

You can have a fine life and educate yourself without ever paying one dime of tuition to an academic bureaucracy.

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11021 Should I stay in college?

"Some people get an education without going to college;
the rest get it after they get out. – *Mark Twain*

Asking the question that is the title of this chapter is generally not encouraged. Ignore the near-unanimous screams from people around you shouting –

> "OF COURSE YOU HAVE TO GO TO COLLEGE OR YOU WILL HAVE A MISERABLE LIFE."

You ignore them because you need to answer this question for yourself, in the context of a holistic observation and examination of your life, not on the basis of people yelling knee-jerk pro-college propaganda at you.

Your answer begins with the question – Why are you in college? (Or, why do you want to go to college?) Are you excited about college learning and the opportunities before you? Do you need a college degree to get credentials to practice in a field like medicine?

Or are you there just because, you know, you are there. Your parents wanted you to go to college. Your friends went to college and you followed them. Social and sports scenes excite you more than learning anything.. (You have to answer this question honestly, lol.)

More questions --

-- Are you on scholarship?

-- Parents paying?

-- Spending your own savings?

-- Working part time?

-- Borrowing the money?

Questions about your area of study.

-- Can you actually get a job when you get your diploma with the knowledge and skills you learn in this particular educational program?

-- Do you know people who recently graduated with your degree who now have good jobs?

-- Do you know people who recently graduated with your degree who now work at cheap hourly-wage job-jobs that have nothing to do with their degree to make ends meet?

Your school almost certainly knows the answers to these questions. They pay attention to such things. If they won't tell you, it's not because they don't have the data, it's because they don't want to tell you that nearly everyone who graduated with your degree is either unemployed or working at low-paying jobs that have nothing to do with their degree. Ask to see the raw data to back up any claims they make about their graduates' ability to find jobs that go with their degrees.

You don't have to go to college to have a good life.

That is certainly contrary to the pro-college propaganda, but the actual purpose of pro-college propaganda is to increase tuition revenue and profits for colleges and universities. Education of students is secondary to the need for a constant source of revenue to support the infrastructure and overhead of higher

education. Call this the economic theory of modern university education.

First Unpleasant Fact: People tell young people to take actions against their best interest all the time.

Years ago student loan lender Sallie Mae encouraged me to consolidate my student loans before the interest rates changed. I asked their customer service representatives, “what will the new rate be?” They said, “No one knows what the rate may be at this time so you better lock in your present rate and avoid any future interest rate increases.”

Based on Sallie Mae’s advice, I consolidated my student loans and locked in my interest rate – just before student loan interest rates plunged to the lowest level in history. In fact, the interest rate they locked me in to was higher than the rate I had been paying.

As things turned out, once I began doing my own research, I discovered that the Salle Mae people repeatedly and consistently lied to me during this consolidation process.

The advice Sallie Mae gave me benefitted Sallie Mae. Following their advice cost me thousands of dollars of additional interest payments that I would not have had to pay if I had not taken their advice.

Yet. . . Everything **they did was legal.** In other words, it was completely ***legal*** for them to lie to me and give me advice that was to their benefit, not my benefit, while telling me “this is for your own good.” Burn this into your brain before you go shopping for a student loan: **It is legal for student loan lenders to cheat their borrowers using tactics that would be illegal for other types of loans.**

That's exactly how corrupt our system is. Congress ***authorized*** the student loan industry to use practices forbidden everywhere else in the debt markets.

If you don’t think the system stacks the deck against you as a student loan borrower, read the previous two paragraphs again and think about the implications. Trusting Sallie Mae cost me big bucks. I should have been less trusting, more skeptical, and sought outside advice from someone with experience with the student loan system.

This is typical of the way things work for young people these days.

College degree requirements have as much to do with keeping faculty employed as they do with providing an actual education. Colleges require students to take – and pay for – useless courses that have nothing to do with their career plans or even with being an educated person. University administrators distort the learning process by padding degree requirements. This increases the price of their degrees and the revenues of their schools.

The concept of General Education Requirements is rooted in the educational system of the 19th century. In an era of the internet, where I can sit at my desk in Oklahoma City and reach out to somebody in the wilds of Outer Mongolia, "General Education," as requirements for a degree, are an expensive relic outdated by the technological changes of our time.

I am not opposed to students taking a broad selection of class work. I am opposed to using General Education Requirements as a way to inflate the cost of a degree without a corresponding increase in the value of the degree.

The university-industrial education system has its own purpose and dynamics. Educating young people is only part of the deal. At some schools, it is not at all clear that educating students is the most important activity.

How can this be known with such certainty?

Follow the money. The highest paid people in academia are not the people who teach a lot of students.

At modern universities, money flows first and foremost to those who coach and manage winning sports teams. Next on the plunder list are those who research, publish, and administer. Actual teachers will always be lower on the totem pole of faculty compensation.

Your money, your parent's money, your scholarship money, and your loan money support a bloated and often indolent and parasitic class of academic aristocrats. These folks are perfectly fine with the idea that you should be indentured to a bank for your entire life in order to pay off your student loans so that they can continue their refined lifestyles of academic leisure.

If you have any questions about whose side a university's administration is on, look no further than Pennsylvania State University, where the most senior administrators conspired to cover up years of sex abuse by a popular coach. This action caused physical and emotional harm to many young men. Janitors at Penn State, interviewed by investigators, admitted that they had seen evidence of Sandusky's attacks on young men and boys. Without exception they were afraid to say anything, lest they lose their jobs. That speaks volumes about the culture of colleges and universities in the United States.

So the question about whether you should stay in school is complex.

The system is not necessarily designed to educate you, but is designed to get your money. You certainly should not trust anything that a university or college tells you about the advantages of a particular school or the general utility of a college education.

These are broad generalizations and here and there, we may find exceptions. You may actually be getting value for your money at your school. If so, that is an argument for staying in your particular school. It says nothing about what others, in programs elsewhere, should do. Context is everything!

Second Unpleasant Fact: You may experience financial privation, bankruptcy, and disaster in your life if you do go to college.

The truth of this matter is that half of all the students who graduated from college since 2006 are either unemployed or working at low-paid hourly jobs that have nothing to do with their degrees.

Wait One Year. At Least.

Don't be in a hurry. We don't have time to be in a hurry. You can have a fine, happy, and prosperous life without ever going to college.

The decision to college or not to college is such a big decision that it is unlikely to be improved by making it in a hurry. Many young people rush right out of high school and immediately jam into college and what is the point of that? I suppose if a school throws actual scholarship dollars at someone, that's a point in favor of proceeding immediately to school. Even in that situation, what about asking the school if you can wait one year before taking up their scholarship?

Most young people would be much better off if instead of going to college right after high school, they found a job, even if it is a cheap job-job, and worked for a couple of years and looked for interesting experiences.

If you must borrow every penny of your expenses,
while earning a degree that is not likely to get you a good job
when you complete your degree,
your best choice is to get out of school,
the sooner the better.
Finish your current semester or quarter and go look for a job.

This doesn't mean that you turn your back on getting a degree, if a degree is something you really have a passion for. It does mean that you shouldn't pursue that dream on borrowed money. Work a while, save your money, go back to school until the money runs out. Go to

work, save your money, go back to school until the money runs out. Repeat as necessary until you get a degree.

There's nothing wrong with pursuing a passion, like English literature, or art history. Never do something like that on borrowed money.

If you do, you may well enslave yourself for life to a vampire bank that will suck you dry. If English literature is your passion, get that degree, but pay for it as you go, even if that means work a year, go to school a year, work a year, go to school a year.

Or. . . dump the college expense and study English literature on your own.

Start reading clubs in low income housing projects. Read Great Expectations with a class of prisoners at a local jail. Study the Red Badge of Courage with disabled veterans at a hospital. Read the Grapes of Wrath with unemployed auto workers. Blog about your experiences. Start a community of support. Who knows where such a path would lead? It will be as great an education as any university could give you. Unless you're lucky, you'll be working at some kind of a cheap job-job anyway once you graduate, so skip the expense of the four-year degree, get the cheap job-job, and pursue your passion with freedom and joy and have fun with it.

And after a while maybe you can learn a way to make some money from your passion and eventually free yourself from the cheap job-job to get paid for what you really enjoy doing with a passion.

The prime argument for going to college.

> College graduates make a million dollars more during their lifetimes than their peers without degrees.

People pitch this at young people as if that million extra dollars of lifetime salary is a slam dunk reality if you just punch your ticket enough to get a four-year degree. The problem is that the statement is only half true.

Average numbers are popular with scam artists and propagandists everywhere. They are useless – and often dangerous – for making plans for real life.

If someone shoots at me six times, misses me five times, and kills me with the sixth shot, I am not "on average" alive, even though 83% of the shots missed and only 17% of the shots hit me.

If you come out of school with a degree in medicine, law, nursing, or engineering, you have a chance of hitting the "million extra dollars in your lifetime salary" target.

But there are other degrees where the "million dollars more during your lifetime" is an "only in your dreams" statement. They won't earn the first million during their working careers.

Average numbers promise nothing about individual outcomes. Statements like this are examples of the things that people advise young people to do that are actually contrary to their best interest.

There's a certain amount of social and economic elitism in such statements.

Suppose all young people wake up some morning and decide – "I have to go to college."

They make their plans accordingly and enroll in four year colleges to work on bachelor's degrees in various fields.

Who will do the plumbing? The electrical work? Who will cook in restaurants? Who will tailor clothes? Who will clean toilets?

These are all honorable and necessary jobs and no one needs a college education to do them. Yet, the college pushers dismiss these careers as unworthy of notice. The unstated message is – "Only losers don't go to college."

Here are some of the losers who not only didn't go to college – some of them dropped out of high school:

-- Paul Allen, billionaire cofounder of Microsoft.

-- Sheldon Adelson, billionaire casino owner, dropped out of college to take a job as a court reporter.

-- Woody Allen – screenwriter, actor, director, producer – was kicked out of college for poor grades.

-- Julian Assange, Wikileaks founder, programmer.

-- Ben Affleck, actor, college dropout.

-- Winston Churchill, prime minister of England during WW II. Flunked 6th grade, graduated high school, no college.

-- Simon Cowell, British entertainer/producer, Britain's Got Talent, dropped out of school at age 16.

-- Johnny Depp, high school dropout

-- Bobby Flay, TV chef, high school dropout.

Many more listed at http://collegedropoutshalloffame.com/.

With permaculture you can design your life in accordance with your desires and passions and the permaculture ethics of caring for people, caring for the planet, and having a care for the future. It's about not taking things for granted nor making assumptions nor allowing someone else to use you for their own purposes. It's about breaking free from the default designs of society that lead to gluttony, injustice, and war, and developing a design for your own life that meets your needs and responsibilities to society and the planet.

Your personal educational plan is an integral part of the permaculture design of your life. Don't work on your parent's design or your school's design or your friends' design. Make your educational plan your design and own it with a passion.

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11031 Self Education

I was happy as a child with my toys in my nursery. I have been happier every year since I became a man.
But this interlude of school makes a somber grey patch upon the chart of my journey.
It was a unending spell of worries that did not then seem petty, and of toil uncheered by fruition;
a time of discomfort, restriction and purposeless monotony. -*Winston Churchill*

If you decide that pursuing a college degree is not the path for you, or "not right now", this does not mean an end to your education. The leading edge of education these days is online and crowd-sourced. There are a growing number of websites and programs offering high quality instruction for free or at low cost. There is a whole "Uncollege" movement, growing like wildfire. Just google Uncollege and check it out in Wikipedia, about which movement the online encyclopedia sayeth. . .

> UnCollege is a social movement that aims to change the notion that going to college is the only path to success. . . The UnCollege movement is founded on these principles:
>
> -- Many people pay too much for university and learn too little.
>
> -- You can get an amazing education anywhere—but you'll have to stop writing papers and start doing things.
>
> -- You need an excellent education to survive in a world where 50% of the population is under 30.
>
> -- Subjects taught in traditional universities are often contrived, theoretical, and irrelevant, promoting conformity and regurgitation rather than innovation and learning.
>
> -- You don't have to decide what to do with your life at age 18.
>
> -- You can contribute to society without necessarily having a university degree.
>
> -- You cannot rely on university to give you a complete and relevant education when professors are often more interested in researching than teaching.
>
> -- If you want to gain the skills requisite for success, you must hack your education.[

An outline of the self-education process –

-- Pursue your passions.

-- Put what you learn into praxis (action with contemplation).

-- Talk about/publicize what you do.

-- Join or create a peer learning community.

-- Market yourself.

Online Educational Resources

12 Dozen Places to Educate Yourself Online for Free
http://www.marcandangel.com/2010/11/15/12-dozen-places-to-self-educate-yourself-online/

Uncollege Resources
http://www.uncollege.org/resources/
Compilation of resources from the uncollege movement.

Zero Tuition College
http://www.ztcollege.com/

Coursera
http://www.cs101-class.org/hub.php
Coursera commits to making the best education in the world freely available to any person who seeks it.

Udemy
http://www.udemy.com/
Take and build online courses on any subject. Our goal is to disrupt and democratize education by enabling anyone to learn from the world's experts.

Open Courseware Consortium
http://www.ocwconsortium.org/
Sponsored by MIT, a collaboration of universities and colleges offering freeware educational resources.

Khan Academy
http://www.khanacademy.org/
Over 3,000 free online videos teaching everything from arithmetic to venture capital and many points between. Strong on math and science.

Academic Earth
http://academicearth.org/
Aggregating video lectures from major universities.

Stanford Engineering Everywhere
http://see.stanford.edu/default.aspx
Accesses courses in Stanford's engineering department.

Online Education from the University of Washington
http://www.pce.uw.edu/online-learning/
Not everything is free, but there is plenty of open material here.

Annenberg Learning
http://www.learner.org/resources/browse.html
Free materials from a supplier of online resources to teachers.

Whatcom College Math Center
http://math.whatcom.ctc.edu/content/Links.phtml?cat=3
Free online math courses.

Carnegie Mellon Open Courses
http://oli.web.cmu.edu/openlearning/
Engineering, statistics, biology, and more.

Free Online Italian Lessons
http://www.oggi-domani.com/

John Hopkins School of Public Health Open Courseware
http://ocw.jhsph.edu/

NYU Free Courseware
https://files.nyu.edu/jmg336/public/html/mathematics.html
Textbooks, lectures, notes, and videos on mathematics

Tufts Open Courseware
http://ocw.tufts.edu/

Sofia Open Content Initiative
http://sofia.fhda.edu/
8 classes offered by a consortium of California community colleges.

Economic Research Institute Distance Learning
http://www.eridlc.com/?FuseAction=Main.Home#List
52 classes on human resources.

Stanford Computer Science Library
http://cslibrary.stanford.edu/
Free access to texts and other materials.

University of Pennsylvania Online Library
http://onlinebooks.library.upenn.edu/

iTunes University
http://www.apple.com/education/itunes-u/

Wikiversity
http://en.wikiversity.org/wiki/Wikiversity:

Main_Page
Text based learning resources online

Textbook Revolution
http://www.textbookrevolution.org/index.

php/Main_Page
Free textbooks online.

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11041 Home Schooling for Families

The schools ain't what they used to be and never was. --*Will Rogers*

If you want your children to be intelligent, read them fairy tales.
If you want them to be more intelligent, read them more fairy tales. -- *Albert Einstein*

Ideology drives the debate on education more than actual concerns about learning. The various groups contending for power in our society understand that to capture the youth is to control the tomorr1ow. That's one reason we have so much administration. The system can't just allow teachers to teach. It must ensure that the teaching conforms to topics, subjects, and content that the ruling elites approved of. Otherwise, something might happen and students might learn to think and that is a fate that our aristocrats want to avoid at all costs.

Like everything else – education follows the pattern set for it.

Schools "as we know them" feature regimented military-like patterns. The system arbitrarily divides students into grades segregated loosely by age. Educational bureaucracies segment information by subject, often via schemes mandated by politicians. No one teaches whole systems thinking. Administrators focus on obedience, which have little to do with education and everything to do with forming obedient worker bees for the military-industrial complex.

There often is a primary emphasis on sports, which have little to do with education but are great for keeping students and parents entertained and distracted. Politicians and educational bureaucrats benefit when no one pays much attention to the poor job of education done by most schools.

Discipline is always a problem. Cafeterias feed students diets high in carbohydrates and junk food. Nutritional content appears to be optional. Few whole foods are on the menu. Indeed, in many school cafeterias, nobody cooks anything. They simply warm up industrial food-like concoctions bought in large quantities by central purchasing agencies.

Corporations and the military have free reign to indoctrinate students with the culture of gluttony, greed, and violence that support their institutions.

The goal of the conventional education system is to create obedient worker-bees with high self-esteem who won't question authority or rock the boat.

I know there are many fine teachers working under impossible conditions in the public school system. They bale a flood with a teaspoon and are locked by dysfunctional patterns into a failing system that cannot be reformed.

In response to the known problems of education, some parents choose home schooling, or unschooling, to educate their children. To explore these possibilities, start with the Wikipedia article on unschooling – http://en.wikipedia.org/wiki/Unschooling – and then read John Holt's books How Children Fail and How Children Learn. Then go on to Ivan Illich's Deschooling Society.

If you decide on some form of un- or home schooling, look online for resources. It is easier than ever to home school children and in many areas, you can find resources for extracurricular activities such as music, sports, and art.

Many home and unschooling families form mutual support communities to help with the process and provide extracurricular activities.

When it comes to the education of your children, the most important thing to remember is that energy follows the pattern.

If you put your children into the public school system, their personal energy will be constricted and deformed by the institutional pattern which will achieve the purposes of the institution. It's possible that you'll find a school that's an exception. That's not the way to bet.

If you want something different, you will need a different pattern for their educational path to follow.

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11051 Education Design Challenges

It is... nothing short of a miracle that the modern methods of instruction have not yet entirely strangled the holy curiosity of inquiry; for this delicate little plant, aside from stimulation, stands mainly in need of freedom; without this it goes to wreak and ruin. It is a very grave mistake to think that the enjoyment of seeing and searching can be promoted by means of coercion and a sense of duty. --*Albert Einstein*

The primary education design challenge in your life is to design the education plan for your life.

If you are not already in your working/earning situation, your education plan should lead to a way to earn a living in the modern world that is sustainable through the complications likely due to the machinations of the four horsemen of the modern apocalypse (peak energy, climate instability, political criminality, economic irrationality).

If you are already in your working/earning situation, your education plan should focus on your passions, on subjects that enhance your life. You may need to change your job as a result of changing circumstances. All of this is part of your education design.

Since important functions should be supported by multiple elements and systems, designing an educational plan that leads to multiple income possibilities greatly increases the sustainability and resilience of your life.

Your education plan will broaden your horizons and give you the knowledge and skills you need to navigate the complicated and difficult future.

If you designed and implemented a learning community, as suggested in section 0, evaluate its effectiveness as part of your educational design.

If you designed and did not implement – or if you did not design – a learning community, evaluate that decision and its impact on your iPermie experience.

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11061 Additional Educational Resources

Today for Show and Tell, I've brought a tiny marvel of nature: a single snowflake.
I think we might all learn a lesson from how this utterly unique and exquisite crystal turns
into an ordinary, boring molecule of water, just like every other one, when you bring it in the classroom.
-- *Calvin, from Calvin & Hobbes*

The Harvard Classics, a/k/a Dr. Elliot's Five Foot Shelf: 52 books considered, in 1909, to be fundamental to becoming a learned person. http://en.wikipedia.org/wiki/Harvard_Classics

Farr, Michael. 300 Best Jobs Without a Four Year Degree. Jist Publishing, 2009. ISBN 1593576587. Bill Gates and Thomas Edison did not have a college degree, that didn't stop them from doing what they wanted and needed to do.

Freire, Paolo. Pedagogy of the Oppressed. ISBN 0826412769. 30th Anniversary Edition, Continuum Press, 2000. How modern education becomes a tool of oppression and describes a path to liberation.

Gatto, John Taylor. Weapons of Mass Instruction: A Schoolteachers Journey Through the Dark World of Compulsory Schooling. ISBN 0865716692. New Society Publishers, 2010. This book focuses on mechanisms of traditional education that cripple imagination, discourage critical thinking, and create a false view of learning.

Holt, John. How Children Fail. ISBN 0201484021. Da Capo Press, 1995. How Children Fail began an education reform movement that continues today. In his 1982 edition, John Holt added new insights into how children investigate the world, into the perennial problems of classroom learning, grading, testing, and into the role of the trust and authority in every learning situation. His understanding of children, the clarity of his thought, and his deep affection for children have made both How Children Fail and its companion volume, How Children Learn, enduring classics.

Holy, John. How Children Learn. ISBN 0201484048. Da Capo Press, 1995. John Holt was the first to make clear that, for small children, "learning is as natural as breathing." In this book, he looks at how we learn to talk, to read, to count, and to reason, and how we can nurture and encourage these natural abilities in our children.

Holt, John. Instead of Education: Ways to Help People to Do Things Better. Sentient Publications, 2003. ISBN - 1591810094. Holt's most direct and radical challenge to the educational status quo and a clarion call to parents to save their children from schools of all kinds.

Illich, Ivan. Deschooling Society. ISBN 0714508799. Marion Boyars Publishers, 2000. Schools are the reproductive organs of the modern consumer society. They promote inequality and inhibit social mobility and provide a ready and universal explanation for educational failure that inhibits a rational inquiry into what is going on with the schools. The present system convinces most people that their inferior status is directly related

to failures to consume sufficient quantities of educational services.

Koetzsch, Ronald. The Parent's Guide to Alternatives in Education. Shambhala, 1997. 1570620679. This book is meant to be a consumer's guide to 22 forms of alternative education available to children whose parents choose not to send them to public schools. It offers an historical perspective of American education, along with the history behind each of the specific alternatives.

Llewellyn, Grace. Guerilla Learning: How to Give Your Kids a Real Education With or Without School. Wiley, 2001. 0471349607. Practical tools to help your children learn.

Llewellyn, Grace. The Teenage Liberation Handbook: How to Quit School and Get a Real Life and Education

Unger, Harlow Giles. But What If I Don't Want to Go to College? A Guide to Success Through Alternative Education. Ferguson Publishing Company, 2006. ISBN 0816065578. Descriptions, advantages, and disadvantages of 12 types of non-college vocational training programs.

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Section 12 Family

What can you do to promote world peace? Go home and love your family. -- *Mother Teresa*

I sustain myself with the love of family. -- *Maya Angelou*

To lose a brother is to lose someone with whom you can share the experience of growing old, who is supposed to bring you a sister-in-law and nieces and nephews, creatures who people the tree of your life and give it new branches. To lose your father is to lose the one whose guidance and help you seek, who supports you like a tree trunk supports its branches. To lose your mother, well, that is like losing the sun above you. It is like losing--I'm sorry, I would rather not go on."
-- *Yann Martel, Life of Pi*

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12011 Family and Children
Fundamental, basic, foundation of the future.

12021 Breastfeeding
Best for baby, best for the parents, best for the planet, and best for the future.

12031 Diapers
Best choice for baby, best for the planet, best for the future.

12041 Towards an Organic Childhood
Laying the groundwork for health, eliminating exposure to pesticides, herbicides, and other toxic substances.

12051 Additional resources.

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12011 Family and Children

A baby is God's opinion that the world should go on. -- Carl Sandburg

Families are fundamental, uniting us across generations to care for people, care for the planet, and care for the future.

The family is the most basic social unit in all human societies. It takes many forms across the continents and the centuries. The common thread however is the care and nurturing of children. This is the way that human families and cultures propagate themselves across time into the future.

Families are integral to all human cultural ecologies.

The modern world has not been kind to families. The glorification of the State and the reduction of all values to economic issues has come at the cost of family ties that once bound us together. We see this most strongly in the decline of the importance and utility of the extended family and the exaltation of the nuclear family, living alone in an ideal televised suburbia.

Just when you think you have your children and the whole child-rearing affair figured out, your kids will surprise you. They are at once predictable and changeable, set in their ways but always looking for something new, obedient and rebellious. Raising kids may be many things rolled into one experience, but "boring" is never on the list.

If you are learning about permaculture design before you form a family, you can work on it as a design challenge. As with any new and complex project, the more you understand in advance, and the more plans you can make – design decisions – the better things will go.

All permaculture designs are living documents that grow and develop and evolve as the situations and circumstances change.

If you come to permaculture design when you are already in the midst of family life, the ethics, principles, strategies, and techniques of permaculture will help you to understand what is happening in your family. Your whole family should be involved with your design and learning process, as much as is consistent with their age, development, and understanding.

Children should be a constant reminder to all of us regarding the importance of what we do with permaculture. The design of the world our children will experience happens right now, either as a matter of intentional design or default acceptance of the standard excess consumption design model.

What will our children and grandchildren say about our choices?

-- If we do not challenge the political criminality and economic irrationality of our time with better design and practical models,

-- if we do not stop the destructive human processes that drive climate instability and curb our insatiable appetites for fuel,

-- will they be grateful for the world we leave them?

What that world looks like fifty years from now depends on what you and I do today.

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12021 Breastfeeding

When we trust the makers of baby formula more than we do our own ability to nourish our babies, we lose a chance to claim an aspect of our power as women. Thinking that baby formula is as good as breast milk is believing that thirty years of technology is superior to three million years of nature's evolution. Countless women have regained trust in their bodies through nursing their children, even if they weren't sure at first that they could do it. It is an act of female power, and I think of it as feminism in its purest form. -- *Christine Northrup*

If a multinational company developed a product that was a nutritionally balanced and delicious food, a wonder drug that both prevented and treated disease, cost almost nothing to produce and could be delivered in quantities controlled by the consumers' needs, the very announcement of their find would send their shares rocketing to the top of the stock market. The scientists who developed the product would win prizes and the wealth and influence of everyone involved would increase dramatically. Women have been producing such a miraculous substance, breast milk, since the beginning of human existence. -- *Gabrielle Palmer*

Breastfeeding your baby is the choice that cares for people, cares for the future, and has a care for the future. Each mother's body makes it especially for her baby. It is free and formula is expensive. Formula is an inferior substitute for mother's milk.

Benefits of breastfeeding for your child

-- Immunity from diseases. A baby is born with a very immature immune system. Breast milk is the way that nature provides for babies to be protected from disease. As they drink the milk made by their mothers breasts, they receive immune system antibodies from the mother, so that whatever the mother is immune from, the child gains protection from.

-- The first milk – colostrum – is the **perfect food for a newborn baby.** It is low in fat but high in protein, carbohydrates, and immune system antibodies. It is produced in quantities just right for a newborn children. This first milk is very important for the development of your baby's gastrointestinal system. As the first week passes by, the colostrum evolves into regular breast milk and increases in quantity.

-- Breastfed babies have a **decreased chance of developing allergies** as they grow older.

-- **Enhances the bond** between the parents and the child and helps the

parents, the mother especially, observe the child's development.

-- **Reduced risk of SIDS**.

Breastfeeding benefits for the mother:

-- Suppresses **fertility and menstruation**.

-- **Lowers the risk** of the mother having a stroke or heart attack or developing diabetes, high blood pressure, and high cholesterol. The beneficial effects last for decades after breastfeeding ceases.

-- Breastfeeding is an important aspect of a **mother's recovery from childbirth.** Not breastfeeding the baby short-circuits the woman's normal post-pregnancy cycles.

-- It **lowers a mother's chance** of getting cervical, breast, and ovarian cancers.

Problems of feeding formula.

-- Formula requires bottles and nipples, which require sterilization, which requires soap, water, and energy to heat water, and produces grey water.

-- Formula requires cans and packaging, manufacturing facilities, and transportation for wholesale and retail distribution.

-- Formula is an expensive manufactured food.

-- Formula is made with commercial ingredients which likely include Genetically Modified Organisms.

-- Bottle-fed babies are more likely later in life to develop diabetes, allergies, asthma, and obesity.

-- A study from the Philippines found that deaths from respiratory conditions and diarrhea were eight to ten times higher among babies fed formula.

-- In the United Kingdom, phthalates, which is a chemical component of plastic, is found in all brands of baby formula tested by the government. The majority of them had levels high enough to reduce sperm counts in rats.

Ten Easy Reasons for Breastfeeding From the La Leche League:

-- Baby's whole body and brain benefit immensely.

-- Release for mother hormonally causing calmer feelings.

-- Easier digestion for baby than formula.

-- Available fresh instantly for hungry baby.

-- Soothing for a crying baby.

-- Treasure of a lifetime bond with your child.

-- Free (cheaper than formula by a long shot)!

-- Effortless pregnancy weight loss.

-- Poop smells better than formula-fed babies (until solids start!).

-- Decreased risk of SIDS than formula-fed babies.

For more information:

To find a La Leche League Leader in your area, call 1-800-LALECHE or 1-847-519-7730. They will refer you to a La Leche League Leader near you. You can also access information about Breast-feeding at the La Leche League website:

http://www.lalecheleague.org/

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12031 Diapers

Politicians and diapers must be changed often, and for the same reason. – *Mark Twain*

Cloth Diapers are Best for Baby, Best for the Planet, and Best for the Future!

Many families spend big bucks for disposable diapers. However, the choice that cares for people, cares for the future, and cares for the planet is the plain cloth diaper. You will need 2 to 4 dozen to start. As babies get older, they use fewer diapers each day. Make your own or buy them. One set will do for several babies over a period of years, getting softer as time passes. Eventually you can repurpose them to make soft rags for dusting and polishing.

Changing diapers

With chemically enhanced disposables, it's not always easy to tell if baby is wet so they get changed by the clock. With cotton diapers, you change them only when it needs to be done. Each time you pick up the baby, use your finger to check the top of the diaper for dampness or feel the bottom for that heavy, warm sensation. For fastening the diaper, there are various Velcro covers available. If you are breast-feeding your baby, you will find that the diaper doesn't smell quite as bad.

Potty Training.

One of the great reasons for using cloth diapers is that it is much easier to potty train your baby and you do so earlier. It's not unusual for cloth diapered kids to be potty trained six months before those using disposable diapers.

Diaper Pails

Scrape off the solids into the toilet, toss into a diaper pail. The two basic options are “Wet” and “Dry.” With a wet pail, the soiled diapers soak in water. You can add some lavender or tea tree essential oils, together with some baking soda. With the dry pail, simply toss the diapers in a pail and sprinkle some baking soda to control odors. Wash the diapers frequently. For a review of the diaper pail options, see http://babyproducts.about.com/od/clothdiapers/bb/wet_dry_pail.htm.

Laundry.

Wash new diapers several times before using to remove chemicals.

To clean soiled diapers. . . Soak them overnight in cold water with ½ cup baking soda added. Drain and wash in a machine with hot water, laundry detergent, and ½ cup baking soda. Double rinse the diapers. During the first rinse, add ½ cup vinegar to the rinse water.

If you can’t soak them overnight, run the diapers through a cold water wash cycle with no detergent. Add ½ cup baking soda to the wash cycle. Afterwards, run the diapers through a hot water wash cycle as described above.

Drying.

Air or sun drying is the preferred method. Sunlight is a natural germ killer and makes everything smell nice. Sun drying helps reduce diaper rash.

Diaper rash.

Avoidance is best. Rinse baby's bottom often. Soaps are not always necessary, as baby poop is water soluble. If you use soap, rinse well. If you travel with baby, keep a wash cloth wet with water in a baggie in your diaper bag, or make your own baby wipes. Use corn starch for baby powder. Olive oil or cooking oil is as good as baby oil and are natural plant-based oils. Your baby's bottom will be healthier if it gets a good dose of occasional sun light and fresh air. Let your baby be without diapers on occasion. Don't leave the baby in the sun where he or she could get sun burned.

For certain restricted circumstances when managing a diaper pail isn't possible, such as traveling, disposable diapers make sense. For regular use cloth diapers are the best.

There is a tremendous amount of information on the internet about the use of cloth diapers. The About.com site is a good place to start.

http://babyproducts.about.com/od/bathsdiaperspotties/bb/cloth_diapers.htm

http://babyproducts.about.com/od/clothdiapers/Cloth_Diapering_Resources.htm

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12041 Towards an Organic Childhood

Don't handicap your children by making their lives easy. -- *Robert A. Heinlein*

Throughout the iPermie text I have highlighted the importance of organic food and indeed, an organic lifestyle. Nowhere is this more important than when it comes to children.

From the time your child comes into the world, he or she is faced with a stew of toxic substances. You cannot protect your child from everything that might harm them but you can try.

A design for how you will manage the complicated efforts involved with detoxifying a child's lifestyle is essential for success. It helps if you've already started to detoxify your household.

Our school systems are little more than reproductive systems for a consumer society. According to some studies, as many as 2/3rds of all teenagers in the United States are afflicted with at least one, and sometimes several, of these conditions: high blood pressure, high blood glucose, high triglycerides, low HDL, waist size greater than 38 inches. One-third of all obese kids, ages 12 to 19, already have metabolic syndrome. Type II diabetes was once known as "adult-onset diabetes." Now it is found with increasing frequency among teenagers.

Food first!

Avoiding these kind of lifestyle diseases in our children starts before they are born, with the mother's diet during pregnancy. A well-balanced diet of organic fruits, vegetables, grains, and dairy and meats from organically managed, free-ranging flocks and herds, sets the stage for three important development effects in babies and children:

1. Establishes, and maintain, a taste preference for nutrient dense organic foods in children.

2. Limits or eliminates dietary exposure to the 180 pesticides known to disrupt the functioning of the endocrine system.

3. Prepares a healthy foundation within the child's body for the functioning of the endocrine system, which regulates issues like blood sugar, immune system functions, and lipids (fats) by promoting healthy patterns of cell differentiation and division.

> Mounting evidence links exposure to endocrine disrupting chemicals, including dozens of pesticides, to epigenetic changes that predispose a person to face, later in life, the challenges of living with overweight, obesity, and diabetes. In addition, science has now convincingly proven that, in the case of epigenetics and human development: The timing of exposures is just as important, and in some cases more important than the dose levels delivered to the developing embryo and fetus. *The Organic Center: That First Step.*

Mothers should begin eating organic foods the moment they decide they want to become pregnant, if they are not already on an organic diet.

Making baby's food.

The American Academy of Pediatricians recommends not serving a baby solid food until he or she is at least four months old and you can wait until six months. Prior to solid food, mother's breast milk is the best for baby.

You don't need much equipment. At its most basic, all you need is a fork to mash up the vegetables and fruits. A blender or food processor can be helpful.

The process is simple. Cook the vegetable, either by steaming or boiling until it is tender. Mash or puree. Let it cool a bit. Serve it to baby. Not rocket scientish at all.

Always make extra and freeze it in ice cube trays for convenient portions later.

Consult your doctor, your local La Leche League chapter, or one of the reference works in listed in the Additional Resources chapter for more information on how to introduce your baby to solid foods.

If you must use conventional produce, avoid those on the Environmental Working Groups "Dirty Dozen". It's OK to serve the "Clean 15" in conventional forms without buying organic. See http://www.ewg.org/foodnews/summary/ for details. Always wash produce well before cooking or eating.

De-toxification of your home.
The arrival of a child requires **"child-proofing"** the home, since most homes have numerous deadly traps that a child can innocently trigger. From putting a finger into an unguarded electric outlet to pulling over a bookcase, parents must keep one step ahead of their child's developing abilities and mobility.

Besides obvious dangers, like electrical outlets, drawers, doors, piles of stuff, and etc., you also want to look for and **eliminate toxic sources of pollution** within your home. The sections on health and on hazards have information helpful to this process.

Use the Environmental Working Groups database on cleaning products to find **non-toxic cleaning products** to use around your child.
http://www.ewg.org/guides/cleaners

Don't use **commercial air fresheners** (bad idea for everyone, not just children) or **paraffin candles.**

Plastic is a major toxic item in your home. It may not be possible to get it all out of your house, but that shouldn't stop you from trying.

Always prefer **natural materials** when it comes to toys, games, and decorations for a child's room.

Always use **low VOC paints** and finishes.

You may not always be able to make the best choice, but make as many best choices as you can.

Teach your children well.

We always want to do everything we can to protect our children. The older they get, however, the more responsibility falls upon them for maintaining their health.

From an early age, teach your children by example and by instruction, how to maintain a healthy lifestyle. Explain why we avoid non-organic fruits and vegetables and the dangers of pesticide exposure. Show them how to spend their money wisely when buying food outside of the home. Give them sound bytes to tell their friends if challenged about the food in their lunch boxes.

Empower them to control their own lives, make their own decisions, and to trust themselves.

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12051 Additional Resources

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Section 13: Putting it all together.

The systems view looks at the world in terms of relationships and integration. Systems are integrated wholes whose properties cannot be reduced to those of smaller units. Instead of concentrating on basic building blocks or basic substances, the systems approach emphasizes basic principles of organization. Every organism- from the smallest bacterium through the wide range or plants and animals to humans is an integrated whole and thus a living system.

...But systems are not confined to individual organisms and their parts. The same aspects of wholeness are exhibited by social systems- such as an anthill, a beehive, or a human family- and by ecosystems that consist of a variety of organisms and inanimate matter in mutual interaction.

What is preserved in a wilderness area is not individual trees or organisms but a complex web of relationships between them. All these natural systems are wholes whose specific structures arise from the interactions and interdependence of their parts. The activity of systems involves a process known as transaction - the simultaneous and mutually interdependent interaction between multiple components. – *Fritjof Capra, The Turning Point*

Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots. It is a set of general principles- distilled over the course of the twentieth century, spanning fields as diverse as the physical and social sciences, engineering, and management. ...During the last thirty years, these tools have been applied to understand a wide range of corporate, urban, regional, economic, political, ecological, and even psychological systems. And systems thinking is a sensibility- for the subtle interconnectedness that gives living systems their unique character. – *Peter Senge The Fifth Discipline*

I have been impressed with the urgency of doing. Knowing is not enough; we must apply. Being willing is not enough; we must do.- - *Leonardo da Vinci*

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13011 Tell Your Story

By resourceful design, we keep the number and scope of our actions to a minimum required to meet human needs, provide a quality life, protect and (if necessary) heal the ambient ecosystem, all living things that our actions might touch. The less we change to achieve those goals, the better we have designed. Good design is not gaudy, it is efficient, humane, and above all restrained.
Dan Hemenway, Elfin Permaculture

As you work your way through the pages of iPermie, you accumulate a collection of design decisions. As this process continues, you next compile those decisions into a single document, with some narrative to connect and explain what you see happening in your life. As the document grows, you see how the beneficial connections among the various aspects of your life link together and support each other. You also keep an eye out for anything that contradicts some other decision so your decisions are consistent in moving you forward towards the goals and purposes for your life.

This document the permaculture design for your life. It is not a document that you write, and then file and forget about, as you had somehow finished the project. It will guide everything that you do for the rest of your life.

Create a living document. This is the intentional plan for your life. As your life develops and your circumstances change, you will revisit your plan and evolve it as necessary.

Some of your decisions (like never using credit cards) can be made and followed for the rest of your life.

Other decisions are contingent on your present circumstances. When those change, your lifestyle evolves to meet the new situations.

Your design isn't done until you die. And even then, your design lives on after you in the influence you have had on those you care about and that care about you. Many of us will leave generations to come with lasting work in the form of invisible structures that make it easier to live a more sustainable life.

Community helps! Indeed, community is critical for good design work. The default modern option is the solitary scribe working alone. That isn't a realistic picture of what is necessary for the good life. Everything about your design process will go better if done in a learning community. It's not impossible to do good work on your own. It is easier and more fun if done in community.

Integrate your spirituality. If you are religious, spiritual, and/or have religious practices, or follow a specific spiritual path or religion, you will surely want to integrate that with your design work. As I noted early in this work, permaculture is indeed a secular discipline. Like all other secular disciplines – gardening, music, art, construction, etc. ad infinitum – people bring their faith and spirituality to the practice of secular disciplines. Permaculture is holistic so it would be odd to leave something as important as

spirituality out of a design for the life of a spiritual person. iPermie doesn't have a section on spirituality because the field is so diverse it's just not possible to do justice to it, not to mention the fact that anything I would say on the subject would be colored by my own personal spirituality and I can't be expected to be an expert on the application of permaculture within the context of other faith traditions not my own. The holistic nature of permaculture is comprehensive enough to incorporate your faith. Or not, as the case may be, if you are an atheist or agnostic.

Make specific decisions. At one extreme, a permaculture design could be contained within the phrase – "Think and live more sustainably." But the devils – or the blessings – are in the details of what it means to think and live more sustainably.

How this happens – in **somewhat exact detail** – is the **story you present** in the permaculture design for your life.

Your design is a narrative you tell to yourself – and to those who you care about and who care about you – that describes where and how you will fare forth in your life.

Document your decisions. If you haven't done so already, start your writing process by compiling your decisions into a document and add a numbering system to make them easy to reference.

Don't make telling this story a source of anxiety. It isn't a term paper that will be graded. Think of it as a long letter you write to yourself, setting forth your plans for your life.

One of the nice things about the iPermie process is that YOU set whatever deadlines you feel you need. Alternatively, you don't set any deadlines whatsoever.

Avoid stress while you work on your design. There is no need for any fear-of-failure. This is you thinking about and designing your life. What's not to like about that? Hack the design for your life as though it has meaning, because your life does in fact have meaning – to you, to people who know and care for you, and to the planet and its diverse ecologies and all of its critters, great and small.

QUEST FOR BENEFICIAL CONNECTIONS.

Compiling the design report is another opportunity to look for beneficial connections, stacked functions, important functions that need reinforcement, synergies, and also to avoid/redirect energy and resource sinks into more useful and beneficial purposes.

This process has been part of your design work from its beginning,. This is another opportunity to make your design even better.

Push this as deep as you can. The more beneficial connections and integrations, the better your design.

You may come up with elements and functions in your design that don't – at least at first glance – have any connection with anything else.

When this happens, first look more closely and deeply and make sure that there aren't some connections that you missed first time through. If these are loner elements, see what you can do to beneficially connect them with the rest of the elements, functions, and systems of your life. Integration, not segregation, is what works in permaculture design.

Whenever you do get stuck – and it would be an amazing design process if you don't run into what look like dead ends and problems-without-solutions – break free and go do whatever it is that you do to de-stress and relax. Fish, hike, eat, party, contemplate, play, or listen to music, whatever it may be – take a break from design work.

Don't fret about the issue at the conscious level of your brain. Your thought process hasn't stopped. It continues at the

subconscious level. Let that process run its course and see what pops into the conscious brain.

Document your connections. Don't assume you have plenty of beneficial connections. Don't take anything for granted. Document them! For example –

-- Buying organic food from local farmers provides food for you and your household.

-- Better food means better health.

-- Better health means less medical expense.

-- Spending money with local farmers supports the local food economy.

-- Supporting the local food economy preserves existing producers and encourages new producers to start growing.

-- More local food production supports resilience of your area.

-- Resilience is good for your household on many levels.

Etc.

I suppose you don't necessarily have to document every single beneficial connection. It doesn't hurt to document as many of them as possible. Besides the benefit to your design, documentation creates a learning process helping you to understand the connectivity of everything.

Keep your eyes and ears and mind open. Do not stop watching your life, your geography, and your circumstances. Do not stop recording your observations. Your observation journal is an important component of your decision process.

Back up your work – often! All of us have lost important work at some stage of our lives because we didn't make proper backups. Considering the time and effort that will go into your design, it would be a tragedy to lose it. Make more than one back-up. Keep at least one back-up off the site. A paper copy may actually be useful as part of your ongoing design process.

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13021 Timelines of Your Life and Design.

Time flies like an arrow. Fruit flies like a banana. -- *Groucho Marx*

Time is a fact of your life. The *timeline* of your life and its cycles are integral aspects of your design. Your design work includes developing a schedule for implementing the decisions you've made for your life. It takes careful work to coordinate your life's timeline and its cycles with your design schedule for implementing your permaculture design decisions.

This coordination does not just automatically spring forth from your brain into life action. During design work, you make numerous decisions. You can't follow-through on all of those decisions at one instant of time. You must decide what are the first things that go first, the second things that go second, the third things that go third, and so on and so forth through all of the decisions you have made in your design work to date.

Let's review –

-- We **start small** or we don't start at all.

-- We prefer **biological solutions** and use **appropriate scale.**

-- We use **succession** – which means, we don't put the cart before the horse. We put the horse before the cart and we then put the horse and the cart on the road. We don't put the horse before the cart and put the pair on the roof.

As you work your way through your design process, you develop ideas for your design. You work on those ideas, evaluate them, change your mind, change your mind again and redo something, and so on and so forth. As the process continues, you pile up a series of design decisions in each area of endeavor. The design elements have beneficial connections with each other and the world around you. **We stack functions. Important systems have back-ups.** If something is seriously important, the back-ups have back-ups.

Never let the **perfect become the enemy of the good**. Don't allow your inability to achieve perfection freeze yourself into inaction.

There is good, better and best.

If you can't do the best, do the better.

If you can't do the better, accomplish the good.

If you can't do the good, at least you can avoid doing more harm.

Let's look at that natural succession again:

Sometimes to reach the best situation –

-- You begin by not doing harm,

-- Then you do good,

-- And when you get good at that, you can do better,

-- After you do better, you can do the best.

Do what you can, with what you have, where you are, at every stage of your life.

No one would give a new-born child a steak to eat. Instead, the mother would offer the baby milk from her own breast. Later, the child gets solid foods, mashed

or pureed. It is only after all of this development, when the child has grown teeth and learned to use a knife and a fork, that a steak would make sense as a menu choice for a child. If you tried to feed a new-born baby a piece of steak, he or she would choke and die.

So it is with the decisions of your life as you move towards sustainability. Sometimes you can move immediately to the best choice – cutting up credit cards, for example, can be done by anyone at any time. Other choices may not be as easy nor as clear. **Appropriate scale is as much a matter of time as it is of size or magnitude.**

How do we weave these seemingly disparate threads together into a coherent narrative of life and action?

That's where the importance of what we call "**staging**" – an organized timeline for implementing your design decisions. – becomes evident. This is a golden thread that weaves through all of the often complicated tapestry of design decisions to draw all together as a coherent good life plan of action.

Use patterns of action. We've learned that energy follows the pattern. Use patterns of action as you contemplate actually doing the changes in your life that your design anticipates. Borrow existing patterns and/or create new patterns for your own situation. By folding your action into patterns, you follow the path of least energy invested for work achieved.

Succession organizes design decisions.

-- First things first,

-- Second things second,

-- Third things third.

Since it is physically impossible to implement all of your design decisions in one burst of activity, you need a schedule for those decisions.

Your design has a time line and it will have cycles. There will be times when you do more and times when you do less.

The natural process of succession is a good pattern to follow. Many decisions have pre-requisites, things that need to be done before a particular action can occur. Staging involves sorting your diverse design decisions in a workable plan for action.

Here's an easy example. Suppose you are in college. You have some decisions that relate to your time after college. Schedule their implementation for the period after you have left school.

Other decisions relate to your time in college. Schedule them to implement now, during your college career.

If want to be part of a housing cooperative that will buy an apartment building, first you must find fellow cooperators and organize the cooperative. Then you must raise the money necessary to buy the building. Next you find the building. Moving in is the final stage. You don't move in first, before you even find the building, nor your fellow cooperators, nor the capital necessary for the cooperative to buy the building.

Careful timing avoids complications. If you plan to start a container garden, don't assign some other function to that space. Schedule acquisition of the necessary materials and knowledge before you schedule building the container garden.

Pulses regulate the rhythm of your action. Think of staging as pulses of action in your life. Consider the way you grow. Generally your body and its various parts and appendages grow at the same scale. A baby does not grow an adult sized stomach or a teenage sized hand. It's not completely uniform. There are various awkward stages, but on the whole, the process of timed growth works well in all species. Something internal to the organism regulates this as a series of pulses. Think of the implementation of your design in the same way. You regulate the rhythm of your life with pulses of action.

Cycles follow pulses. Pulses create cycles. We think of everything as linear progressions. We get snatch-grabbed from our parents at an early age and confined in a coercive industrial institution whose great achievement is for students to pass from one grade to another, in a linear manner.

That's not the way that nature works.

Since your life will travel in pulses and cycles, take advantage of this natural process as you stage your decisions for action.

Do NOT be in a hurry. The temptation in the beginning is to substitute energy for time because we are always in a hurry. We are taught to be in a hurry. If we are not in a hurry, we are wasting time! And wasting time is surely a mortal sin according to the default system. If we are wasting time, we aren't consuming or excreting! That can't be allowed!

So like I said, don't be in a hurry. Don't feel guilty about "wasting time" thinking. Don't procrastinate – but that's not the same as being thoughtful and deliberate in the pace of your action. If civilization suddenly crashes, we can all get in a hurry, but short of that, thoughtful and deliberate wins the day over hurry and rush. Just ask the Tortoise and the Hare if you doubt the truth of this wisdom.

A certain amount of this trading energy for time can work for specific tasks but the key here is "appropriate" for the task. If the implementation of the design for your life stops being energy conservative, it starts being a problem. Discernment of the energy limitations in your life is a wisdom call. When in doubt, err on the side of "less energy".

This issue comes up a lot with travel. Let's face this right away. Most of us like to travel – a lot. We have a sense of entitlement to travel. We don't like to think about the ecological consequences of our travel. We don't mind composting our kitchen leftovers, but we hesitate at the thought of curbing our travel.

Meanwhile, the data are clear and not ambiguous – the most fuel and carbon emission efficient method of travel between cities is the bus.

So we tell ourselves that we don't have the time to take the bus. People like "us" don't take the bus because, well, we are people like "us" and "we" don't take the bus. It's just not done. We have to fly because that way we get there quicker.

We ignore the ecological costs of flying because of our addiction to speed and the velocity of our lives.

Be wary of that addiction at every point in your design process.

One of the common errors made by beginning permaculture designers is the tendency to seriously front-load design decisions into the first year or two of implementation. You have your whole life ahead of you. **Knowing your ability to accept change is as important as anything else** for the successful permaculture development of your life.

Add one thing at a time. Don't get up some morning early in the implementation of your design and --

+ Quit smoking,

+ Start baking whole wheat bread,

+ Plant a garden,

+ Sprout some seeds,

+ Organize a community permaculture program,

+ Start a grey water recycling system for your house,

+ De-plastic your life.

Whew! That list makes me tired just thinking about it. A better idea is to add one lifestyle evolution or project at a time. Get good at it and then add something else. Take your time.

Think of the pulses and cycles of your life and fold the implementation of your design decisions into to your life

gradually, gently, and peacefully. Be kind to yourself as you change your life.

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13031 Walk Your Talk.

As a single footstep will not make a path on the earth, so a single thought will not make a pathway in the mind.
To make a deep physical path, we walk again and again. To make a deep mental path, we must think
over and over the kind of thoughts we wish to dominate our lives. -- *Henry David Thoreau*

Having written the design, now comes the fun part – living your design!

Yes it's true. This work you've been doing isn't just an intellectual exercise. It's purpose is to help you live an authentic life that cares for people, cares for the planet, and cares for the future by being aware of limits and putting surplus into circulation.

Community is the make or break issue. Maybe you can live a permacultural life all by yourself but that's not the way to bet your cards.

Just as we learn permaculture better in a community of support, **we will live better, more sustainable lives, in the context of a community of support, interdependence, and understanding.** When the going gets rough, the tough may get going. The way to win through the rough times is through community. That's the essential difference between the Unplugged story and other such ideas for changing the future. Unplugging worked (in that fictional alternative universe) because people came into an existing community, with established ways of doing things. They did not have to invent everything for themselves.

That's what we aim for here. We want to cast this iPermie net as widely as possible. From those seeds, the goal is the birth of community that is intensely local, while at the same time committed to the universalist permaculture ethics of caring for people, caring for the planet, and caring for the future by being aware of limits and putting surplus into circulation.

Persistence and fortitude are the critical virtues. It takes **courage** because when people do permaculture design they find lots of changes to make in our lives. This is partly a function of how unsustainable the lifestyles are of most of us who come to permaculture. We never make changes just for the sake of being busy and making changes, but we don't shrink from decisions if they are necessary. It takes **persistence** because change is rarely easy. We often stumble at first. I bet I quit smoking a hundred times before I finally learned how to quit and live as a non-smoker.

Do not attempt too much too fast. If you pile up too much stuff to do at any one point in time – or pulse – or cycle – then BOOM you shoot yourself in the foot and don't get anything very useful done. You may take one step forward and then four steps backward.

This leads to discouragement which lays the groundwork for failure.

Before long you are back living a life that cares little for people, cares less for the planet and its future, and eats, drinks, and is merry in the present because neither you nor the planet have much of a future.

So it's better to be realistic about what and how much you can do and when the

work gets done. You're not doing this for someone else's approval. This is your design for your life. You are the one who has to be happy with the results. If you over-commit yourself to too much work too fast, you will not be happy. Nor will those who love and care for you.

Don't follow the standard worldly script. The domination and control programs of the ruling authorities have plans for you. They understand that people will try to break free. It happens all the time. That's why the system makes it difficult to go against the domination/subjugation program of consume and excrete, consume and excrete, consume and excrete.

You won't lack for messages encouraging you to Just Give Up. People will say –

-- Those environmentalists are whackos anyway.

-- There is plenty of oil and gas. We can use all we want and never run short.

-- You ask too much of yourself.

-- What you do is irrelevant in the greater scheme of things.

What you do – how you live your life – matters! It impacts you and all you love and care about, your neighbors, and the planet we share. Your life has meaning, purpose, and consequences. Never doubt that, not for a nano-second.

We got into this present impasse as a result of myriads of bad decisions made by billions of people over long periods of time. The only way out is for people to learn to make better decisions. Your permaculture actions are part of that process.

Your actions have impacts far beyond your geographic neighborhood. Each bad decision you make sets in motion a series of negative events that may stretch across continents to the other side of the world, where the consequences of your works may enable oppression, injustice, and even murder, rape, and genocide.

On the other hand, **your works of sustainability, wisdom, justice, and beauty,** as they propagate across the planet, **may free peoples from oppression, make justice possible, end tyranny, and halt genocide.** Don't shake your head and roll your eyes. Every good work is a good work and a necessary building block of a future of justice, wisdom, sustainability, and beauty. We cannot do it without you.

Authenticity is a source of wisdom. As you walk the talk, you live an authentic life. We all know plenty of people who live lives of fakery and confusion. They always attempt to be someone they aren't and they fail miserably. Our goal is to be who we are, to live life with authenticity. Over time, this constant praxis in your life – the combination of action and contemplation – leads to the development of wisdom.

One of the tragedies of our time is that wisdom has been so scarce. The wisdom-deficit is not something that can be legislated. We can't just call up a broker and order two truckloads of wisdom.

We can choose to live our lives in authenticity, keeping our focus on the ethics of permaculture, as applied to the actual realities of our lives. That is the path of wisdom. We take the red pill.

We can choose to turn our backs on truth and remain as slaves of money, power, and violence. This is the path of domination and subjugation. We take the blue pill.

It's much easier to take the blue pill of delusion and excess consumption and just not think about these things. The problem is that is truly a road to destruction. Sooner or later, unsustainable systems crash and burn.

In the meantime, the system begets an itchy angst and anomie. No matter how much you consume, it is never enough. That monkey stays on your back, driving you away from family, from community,

from all that is truly good and beautiful, in favor of accumulating ever larger piles of cheap junk, at a price of injustice and environmental degradation.

Some may think that the red pill of a life lived in accordance with permaculture ethics is a hard road to walk. This is simply not true as long as we are careful in our design work. The ethics lead us towards sustainability and peace. It is a life that avoids chaos, violence, and the mega-deaths of human beings. And its journey begets wisdom and peace, as the dawning hope of sustainability becomes an ever-growing reality across the planet.

This promise given at the beginning of this literary journey is true:

Permaculture can help you design your life so that you experience more beauty, health, happiness, freedom, and cooperation – with less work, consumption, conflict, injustice, and waste.

If that's not what you want out of life, all I can say is go in peace. I hope you will be warm in the winter, cool in the summer, and well fed in all seasons.

For the rest of us, let's get to work.

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13041 Evolutions of the Story.

A beautiful thing is never perfect.

The permaculture design for your life is a living document. Change and evolve it as your own life's journey changes and evolves. It will never truly be finished until the day you die. Even then, the design of your life continues on via the influence and relationships you leave behind with the people you knew and cared about and that cared for you.

Keep your eyes open. The one constant in life is change. Sometimes life changes slowly. Sometimes the situations change with such rapidity it is hard to keep track of and understand what happens to and around you.

Record your observations. You need a system to record your ongoing observations. This could be a public blog. It could be a private journal. It could be a box with notes and receipts and photographs. You designed and implemented an observation system to do your design work. Adapt that and practice it so you get good at it as an ongoing aspect of your work.

Feedback and understanding outcomes are critical for your on-going implementation work. These reports tell us how we are doing. If your outcomes are not what you want, if feedback turns negative, this should drive a reexamination and reworking of your design decisions and actions. This goes on in nature all the time but we can't observe the actual process as it occurs. We can see the results in a forest or a prairie or other complex ecosystem that maintains itself, somehow, without our assistance. Our designs will never be that well regulated. Our inability to achieve perfection should not stop us from always striving to be responsive to feedback from our actions so that we make appropriate adjustments in what we do to enhance the positive and minimize the negative.

Feedback and outcome analysis is critical for our work with invisible structures. Human factors complicate receiving, understanding, and processing outcome analysis. People sometimes react defensively when they receive feedback. It is not always easy to accept criticism, even when it offered honestly and without personal animus. Yet, accepting and giving feedback in invisible structure work is every bit as critical as it is for our work with systems like gardens and water harvesting systems.

Analyze your circumstances as they evolve. As life changes, always seek to understand what happens with you and your household and your watershed and ecosystem. How do the new circumstances impact your existing plans and decisions?

Learn more. Never stop learning. As the body of knowledge available for permaculture develops, be informed about its content and its applicability to your own life.

Praxis consistently. It's not enough to just observe and analyze. Praxis includes both reflection and action situated in the context and historicity of human persons as beings integrated in natural ecologies (whether we know this and accept it or not).

Continue to design. The more design you do, the better your design skills become. That seems to be the way it works. If you want to do better at a skill, you practice that skill. Actually, you praxis that skill. As you learn better design, you may see things that need changing in your lifestyle design. You won't necessarily get everything right first time out of the chute. Mistakes happen, in permaculture as in everything else. When you find a mistake in your design, correct it! Notice that the previous sentence says "When," not "if." You would be most exceptional if you worked through all your design work and did not make one mistake. Just remember that mistakes are opportunities for learning and you will do fine.

Be open to unexpected developments. Just when you think you have everything figured out, life will hand you something completely unexpected, punctuating your own personal equilibrium. Such events will almost always call for a revision of your design for your life. Do it!

Always trust yourself. You first heard those words early in this learning experience. Your willingness to trust yourself and your own experiences is critical to successful design work, whether it be the first time you work out your design ideas or subsequent revisions and changes. You are a unique expression of Creation, a human personification of beauty. Don't let anyone tell you differently or allow any system or structure to deny your true reality.

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13051 Road bumps in the Story

One of the most important insights of the new systems theory is that life and cognition are inseparable.
The process of knowledge is also the process of self-organization, that is, the process of life.
Our conventional model of knowledge is one of representation or an image of independently existing facts
which is the model derived from classical physics.

From the new systems point of view, knowledge is a part of the process of life, of a dialogue between subject and object.
I believe that the world view implied by modern physics is inconsistent with our present society,
which does not reflect the interrelatedness we observe in nature. To achieve such a state of dynamic balance,
a radically different social and economic structure will be needed; a cultural revolution in the true sense of the word.

The survival of our whole civilization may depend on whether we can bring about such a change.
It will depend ultimately, on our ability to...experience the wholeness of nature and
the art of living with it in harmony. -- *Fritjof Capra*

One accusation thrown up against permaculture is that implementing permaculture across our entire society would hurt some people. “And I thought y’all cared for people. How’s that working out for ya?”

If everybody stops buying new cars, then automobile manufacturing companies will collapse and their employees will lose their jobs.

Yes, this would happen. It’s what happened to buggy and wagon makers and breeders of draft horses in the early decades of the 20th century when the automobile replaced animal traction for moving people and goods across the land and city scapes.

Did that “hurt” wagon makers? It hurt the earth more, but yes, wagon makers and the associated jobs experienced negative economic consequences. Meanwhile, people who got jobs at the new automobile manufacturing companies experienced positive economic consequences, although the process was negative for the planet’s ecologies. Some of those people who got those jobs had previously worked for wagon and buggy makers.

In our time, if automobile manufacturing companies go out of business, people who work for them will experience short-term negative economic consequences but they will receive long-term benefits from the positive impact on the earth’s ecologies of the decline in the use of automobiles. Meanwhile, the need for people to move around and haul stuff will not go away. It will happen in different ways and it is likely that those ways will be more decentralized and operated by smaller businesses. Even in our distorted and irrational times, one fact of economic life is that small businesses create most new jobs.

So the likelihood that former auto-workers will find work in the new jobs created by the end of the automobile era, and the long-term ecological benefits they receive, balances the personal economic problems that they may face. They would be part of the transition to new and better ways of doing things. That will happen for lots of people. It will be important for the invisible structures of our society to support this transition by providing intellectual, regulatory, and commercial space for it to happen.

At least under this permaculture scenario, new jobs will be created.

There are other ways the automobile era can end – scenarios that are more catastrophic and dystonic. Autoworker jobs could disappear with no new jobs being created to replace them. That's the likelihood outcome for autoworkers without broad-scale hacking of permaculture.

One of the problems with our present economy is that many forms of honest work are practically illegal for those not already involved with such work. Laws restrict where people can work. It would be illegal, for example, to set up a food truck at highway rest stops. It would be illegal in many areas to repair cars in your driveway. There are limited numbers of taxi licenses in most areas, so it would be illegal for you to just start working as an independent taxi, without benefit of government licenses. This slows the transition to better economic times and creates more economic hardship and poverty.

Permaculture transition plans support responsible structures that help workers displaced by the economic and ecological necessities of the future so that they can find other ways to make a living.

The consequences of delaying, avoiding, or otherwise marginalizing permaculture transition and thus minimizing its impact on human and natural systems will be catastrophic for all life. It could possibly lead to the outright collapse of our economic and technological systems and contribute to a terrible die-off of the human species. That dystopia will hurt people a lot more than anything connected with permaculture transition could.

Permaculture provides the possibility of a soft landing and a carefully managed transition from the dysfunctional systems of the present to the humane and ecologically sane systems of the future. Beware of people who do not care for people, do not care for the planet, and could care less for the future. They are the ones with plans that lead to collapse, death, and suffering on a world wide scale.

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13061 iPermie as Movement

Unjust laws exist: shall we be content to obey them, or shall we endeavor to amend them,
and obey them until we have succeeded, or shall we transgress them at once?
-- *Henry David Thoreau*

You assist an evil system most efficiently by obeying its order and decrees. An evil system never deserves such an allegiance. Allegiance to it means partaking of the evil. A good person will resist an evil system with his or her whole soul. – *M. Gandhi*

How does developing a permaculture design for your life morph into a movement that can change the world? By being –

-- the right idea,

-- presented to people ready for it,

-- at the opportune time.

The Three Rules of Epidemics

Malcolm Glad well is the author of a book – Tipping Point: how little things can make a big difference. In it he describes "three rules for epidemics."

1. The Law of the Few

Ideas that will become popular are fortunate enough to be adopted early by people with social gifts. Three types of early adopters in particular are important for the spread of new ideas –

-- **Connectors,** people who know a lot of people and who like to introduce new people and new ideas,

-- **Mavens**, who are information specialists, who accumulate knowledge and share it with others, and

-- **Salesmen,** gifted with great skills of persuasion

2. The Stickiness Factor

Ideas that become popular have something that is really memorable about them.

Permaculture has a lot of goodwill and general awareness out there but to date learning permaculture has been a difficult process involving expensive permaculture design courses. **iPermie creates a 2.0 method of learning permaculture.** The system can be summarized in 350 words. The subsequent 380,000 word commentary divides the topic into incremental bites for people to savor and learn as they have time. It comes with the equivalent of "Almanac of Useful Information" with a considerable amount of best practices and reskilling information. It expands permaculture to explicitly help people without any land, or who can access only a small amount of land, to learn sustainable design. iPermie is not expensive – it's available to everyone everywhere with an internet connection who can read English and download PDF files or eBooks.

3. The Power of Context

Information epidemics occur because the situations facilitate their evangelization and adoption.

It's like dropping a lighted match into a pool of gasoline which ignites the fuel and immediately spreads.

Circumstances cause people to ask questions and to check their assumptions.

Several years into this slowly-unfolding second Great Depression, and as severe climate changes impact tens of millions of people, every day people wake up and start looking for a red pill. They may not fully realize that is what they want at first, but as their consciousness changes, they will seek answers from trustworthy, authentic sources.

Each generation has different issues.

Baby Boomers are approaching retirement. We see our retirement funds melt away in one stock market catastrophe after another. We watch as Baby Boomer political leaders turn out to be every bit as evil and corrupt as those who went before them and created the present political criminalities.

Generation X families may be taking care of both children and aging parents, while struggling to pay bloated student loans as they work at jobs that don't pay quite what they anticipated during college. They struggle and see very little light at the end of the tunnel, and even that is most likely signaling the approach of another train to run them down on the tracks.

The Millennials, our young people, have been particularly hammered by the ongoing economic crisis. Half of everyone who has graduated from college since 2006 is working at a cheap job-job unrelated to their college work or are unemployed.

Permaculture design is a "sign of hope" for all – Baby Boom, Generation X, and Millennials alike – that can allow us to avoid the cruelties of an inter-generational war which our ruling classes seem determined to instigate as part of their on-going maneuvers that divide and conquer.

We can confidently expect that circumstances will continue to drive people in the direction of understanding their need for permaculture design.

Our job is to get there the firstest with the mostest, as people ready themselves for real answers to the critical problems of our era.

Change one life.

This is how we change the world.

Observe – study – evaluate – design – implement! OSEDI! That's the way the future happens – by design, not accident.

Such change doesn't happen over night. It's not a grand quick maneuver. It is one incremental change added onto one incremental change, one day at a time, three hundred and sixty-five days during the year. Each one tells one, and then another, and another. Everyone connects so we can potentially reach everyone.

Easy to use. Right praxis. Ripe time.

There is nothing here that is rocket scientish. You can find everything that is necessary in the "Hacking Permaculture in 350 words."

More and more people worry about global climate weirding, peak oil, political criminality, and economic irrationality. iPermie is the right solution, at the right time, for the right people.

Unplugged shows the way.

Vinay Gupta mapped it out. We need: a way to live, a way to eat, a community of praxis, compassion and care.

It's a leaderless resistance with no bureaucracy to support. Everyone has authority to spread the word and start their own permaculture communities. If you doubt that, print the certificate and sign it.

Might as well go ahead and get started.

How? Tell a friend. Invite people to join your permaculture learning circle. That's how we do it, one person at a time. It's relational. (What a concept!)

Each one tells two.

To send this movement forward, "each one tells two." Who can you tell about iPermie? Make a list, send out the word. Like our page on Facebook. Share it with your friends. Post a review of iPermie at one of the on-line bookstores where it is for sale. Sign up with talk@ipermie.net.

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13071 Songs for the movement

Every successful movement goes forth with music. During the Civil Rights era, “We shall overcome” was the anthem. About the protest songs of his era, the Rev. Dr. Martin Luther King said, “They invigorate the movement in a most significant way. These freedom songs serve to give unity to a movement.”

The permaculture movement needs songs. We need songs to keep up our spirits and teach our principles. Traditionally, protest and teaching songs put new words to old tunes that everyone knew. This enabled the songs to spread quickly.

In that tradition, here is a beginning collection of permaculture songs. Send others and we’ll tell everyone!

Local Food Carol
Tune: Deck the halls with boughs of holly

(1) Tis the season for the feastin',
All our local foods are good to eat!
Taste nutrition can't be beaten,
All our local foods are good to eat!
Nurturing the land and people,
Farm and city joining hands.
Tis the season for the feastin',
All our local foods are good to eat!

(2) Care for people and creation,
All our local foods are good to eat!
Hope throughout the bioregion,
All our local foods are good to eat!
From our farms onto our tables,
we will bless the way we eat!
Care for people and creation,
All our local foods are good to eat!

(3) Healing nature with earth's beauty,
All our local foods are good to eat!
Wisdom, joy fulfilling duty,
All our local foods are good to eat!
Eating with the changing seasons,
Chasing the CAFOs from our land!
Healing nature with earth's beauty,
All our local foods are good to eat!

(4) Social justice, sustainability,
All our local foods are good to eat!
Economic viability,
All our local foods are good to eat!
These our values, govern always,
They will take us forward far!
Three in number the core values,
All our local foods are good to eat!

You can substitute the name of your area for “all our local foods”. For example, in Oklahoma we sing this “Oklahoma foods are good to eat!”

The Autumn Carol
Tune: O Tannenbaum (O Christmas Tree)

(1) O Autumn season, golden bright!
We hail the harvest welcome sight!
The air is crisp, the moon shines long,
It's time to raise our voice in song
The squash and pumpkins, taters sweet,
Peppers, greens, and nuts we greet.
O autumn season, golden bright!
We hail the harvest welcome sight!

(2) The heat of summer is now past,
We wait the time of winter's blast.
The children are in school today,
The farmers work to reap the hay.
Peach preserves and apple butter,
Set our hearts to be aflutter.
O autumn season, golden bright!
We hail the harvest welcome sight!

(3) There is no kinder time of year,
Than Autumn bright without a fear,
The peaceful times upon the land,
Bring hope and health, a time so grand.
So raise a glass of Autumn cheer,
A cider strong, a mug of beer.
O autumn season, golden bright!
We hail the harvest welcome sight!

The Get Ready for Winter Song
Tune: "Santa Claus is Coming to Town".

OH! We better not wait,
it's time to make plans,
Compost, mulch, put away the fans,
Winter time is coming to town!

Squash and turnips and carrot plants,
Season extension for the cabbage transplants,
Winter time is coming to town!

Let's insulate the attic!
Insulate the floors!
Insulate the walls so deep,
and don't forget the doors!

So! Make your list, and check it twice,
Solarize, weatherize,
don't roll the dice,
Winter time is coming to town!

Get Ready for Spring Song
Tune: Jingle Bells

Chorus:

Plant the garden, plant the garden,
Spring is on its way!
Seeds and bulbs and
mulch and worms,
It's time to plant today!

Plant the garden,
Plant the garden,
Spring is on its way!
Seeds and bulbs and
mulch and worms,
It's time to plant today!

(1) Winter is soon past,
Spring is on its way,
Fruit trees bloom at last,
Brightening up the day.
The garden will not wait,
The clock is ticking fast,
Delay will bring an awful fate,
For seed time will be past!

Chorus

(2) Planting is such fun,
Potatoes, leeks, and peas,
Growing in the sun.
Tantalize the bees!
Spinach in the light,
Carrots in the ground,
Chard and beets with all their might
Will make our song resound!

Chorus

(3) Trust in worms and bees,
Abandon noxious brews.
Compost and its teas,
Earth do not abuse.
Organic is the way,
To care for all the land,
So raise your hoe, do not betray.
It's time to make a stand.

Chorus

A Permaculture Camp Song
Tune: Oh My Daughter Clementine

Come my friends now,
hear the story,
of the permaculturists.
Habitations, love and justice, and peace
for all the earth.

Three in number are the ethics,
of the permaculturists,
care for people, care for planets,
and have a care for all the future.

Four in number, are the disciplines,
of the permaculturists,
Observe all, trust yourself, respect for
nature, holistic vision.

Ten we count now for the principles,
of the permaculturists,
these the pathways to design
for peace and harmony.

Stack the functions, be redundant,
with appropriate scale design,
work with edges and diversity,
keep the law of gifts in mind.

Do only what is necessary,
everything will work both ways,
Irrelevant is nothing,
and all energies follow patterns.

Oh the strategies and the tools
of the permaculturists,
are gentle and loving,
full of beauty, wisdom, and power.

Accept all feedback,
spiral the herbs, and
biology rules the day.

All things cycle,
and the problem
often will tell us of solution.

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13081 Resistance is Fertile

Now is the accepted time, not tomorrow, not some more convenient season. It is today that our best work can be done and not some future day or future year. It is today that we fit ourselves for the greater usefulness of tomorrow. Today is the seed time, now are the hours of work, and tomorrow comes the harvest and the playtime. – *W.E.B. DuBois*

It's not hard to look at the present situation and feel like things are hopeless.

I'm sure that's what people involved with the struggle against human slavery thought.

More recently, when I was younger, my home town had "Colored Only" and "White Only" signs on its restrooms. African Americans were not allowed in the town's restaurants. They had to sit in the balcony of the theater. Our small town, which could hardly afford one school system, maintained two – one for whites, the other for blacks. During the long struggle against Jim Crow segregation, I am sure many people wondered if their situation would ever change.

The institution of slavery never seemed so eternal than it did just before it provoked a civil war that led to its demise. The response to agitation for change in the 1960s in the South of the United States was – "Segregation now! Segregation tomorrow! Segregation forever!" – as governors stood in the doors of schools to keep African American students away from the white kids.

All of that went away, in spite of the temptation to despair and surrender.

Dominant systems are well stocked with the constancy, persistence, and resilience we have been discussing as they relate to developing sustainability. They resist damage, support themselves, and are able to repair themselves when damaged. We the people are essential to the dominance systems' programs of constancy, persistence, and resilience. We support them with our money, time, effort, talents, work, and creativity. We resist moves to dismantle their dominance and replace it with sustainability. We rush to repair them when damage occurs.

Going into the future, that's going to change.

Just as slavery and Jim Crow segregation came to an end, today we move towards what amounts to a "final battle" between the old systems of subjugation and domination and the new humane systems of human community that care for people, care for the planet, and have a care for the future.

Three stages of revolution.

There are three stages to revolutions. **The first is Ideological Resistance.** One of the functions stacked on iPermie is “ideological resistance”. Here we take advantage of the contagion of ideas to spread the word that a new and better world is not only possible, it is on its way.

The second is disobedience. A second function stacked on iPermie is “Manual of Civil Disobedience.” Most people think of civil disobedience as protests or demonstrations. But given the signs of these times, the most important and effective civil disobedience is how you

live your life. By breaking out of the Excess Consumption Default Design system, you live a life of civil disobedience.

The third stage is the actual time of systemic change, punctuated equilibrium that will birth a new and more humane and just normal. Our goal is a peaceful transition and devolution of power away from the economic aristocracies who presently rule to a system of grassroots democracy that forms itself in response to the circumstances.

The secret to that success is to do a **successful job with our ideological resistance and our disobedience to established authority.**

They fight with money. We resist with time. They will run out of money before we run out of time.

-- If they can't **pay their soldiers**, their **soldiers will not fight.**

-- If they can't **buy ammo**, their **guns will not fire.**

-- If they can't **reward their friends**, they will **have no friends.**

That is the long and the short of our task going forward. **Resistance is fertile!**

We are the pioneer species colonizing the damaged cultural ecologies of our era. As the on-going situation unfolds, more and more people will be driven by their circumstances to becoming open to the iPermie approach. As we grow our communities of care, compassion, and permaculture praxis, we will present attractive alternatives to the politics of economic domination and cultural subjugation that are the best the system can offer.

When people are ready to ask questions, you can be there for them with answers.

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13091 You can do this!

Those who believe they can do something and those who believe they can't are both right.
– *Henry Ford*

Security is mostly a superstition. It does not exist in nature, nor do the children of men as a whole experience it.
Avoiding danger is no safer in the long run than outright exposure. Life is either a daring adventure, or nothing. – *Helen Keller*

Whatever you can do, or dream you can, Begin it. Boldness has genius, power and magic in it, Begin it now.
– *Johann Wolfgang von Goethe*

Here you are. You have read through all 388,000 words of iPermie Your mind is packed with new concepts and ideas. No doubt a couple of hundred thousand words ago you began to think . . . "This is too much information!"

That little devil sitting on your shoulder, representing the Excess Consumption System Design urgently whispers in your ear.

> This is bogus to the max! No one could ever do this! You could break your brain trying to understand this stuff. There's no emergency! You have plenty of time! Climate change and peak oil are like Y2k, all hype, no reality. You should go shopping, buy some great stuff, and then go out with your friends and get so wasted you have to be carried home. That's the life!

All systems defend themselves and the Excess Consumption System Design is no different. You have been programmed from birth to be an unquestioning part of that design. You're supposed to be an obedient little worker bee, your lifetime productivity indentured to the parasitic international finance system, guaranteed to consume and excrete and consume more on a regular schedule.

But the call of permaculture is to rise up and come out of that Babylon of degradation and destruction before it collapses around and on you in an orgy of ecological devastation.

You can be part of the solution, or you will be part of the problem.

Those are the only choices. Everyone takes the red pill or the blue pill.

If you think you can refuse to choose, you get the blue pill by default.

The journey itself – how you get there – is as important as your ultimate goals.

iPermie is not the only way out of the problem and into the solution, but it is an effective way. Like all permaculture strategies, it has the advantage of being comprehensive and holistic, helping you to observe and understand the patterns that govern and direct the energies of our lives.

The iPermie project is best approached in company with others, as part of a learning community. If you skipped over the call to community, now would be a good time to revisit that decision. Getting out of the problem and into the solution is much more fun, exciting, and productive in company with others.

While permaculture is a holistic design approach, it can – and certainly should – be approached one thing at a time. It's like the tired old joke, "How do you eat an elephant? One bite at a time."

So there is nothing wrong with deciding to concentrate on one aspect of iPermie for a period of time. With 13 sections, you and your learning community could work on one section a month and be done in 13 months. Or y'all may decide you need two or three months per section, and then you finish in two to three years. That is not too short of a time to devote to planning your entire life.-

If you can summon belief and confidence in yourself, you can do iPermie

– Procrastination is your enemy.

– Procrastination is the thief of time.

So don't delay, start today! All that you love and that care for you, the planet and all of its wild menagerie of life, depend upon you to do the right thing for yourself, the planet, and the future.

Remember: each one tells two is the way to start a viral movement for compassionate, humane, and just social change to build a society that cares for people, cares for the planet, and has a care for the future.

> Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less. – *Marie Curie*

> When you get the choice to sit it out or dance, I hope you dance. – Lee Ann Womack

> It is never too late to be what you might have been. – George Eliot.

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iPermie: The Epilog. Words for the Generations

The ultimate test of man's conscience may be his willingness to sacrifice something today for future generations whose words of thanks will not be heard. -- *Gaylord Nelson*

Baby Boom.
This is my own generational cohort. We burst onto the scene in huge numbers and as they said at the time, changed everything. Leaving the generational propaganda aside, now we approach the ends of our years. We haven't really accomplished what we hoped we would do, based on our thoughts and ideas in the 1960s and1970s. While there have been some notable areas of progression, for the most part we pretty much became what the system designed us to be – super consumers who don't question the status quo but who do as we are told.

The script seems to be problematic at this stage. Millions saw their retirement assets dwindle to almost nothing. People talk about the concept of retirement in the past tense. I hear, "I will never be able to retire," a lot from other Baby Boomers.

Austerity is the word in Washington, D.C., and while much of the controversy about Social Security and Medicare is politically contrived, that doesn't make the controversy less real. Indeed, it predicts continued raids on all social insurance programs. Until the permaculture revolution, governments everywhere will always have all the money they greed for bombs, weapons, and war. Social insurance funds will always be raided before cutting subsidies for big corporations and the military. Since it will take decades to build towards the permaculture revolution written about in Section 13, all of us should plan as though social insurance will be a problem as we get older.

Thus, for all in my generation, iPermie represents an alternative retirement plan. Every dollar you don't have to spend during retirement is a hundred dollars you don't have to save for retirement, at current interest rates. If returns on money increase in the future, to say 4%, then your dollar you don't have to spend saves you twenty-five dollars.

Given the present returns on money, that's not a bad investment. If you reduce the energy cost of your dwelling by $100/month, that's $1200 a year in expenses avoided "forever." You would have to have $120,000 in the bank, at the present rates of one percent per year to earn that much income. If return on money is four percent, then you would "only" need $30,000 to earn that $1,200. Actually, you need a little more, since you have to pay taxes on your income. If you pay 15% to the feds, and 5% to your state, you would need $144,000 in the bank to earn $1440 so you could pay your taxes and pay for the extra $100 in energy expense you incur because you didn't do sensible things before retirement so you would have less expense.

In other words, spend money now, while you have income, so you don't have to spend money later. Get out of debt. Superinsulate your home. Take advantage of passive solar. Do as many of the other iPermie exhortations as are relevant to your context.

I often say that my retirement plan is a super-insulated home with no debt that is really cheap to operate, has plenty of edible landscaping, and is located close to everything I need so I don't have to own a car. People often chuckle when they hear that, but I am serious as the proverbial heart attack about that retirement plan. It will work for me whether or not the stock market is up or down and whether or not the feds actually send me a Social Security check.

Generation X

Generation X, sandwiched between the Baby Boom generation and their offspring, the Millennials, "are doing the quiet work of keeping America from sucking" (Jeff Gordinier). Many of the themes of iPermie are found among the practices of Generation X. Indeed, the rapid growth of the permaculture movement worldwide has largely been a Generation X affair. While the original cohort of teachers were Baby Boomers, the present generation are largely Generation Xers.

The interest of Generation X in issues of environment, race, and class follows the experience of the world during the past few decades. With the rise of access to each other via the personal computer and the internet, issues that once could be safely viewed through the lens of print or analog television gained a new immediacy. While the state has certainly used the computer to its advantage, so have those who oppose the present system, and there can be no doubt that Generation X has been at the leading edge of that trend.

Generation Xers are also at the leading edge of the collapse of the consume/excrete/waste system that has evolved to its present series of impasses, crises, and cliffs. The economic evidence seems to be that they are not earning, saving, and investing at the level of the previous generation. This marks a sea change, since the arc of the developed world has been that "each generation has it better than the previous." That is no longer true. We are not living on interest and earnings, we are consuming natural capital and that is now being played out in the Generation X cohort's economic prospects.

Some Generation Xers are raising children while at the same time caring for aging parents. Squeezed at both ends, many find themselves trapped.

For Generation X, iPermie comes as the codification of things they had suspected all along, but were perhaps not quite sure how to fit them together into a coherent lifestyle. By taking advantage of the design processes described herein, you can find a way out of the traps that modern life lays for you and follow a good-life design that makes sense for you and your family.

The Millennials

The devolution of our present economic systems falls most heavily on the young.

In the United States, half of recent college graduates are unemployed or underemployed. Spain has youth unemployment levels of 40%, the United Kingdom at 19.1%. With the onset of economic troubles 2007-2008, incomes for young people dropped at twice the rate that the general adult population's income declined.

For Millennials, iPermie offers them the opportunity to escape the trap laid for them by the present default system of consume, excrete, and waste. Already known to be more civic minded than previous generations, Millennials may have the least problem with the iPermie exhortation to community.

Since they are the youngest, they have the greatest stake in the future. Our young people will one day inherit the climax of generations of political criminality and economic irrationality. They will have to deal with the issues of energy scarcity and climate instability. The world goes into this time of climax issues poorly prepared for the realities of the future. Capital – both economic and natural – has been

wasted frivolously. None of this is the responsibility of the Millennial generation, but they are the ones who will get stuck with the bill.

As such, iPermie offers a lifeline of hope, a design for the future with less chaos and violence and more beauty and wisdom. Everything herein is within the abilities of the Millennial generation to understand and implement and doing so will save them enormous grief and sorrow during a time in their lives when they can ill afford such disruption, danger, and devolution.

Winter is coming. Better get ready.

> The ending is nearer than you think, and it is already written. All that we have left to choose is the correct moment to begin. -- *Alan Moore, V for Vendetta*

Return to the beginning.

Stay In Touch!

Check www.ipermie.net for updates and news.

Participate in talk@ipermie.net to keep up with the conversation.

Read www.bobwaldrop.net for rants on iPermie topics.

Email bwaldrop1952 – AT – ATT – DOT – net with private questions, comments, or requests.

~-~ The End ~-~

Return to the beginning.

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