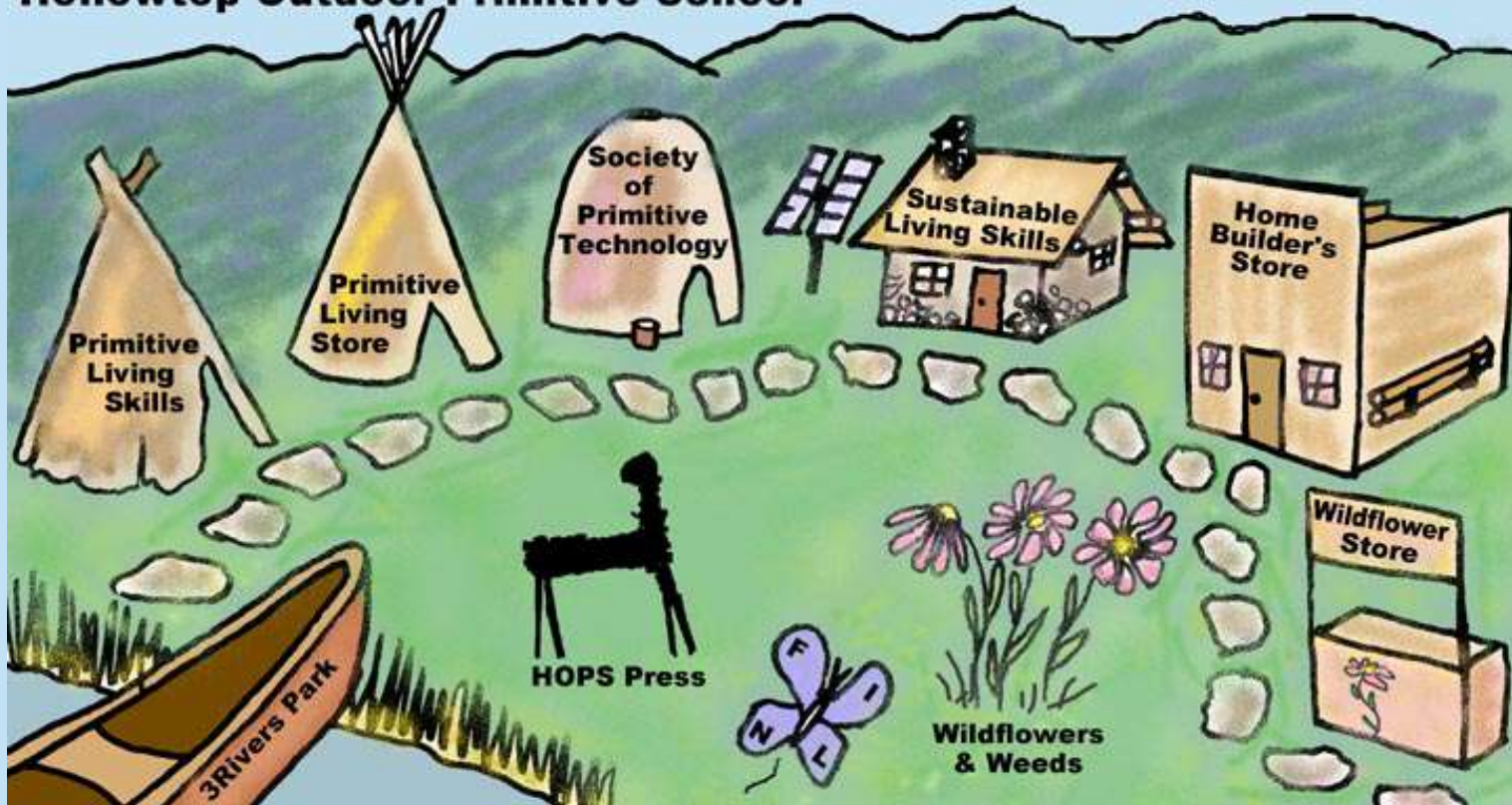


Hollowtop Outdoor Primitive School



Thomas J. Elpel's
Hollowtop Outdoor Primitive School
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[Society of Primitive Technology](#) | [Food Insects Newsletter](#)
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Tools & Supplies

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Bulletin of Primitive
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Ecological Economics



Home-Builder's Store

Stone, Log & Strawbale
And Many More Creative
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Videos & Resources

Wildflowers & Weeds

Plant Identification
& Edible Plants
Rangeland Ecology
Weed Control Alternatives



"In order to create a truly sustainable economy we must mimic the ecosystem so that the waste of every household and business becomes resource inputs to other enterprises, and the only waste produced is diffuse, low-grade heat from renewable resources like solar."

***--Thomas J. Elpel
Direct Pointing to Real Wealth***

**Thomas J. Elpel's
HOPS Press / Hollowtop Outdoor Primitive School, LLC
--Working for a Better World--**

If you have read my books, then you know that making the world a better place is the one thing that motivates me to get up and go to work each day. I write and teach about plants and primitive skills to bring people closer to nature. We built our own home for maximum resource efficiency, and wrote about next generation home-building in my book *Living Homes*. I research and write on economics and ecology to help steer the world towards sustainable development. My whole reason for writing books or being in business is to help make a greener world. The way I see it, business and money are powerful tools with the potential to make positive change in the world.

All this leads to the question: What is our environmental record in business? How effective have we been at closing the loop on waste and supporting earth-friendly causes?

**About HOPS Press
& Video Productions**

HOPS Press is our publishing business. When you place a **wholesale order** for my books (call us at 406-685-3222), then you are purchasing directly from HOPS Press. At first we didn't worry too much about the recycled content in our books, simply because we were learning the ropes of the publishing business and had all we could handle at once. But each time we returned to the printer we asked for more earth-friendly production. Direct Pointing to Real Wealth includes about 30% post-consumer recycled content. With Living Homes, everything but the cover is printed with soy ink on 100% post-consumer recycled paper, bleached without chlorine. Botany in a Day is now printed with soy ink on 100% recycled content as well. And the newest printing of Participating in Nature (November 2002) is our greenest book yet. Even the cover is printed on 100% recycled paper.

- \$1 from every copy of Living Homes sold is donated to the Institute for Solar Living to support their work promoting sustainable living through inspirational environmental education.
- \$1 from every copy of Direct Pointing to Real Wealth sold is donated to the Alternative Energy Resources Organization in Helena, Montana to support their work promoting "smart growth" planning and transportation alternatives, renewable energy and conservation, environmental quality, and community

Wildflowers Store

Plant & Mushroom Guides
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Grazing Resources
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3Rivers Park

A Place for People
Help us Secure the Rivers!

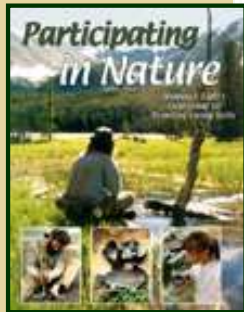
What's New?

See what's new
on all our websites!

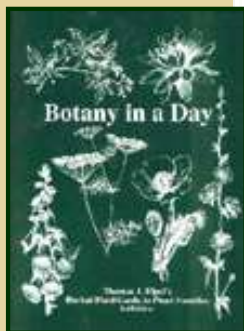
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Participating in Nature



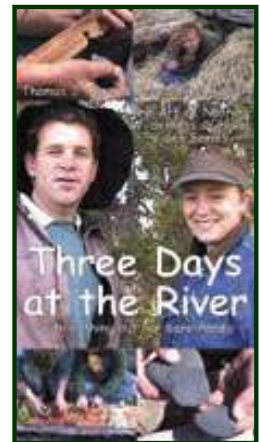
Botany in a Day

self-reliance.

- \$1 from every copy of Participating in Nature sold is donated to 3Rivers Park to help purchase habitat for people and wildlife in the Missouri Headwaters watershed in southwest Montana. In our previous printing of *Participating in Nature* we donated \$1.00 from every copy sold to the Montana Wilderness Association, raising about \$2,500 in three years to support their support their work protecting our last best places.
- \$1 from every copy of Botany in a Day sold is donated to 3Rivers Park to help purchase habitat for people and wildlife in the Missouri Headwaters watershed in southwest Montana. In our previous printing of *Botany in a Day* we donated \$1.00 from every copy sold to United Plant Savers, raising \$4,556 in two years to support their work to protect medicinal plants and their habitat for future generations.

Shipping: Most of our wholesale orders are shipped in second-hand boxes, padded with second-hand peanuts, or crumpled newspapers and magazines. We rarely purchase any additional shipping boxes.

Videos: We also produce educational videos tapes. A critical concern to us was that we did not want to consume new resources for our video tapes. Fortunately, we found a supplier of quality reusable tapes.

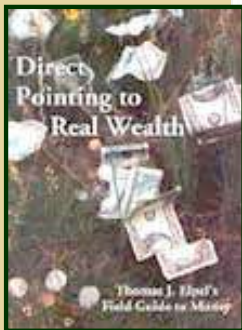


EcoMedia Recycling accepts all grades of magnetic media tape (video cassettes/audio cassettes) for recycling. Most of the tapes are destroyed and used as feedstock for new products. However, EcoMedia also collects many "duplication grade one-pass video tapes". These tapes have been manufactured for professional, high quality duplication and have been recorded once but never played. Instead of disassembling the tapes for salvage, they are diverted for reuse. The tapes are visually inspected, erased, cleaned and burnished. Then the audio and video tracks are are mechanically inspected for quality. Finally, the tapes are erased again, to insure that all copyrighted material has been thoroughly erased. The tapes are guaranteed error free.

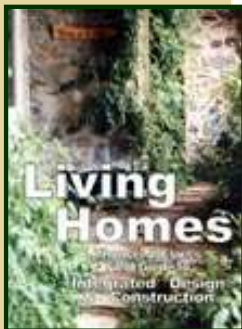
Our videos The Art of Slipform Stone Masonry and the Art of Nothing Wilderness Survival Video Series are produced on these recycled video tapes for a truly green video product. Now we are in a position to recommend recycled tapes to the other vendors we purchase video tapes from.

About Hollowtop Outdoor Primitive School, LLC

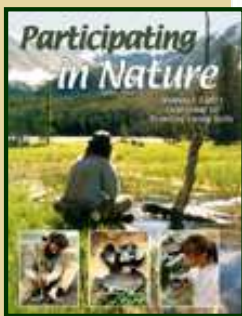
When you place a **retail order** using our on-line shopping cart system, then you are purchasing directly from Hollowtop Outdoor Primitive School, LLC. Besides my titles, we also carry books and videos from outside publishers and vendors. Most of them have little or no recycled content in them, but we carry them as tools for people to get closer to the natural world. Other items we sell include primitive friction fire sets, which are made from ethically wild-crafted natural materials, except for the nylon cords. Eventually we will give each product an environmental rank to highlight those that are especially earth-friendly. We will also encourage the



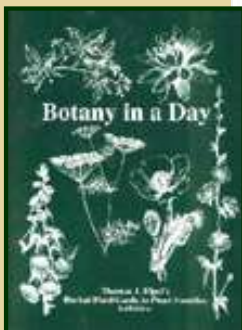
[Direct Pointing to Real Wealth](#)



[Living Homes](#)



[Participating in Nature](#)



[Botany in a Day](#)

vendors that we buy from to increase the recycled content of their products.

Shipping: Most of our retail orders are shipped in Jiffy Padded Mailers manufactured from 77% recycled paper, including 62% post-consumer fiber. Other retail orders within the USA are shipped in Priority envelopes and boxes provided by the United States Postal Service, made from 100% recycled paper, including 80-100% post-consumer fiber, and printed with soy inks. Be sure to recycle your own papers to help close the loop on waste!

**Thomas J. Elpel's
Hollowtop Outdoor Primitive School, LLC
PO Box 697
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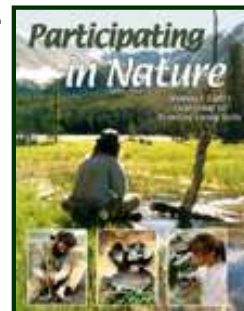
Thomas J. Elpel's

Hollowtop Outdoor Primitive School, LLC

"Primitive living is a metaphor we participate in and act out. Life is simplified down to the bare essentials: physical and mental well-being, shelter, warmth, clothing, water, and food. We go on an expedition to meet those needs with little more than our bare hands.

"In our quest we learn to observe, to think, to reach inside ourselves for new resources for dealing with challenging and unfamiliar situations. We build up our personal strengths, and at the same time we interact with and learn about the world around us.

"In a story we can only join a quest in our imaginations. But in primitive living, we physically leave the contemporary world. We journey into the world of stone-age skills, and we return with knowledge, wisdom, and strength to enrich our lives in contemporary society."



--Thomas J. Elpel, Author
Participating in Nature

More About HOPS

Last Updated July 16th, 2003

**Updated! Primitive Living Skills Schedule
Classes with Thomas J. Elpel**

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Check out the
On-Line Calendar of Schools
Directory of Primitive Living & Nature Awareness Schools
Directory of Schools in Europe
Directory of Primitive Skills Gatherings

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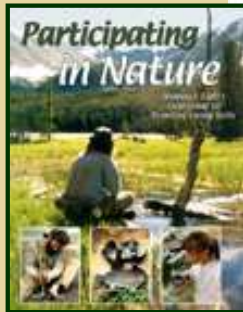
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on all our websites!

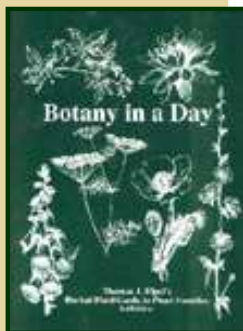
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Botany in a Day

New! Primitive Living FAQ's

Tom's Camping Journals

NEW! Harrison School 8th Grade Camping Trip

(May 15th - 16th, 2003)

Jefferson River Walk

(August 29th - September 3rd, 2001)

Jefferson River Canoe Trip

(May 14-21, 2001)

A Wildlife Sanctuary in the Land of Cold

(November 30 - December 4, 2000)

Camping with the Kids

(October 19-21, 2000)

Missouri River Canoe Trip

(July 2-14, 2000)

Missouri Moonlight

(February 17-22, 2000)

Tobacco Roots Trek II

(September 28-October 2,
1999)

Green River Canoe Trip

(July 1-14, 1999)

A Father-Daughter Camp-Out

(February 27-28, 1999)

Island in the Sky

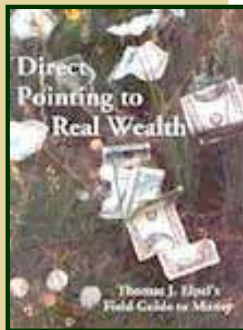
(September 29-30 1998)

Tobacco Roots Trek

(September 1-6 1998)



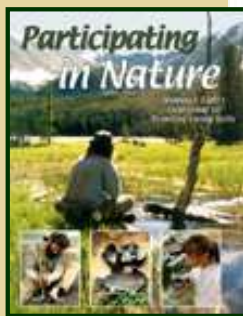
The artwork on this page was produced by Roger J. Yazzie, Copyright 1998.



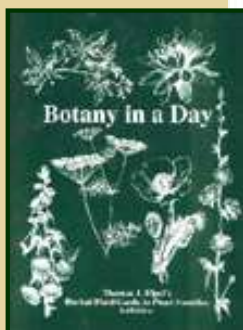
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Primitive Skills & Awareness Articles by Thomas J. Elpel

[Primitive Living as Metaphor](#)

[Tire Sandals](#)

[The Atlatl and Dart](#)

[Artifacts & Ethics](#)

[The Art of Nothing](#)

[Bear Summer](#)

[Some Thoughts on Awareness](#)

Other Articles and Items of Interest

[Primitive Living Skills Links](#)

[Storytelling: Painting Pictures With Your Tongue](#)

NEW! [A Friction Fire Inquiry: Bow Drill \(752K\)](#)

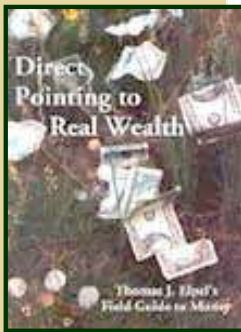
NEW! [Making Horsetail Pan Flute](#)

NEW! [The Quartz Crystal Handdrill](#)

Hello,

Two weeks ago I received your book [Participating in Nature](#). I have already read it 4 times and each time I find something new. This book is a wonderful guide to living the type of life I would like to live. I don't mean that I am interested in living through stoneage technology but I am interested in becoming more knowledgeable about nature and my interaction with it. I find myself hungry for more and thus have ordered two more of your books. I was very happy to discover that your books are more than just "how-to". I find the use of story intertwined with skills puts things in context and makes for a richer learning experience and one that is easy to remember. I am looking forward to reading your next books!

*-- Michael M.
living in Japan
(used with permission)*



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Rangeland Ecology
Weed Control Alternatives



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Primitive Living Store

Updated September 6th, 2003

Click on any link to learn more about the product.

Most items ship within 24 - 48 hours...
except when we are out in the woods for a few days!

Take a look at our [Environmental Record](#) in business.

Unique Books & Videos by Thomas J. Elpel

-Participating in Nature: Thomas J. Elpel's Field Guide to
Primitive Living Skills

-Botany in a Day: Thomas J. Elpel's Herbal Field Guide to Plant
Families

-Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide
to Money

-Living Homes: Thomas J. Elpel's Field Guide to Integrated
Design & Construction

-The Art of Slipform Stone Masonry Video Companion to
Living Homes



The Art of Nothing Wilderness Survival Video Series

with Thomas J. Elpel & Special Guests

(Recorded on quality recycled VHS video tapes.)

-3 Days at the River with nothing but our bare hands.

-Mountain Meadows camping with almost nothing but the dog.

NEW! -Mountain Lakes a survival fishing trip.

Wildflowers Store

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Holistic Management
Grazing Resources
Books & Videos

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Help us Secure the Rivers!

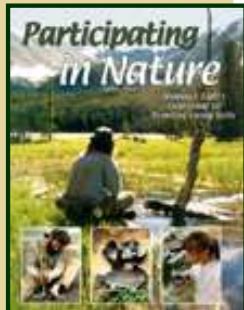
What's New?

See what's new
on all our websites!

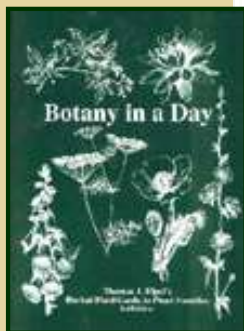
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Primitive Fire-Making Tools

- [Flint & Steel Kits](#)
- [Bowdrill Fire Sets](#)
- [Handdrill Fire Sets](#)
- NEW!** -[Fire Plow Sets](#)
- [Fire Pistons](#)
- [Oakum Tinder](#)

Water Purification

- [Iodine Crystals for water purification](#)

Primitive Canoeing and Fishing

- [Building a Birchbark Canoe](#) by David Gidmark
- [Canoecraft: Woodstrip Construction](#) by Ted Moores
- [Indian Fishing](#) by Hilary Stewart

Primitive Shelter

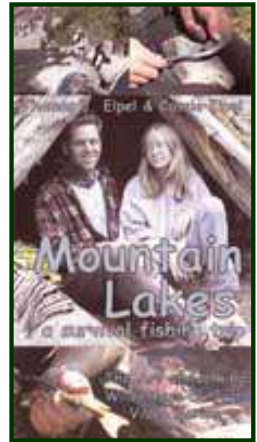
- [Authentic Mongolian Felt Gers](#) (Popularly known as "yurts".)

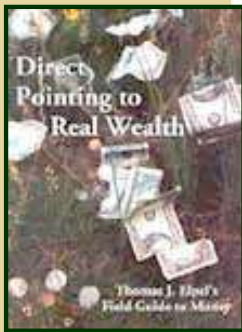
Primitive Skills Books & Videos

- [Earth Knack](#) by Bart & Robin Blankenship
- [Outdoor Survival Skills](#) by Larry D. Olsen
- [Survival Arts of the Primitive Paiutes](#) by Margaret M. Wheat
- [Survival Skills of Native California](#) by Paul D. Campbell
- [Primitive Technology: A Book of Earth Skills](#) Edited by David Wescott
- [Primitive Technology II: Ancestral Skills](#) Edited by David Wescott
- [Primitive Wilderness Living & Survival Skills](#) by John & Geri McPherson
- [Primitive Wilderness Skills, Applied & Advanced](#) by John & Geri M.
- [Eight Primitive Wilderness Skills Videos](#) by John McPherson
- [Woodsmoke, The Best of](#) Edited by Richard & Linda Jamison
- [Woodsmoke: Primitive Outdoor Skills](#) Edited by Richard & Linda Jamison
- [Woodsmoke: Collected Writings](#) Compiled by Richard & Linda Jamison
- [Six Woodsmoke Videos](#) by Richard & Linda Jamison
- [Five Videos from Northwest Video Productions](#)
- [Thirteen Woodsmaster Videos](#) by Ron Hood
- [Three Cave Cooking Videos](#) by Karen Hood
- [Primitive Technology: Practical Guidelines](#) by Errett Callahan
- [How to Make Primitive Pottery](#) by Evard Gibby

Northern Skills Books & Videos

- [Bush Craft](#) by Mors Kochanski
- [16 Wilderness Survival Pocketbooks](#) by Mors Kochanski
- [Four Wilderness Skills Videos](#) by Mors Kochanski
- [7 Plant Videos + Master Tape](#) by Mors Kochanski
- [Snow Caves](#) by Ernest Wilkinson





[Direct Pointing to Real Wealth](#)

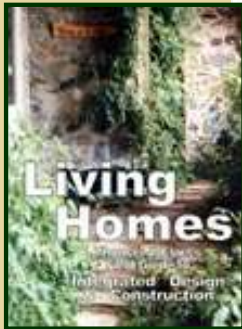
Flint Knapping Books & Videos

NEW! -2004 Flintknapping Calendar

- The Art of Flint Knapping** by D.C. Waldorf
- 5 Great Flintknapping Videos** by D.C. Waldorf
- Best of the Story in Stone Poster** illustrated by Valerie Waldorf
- The Basics of Biface Knapping** by Errett Callahan
- Pressure Flaking Flash Cards** by Errett Callahan
- NEW! -Welcome Back to the Stone Age Video** by Woody Blackwell

Bow-Making, Primitive Archery & Atlatls

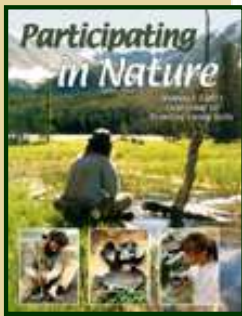
- The Art of Making Primitive Bows and Arrows** by D.C. Waldorf
- The Flat Bow** by Ben Hunt & John Metz
- Bows and Arrows of the Native Americans** by Jim Hamm
- The Bowyer's Bible, Volumes 1, 2 & 3** by Jim Hamm & Others
- Enc. of Native American Bows, Arrows & Quivers, Vol. 1 & 2** by Steve Allely and Jim Hamm
- Ishi & Elvis** by Jim Hamm
- Whitetail Tactics with Recurves & Longbows** by Jim Hamm
- Making Indian Bows and Arrows the Old Way** by Douglas Spotted Eagle
- Roving Handbook** by Errett Callahan
- The Atlatl: Primitive Weapon of the Stone Age** by Kris Tuomala
- Sinews and Hide Glue**



[Living Homes](#)

Braintan Buckskin: Books, Videos, Tools, & Finished Hides

- Wet-Scrape Books, Videos and Tools**
- Dry-Scrape Books, Videos and Tools**
- Braintan Buckskin For Sale**



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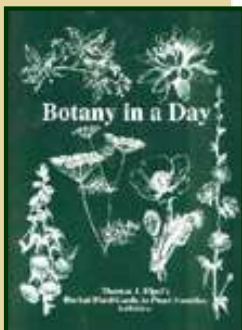
Awareness Books, Tapes, Resources and Perspective

(This is a combination article and book reviews.)

- Tom Brown Jr. Autobiographies & Field Guides**
- Jon Young Audio Tapes**
- Jon Young's Kamana Naturalist Training Program**
- Chris Chisholm's Wolf Journey Part One**

Also see these related pages:

- Jon Young Native Awareness Resources**
- Ingwe** by M. Norman Powell
- Hatchet** by Gary Paulson
- The Secrets of Natural Movement videos** by John Stokes

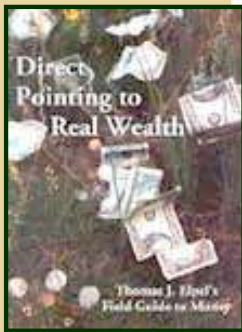


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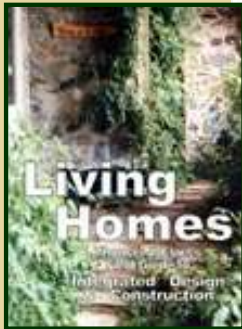
Bird Identification & Interpreting Bird Language

(This is a combination article and book/tape reviews.)

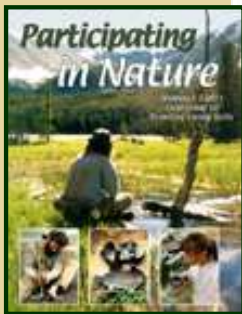
- Learning the Language of the Birds** with Jon Young
- Advanced Bird Language** with Jon Young
- Sibley Guide to Birds** by David Allen Sibley
- Sibley Guide to Bird Life & Behavior** by David Allen Sibley



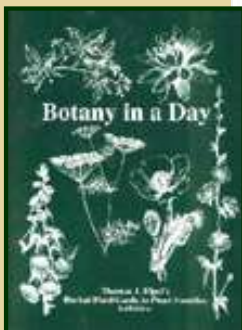
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Books about Wilderness Schools

[-Aboman's Guide to Wilderness Schools](#) by Joseph A. Bigley

[-Shouting at the Sky](#) by Gary Ferguson

Tracking Books & Videos

[-Mammal Tracking in North America](#) by James Halfpenny

[-Tracking Elk for Hunters Video](#) by James Halfpenny

[-Animal Tracks](#) by Olaus J. Murie

Primitive Musical Instruments

[-Stoneware and Recycled Plastic Ocarinas](#)

[-Make Your Own Five Hole Flute from Recycled PVC](#)

Astronomy Books

[-The Stars](#) by H. E. Rey

Basketry

[-Barbwire Hearts](#)

[-Barbwire Baskets](#)

Note: Plant Identification Books & Videos, Herbal Books, Dandelion Resources, Mushroom Books and Wilderness First Aid

-Have All Been Moved to Our [Wildflowers & Weeds Store](#).

Dear Tom & Renee,

I was shocked when I opened my mailbox on Thursday and there were my [Advanced Bird Language](#) tapes. I just ordered them on Monday! Thank you so much for getting them out so quickly.

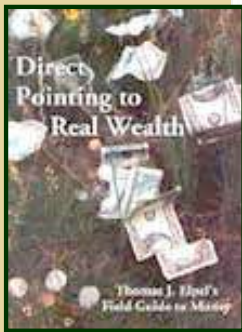
I also enjoyed the papers they were wrapped in --kudos to you for your recycling efforts!

*--Joyce D.
Golden, Colorado
(used with permission)*

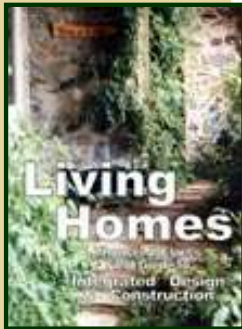
Hello Tom!

Just finished reading [Participating In Nature](#) and I loved it. I am a Tom Brown student, as well as a fan of Mors Kochanski and any other primitive skills authors I can find. Your book is very refreshing in that it reads as such a nice adventure story that teaches all along. There are also many ideas and skills that I have never encountered in other books and that is wonderful. I really enjoy the realistic approach to the philosophy of living well within today's society. Thanks!

*--Dale Kiselyk
A.K.A.: Nature Boy
Nature Boy's Wilderness Living and Survival Instruction
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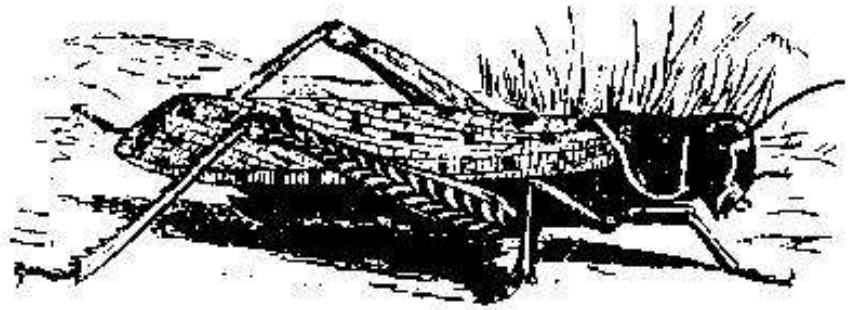
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The Food Insects Newsletter, Inc.
(A non-profit, Montana corporation)

Web space provided courtesy of [Hollowtop Outdoor Primitive School](#)

Updated July 5th, 2002

[-Click here to Subscribe and to Order Back Issues-](#)

[An important letter from the Assistant Editor, February 1999](#)

Selected on-line articles from FINL back issues:

March 1998: [Fried Grasshoppers for Campouts or at Home](#)

November 1997: [Food Insect Festivals of N.A.](#)

March 1996: [Raising Mealworms](#) (including recipies!)

July 1995: [Allergies Related to Food Insect Production and Consumption](#)

November 1994: [Some Insect Foods of the American Indians](#)

March 1993: [Food Conversion Efficiencies of Insect Herbivores](#)

July 1992: [Large-scale Feed Production from Manures with a Non-Pest Native Fly](#)

November 1991: [They Ate What?](#)

November 1990: [Collecting Ant Pupae for Food](#)

July 1989: [Hunter-gatherers were sometimes very labor-efficient](#)

November 1988: [Commercial Availability of Food Insect Products in the U.S.](#)

Check out these Insect & Bug Books!

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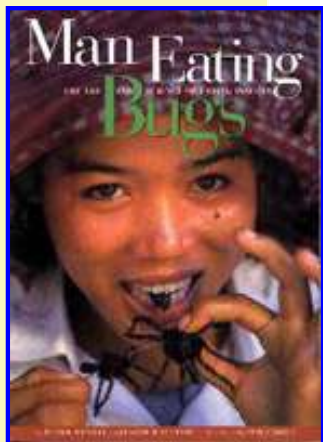
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[Insect Books](#)

- [-Man Eating Bugs](#) by Peter Menzel & Faith D'Aluisio
- [-Creepy Crawly Cuisine](#) by Julieta Ramos-Elorduy, Ph.D.
- [-Eat-A-Bug Cookbook](#) by David George Gordon
- [-Entertaining with Insects](#) by Ronald L. Taylor




[Other Food Insects Sites on the Web](#)



This [SurvivalRing](#) site is owned by
the [Food Insects Newsletter](#).

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--Sustainable Living Skills Home Page--**

Last Updated May 24th, 2003

"Prosperity in the 21st century belongs to those who seek profit in making the world a better place. Ecopreneurs will out-compete inefficient, abusive industries by starting green businesses that close the loop on wasted materials, energy, time, money and labor. They will heal wasted ecosystems and restore biodiversity at a profit while delivering useful goods and services to the public. Home-owners too, will profit by seeking ways to eliminate everything from high energy bills to mortgage payments--even eliminating the need for a regular job. But there is no need to wait for such a future to come, for the revolution has already started. The door is wide open, and anyone can walk the path to green prosperity, changing the world every step along the way."



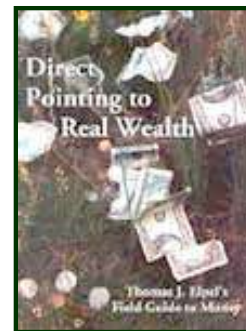
photos by Will Brewster

**--Thomas J. Elpel, author of
Direct Pointing to Real Wealth
and**

Living Homes: Integrated Design & Construction

Economics & Ecology Articles by Thomas J. Elpel:

- **ESCAPING THE JOB TRAP: It's a Matter of Time, NOT Money!**
- **Calories: The Currency of All Economies**
- **Wealth & Work: A Ten Thousand Year-Old Pattern**
- **Carbon Dioxide Quiz**
- **The Most Important Ideas of the New Millenium**



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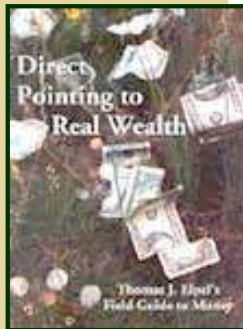
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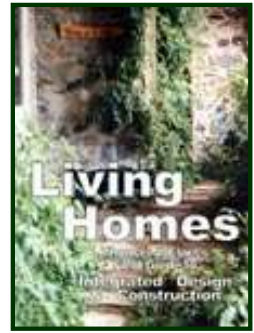
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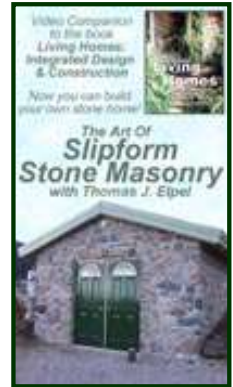
Stone Masonry Construction Articles and Resources

- [Stone Masonry Construction and Resources](#)
- [We built a Slipform Stone Workshop](#)
- [A reader builds a Slipform Stone Mansion](#)
- [A reader builds a Wilderness Cabin of Stone](#)
- [Slipform Stone Masonry: Class Information](#)
- [Tilt-up Stone Masonry](#)
- [Living Homes: Integrated Design & Construction](#)
- [The Art of Slipform Stone Masonry Video](#)



**Log, Timber Frame, Strawbale and Earthen Construction
Articles and Resources**

- [Log House Construction, Overview and Books](#)
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- [Strawbale Construction, Overview and Books](#)
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Question & Answer Pages

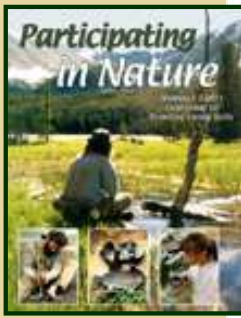
- [Questions about Buying Land](#)
- [Questions about Low-Cost Construction](#)
- [Slipform Stone Masonry Questions](#)
- [Tilt-Up Stone Masonry Questions](#)
- [Fireplace & Chimney Questions](#)
- [Log Home Construction Questions](#)
- [Strawbale Construction Questions](#)
- [Home Heating, Insulation & Energy Efficiency Questions](#)
- [Roofing Options Questions](#)

Go to the [Home-Builder's Store](#) for Alternative
Construction Books, Resources, and Schools.
(Stone Masonry, Strawbale Construction, Log Homes
Rammed Earth, Adobe, Papercrete, Earthships and more...)

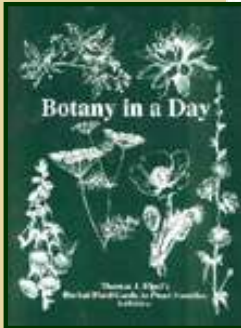
HOPS Press - The Thomas J. Elpel Field Guide Series

- [Participating in Nature:](#) Thomas J. Elpel's Field Guide to Primitive Living Skills
- [Botany in a Day:](#) Thomas J. Elpel's Herbal Field Guide to Plant Families
- [Direct Pointing to Real Wealth:](#) Thomas J. Elpel's Field Guide to Money
- [Living Homes:](#) Thomas J. Elpel's Field Guide to Integrated Design & Construction
- [The Art of Slipform Stone Masonry:](#) Video companion to *Living Homes*.

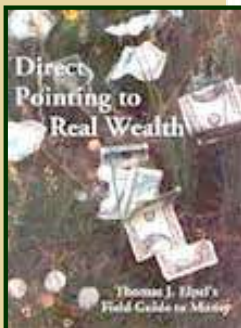
Looking to buy or sell land in Montana, Wyoming or Idaho?
Check out [American Conservation Real Estate](#)
for a truly ethical approach to the real estate business.
Be sure to watch the introductory movie!



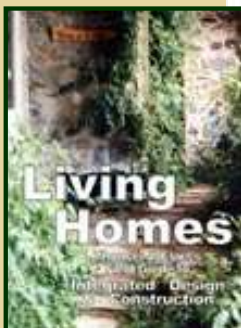
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Also check out the [Corporation for the Northern Rockies](#) and download their *Welcome to the West* guide.

[Other Sustainable Living Skills Links](#)

[More about Hollowtop Outdoor Primitive School, LLC](#)

I've just read your article [Building a House on Limited Means](#), and placed an order for your "Living Homes" book. I can't wait to receive it. My boyfriend, Jim, and I have almost identical aspirations for our own lives (right down to building a house into a hill, heating our water with the warmth of a woodstove, and eliminating the need for a 40hr/week job). Reading your article, I could hardly believe that there was someone out there that had similar dreams, and, better yet, made them come true! I knew it was possible!!

Thanks for the inspiration!!!

*--Erin Mulcahy
(used with permission)*

Hello-

Just ordered your [Field Guide to Money](#). It is a great book, I tried to get my library to buy it. They let me read a copy from Boise instead.

I've already used some of the principles in this book to get a job at Boulder Hot Springs at Boulder, Montana. I drive over once a month or so, and help them with their Organic food production. I visited Boulder H.S. in April, May and June - helping them learn to grow food in their new geothermal greenhouse. It's a great job. I utilize your ideas about closing waste loops and Wow! - it works great. Small input and RESULTS! Waste streams are so generous!

Thank You!

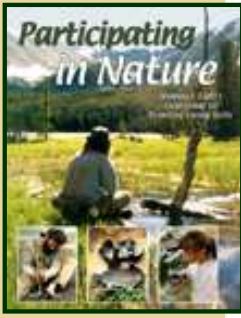
Sincerely,

*B. Goodrich
Sandpoint, Idaho
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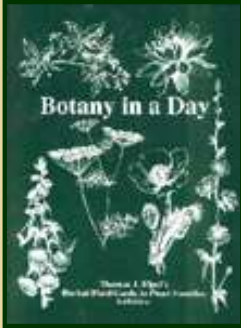
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Timber Framing | Earthships | Monolithic Domes

Earth Construction: Rammed Earth, Ceramic, Earthbag, Cob

Insulation Alternatives | Masonry Stoves

Links for designing and building your own Resource-Efficient, healthy home.

- Solstice -Good info on alternative construction, energy efficiency and renewable energy
- CSF: Earthfriendly and Self-Sufficient Architecture Discussion Board
- Country Home Design/BuildDiscussion Board
- Natural Life: Sustainable Shelter Links
- Center for Resourceful Building Technology
- E-Building Codes - International Building Codes
- Southwest Desert Sustainability Project
- Building with Awareness
- The Humanure Handbook On-Line

Home Planning and Design Books from Our Home-Builder's Store:

- **The Real Goods Independent Builder** by Sam Clark
- **The New Independent Home** by Michael Potts
- **The Natural House** by Daniel Chiras
- **The Art of Natural Building** by Kennedy, Smith and Wanek
- **The Whole House Book** by Pat Borer and Cindy Harris
- **The Solar House** by Daniel Chiras
- **The Passive Solar House** by James Kachadorian

Schools for designing and building your own Resource-Efficient, healthy home

- Institute for Solar Living / Real Goods (Near San Francisco, California)
- Solar Energy International (Nationwide Workshops)
- Institute for Social Ecology
- Virtual Mountain Wilderness School

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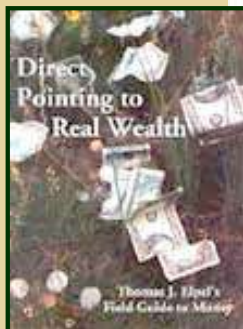
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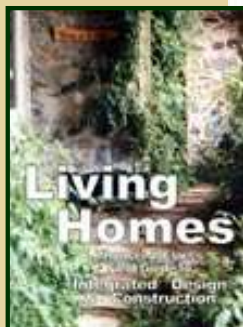
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Strawbale Links

- [U.S. D.O.E.: Strawbale Comes of Age](#)
- [C.R.E.S.T.: On-line Strawbale Construction Resources](#)
- [Surfin' Strawbale: Online Resources](#)
- [Burbophobia: An Excellent List of Strawbale Resources](#)
- [Strawbale Links](#)
- [STRAP: The Strawbale Regional Assistance Project](#)
- [Terra Home: Structural Frames for Arched Strawbale Homes](#)

Strawbale House Books from Our Home-Builder's Store:

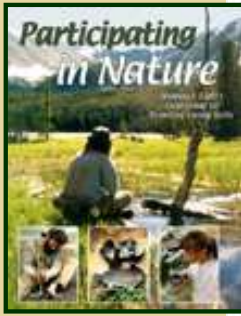
- [Strawbale Construction \(A Brief Overview\)](#)
- [Living Homes: Integrated Design & Construction](#) - by Thomas J. Elpel
- [The Strawbale House](#) - by Athena Swentzell Steen, Bill Steen, David Bainbridge & David Eisenberg.
- [The Beauty of Strawbale Homes](#) - by Bill and Athena Steen
- [Serious Strawbale: A Home Construction Guide for All Climates](#) - by Paul Lacinski, Bergeron Lacinski & Michel Bergeron
- [Straw Bale Building: How to plan, design & build with straw](#) - by Chris Magwood & Peter Mack
- [Straw Bale Details: A Manual for Designers and Builders](#) - by Chris Magwood & Chris Walker
- [Building with Earth and Straw](#) - by Bruce King, P.E.
- [Strawbale Home-Builder's Dreampack](#) - Be informed before you build!
- [Build It With Bales: A Step-By-Step Guide to Straw-Bale Construction, Version Two](#) - by S. O. MacDonald, Matts Myhrman
- [Strawbale Homebuilding](#) Edited by Alan T. Gray and Anne Hall

Strawbale Construction Schools

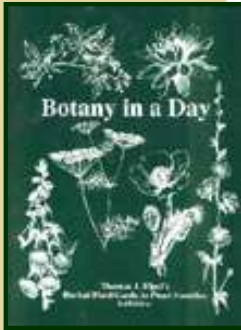
- [Institute for Solar Living / Real Goods](#) (Near San Francisco, California)
- [Solar Energy International](#) (Nationwide Workshops)
- [Sage Mountain Center](#) Whitehall, Montana.

Papercrete (Fibrous Cement) Links

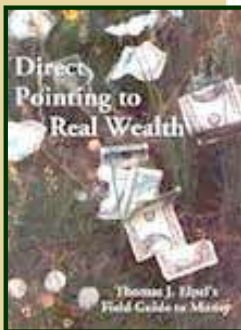
- [Building with Papercrete and Paper Adobe](#)
- [Papercrete News](#)



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- [Building with Papercrete and Paper Adobe](#)

Stone Masonry Links

- [Kootenay Stone Masonry Training School](#)
- [Multi-Arc Tool for Masonry Arches](#)
- [Cultured \(Artificial\) Stone](#)
- [Masonry Advisory Council](#)
- [Stone World \(Trade Magazine\)](#)

Stone Masonry Books from Our Home-Builder's Store:

- [Stone Masonry Construction \(A Brief Overview\)](#)
- [Living Homes: Integrated Design & Construction](#) - by Thomas J. Elpel
- [Building Stone Walls](#) by John Vivian
- [Stonework: Techniques and Projects](#) by Charles McRaven
- [Building With Stone](#) by Charles McRaven
- [The Stonebuilder's Primer: A Step-By-Step Guide for Owner-Builders](#) - by Charles K. Long
- [Stone Mason's Dreampack](#) - Be informed before you build!

Stone Masonry Schools

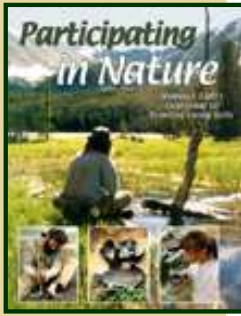
- [Hollowtop Outdoor Primitive School](#)

Cordwood Construction Links

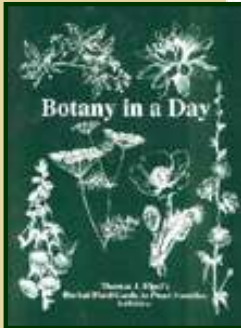
- [Cordwood Newbee Page](#)
- [Cordwood Message Board](#)
- [DayCreek.com--Cordwood Construction and More!](#)

Cordwood Construction Books

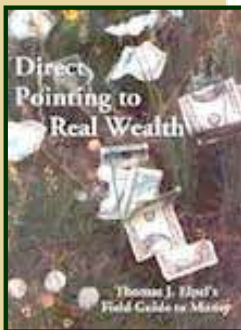
- [Complete Book of Cordwood Masonry Housebuilding: The Earthwood Method](#) - by Rob Roy
- [Cordwood Construction: A Log End View](#) - by Richard Flatau



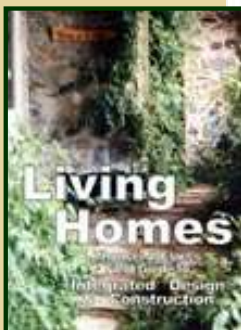
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Cordwood Construction Schools

- [Sage Mountain Center](#) Whitehall, Montana.

Log Home Links

- [Building a Log Cabin--Construction Photo Album](#)
- [Sunrise Productions Log Home Bookstore](#)
- [Linking Logs--Directory of Builders, Schools, etc.](#)
- [LogHomeLinks.com--Lots of Links!](#)
- [Log Home NetZine--On-line Newsletter](#)
- [Log House Construction Problems](#)
- [Skip Ellsworth Log Building Method](#)

Log Home Books from Our Home-Builder's Store:

- [Living Homes: Integrated Design & Construction](#)- by Thomas J. Elpel
- ["How-to" Build This Log Cabin for \\$3,000](#) - by John McPherson
- [Log Construction Manual](#) - by Robert W. Chambers

Log Home Building Schools

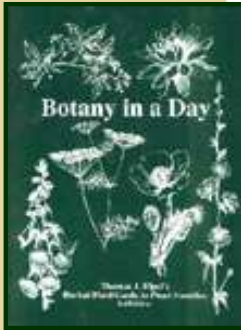
- [Island School of Building Arts](#)
- [Chapman Log Construction](#)
- [Great Lakes School Of Log Building](#)
- [William M. Lasko School of Log Building](#)
- [Okanagan University College](#)
- [Pine Top School of Log Building](#)

Timber Framing Links

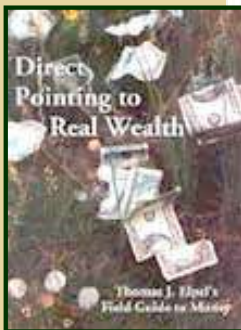
- [Joiner's Quarterly](#) Journal of Timber Framing & Traditional Building
- [Timber Framing Magazine Online](#)



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Timber Frame Construction Books from Our Home-Builder's Store:

- [Timber Frame Construction](#) - by Jack Sobon & Roger Schroeder
- [Build a Classic Timber-Framed House](#) - by Jack Sobon
- [A Timber Framer's Workshop](#) - by Steve Chappell
- [Out of the Woods](#) - by Pat Borer & Cindy Harris
- [Timber-Framer's Dreampack](#) - Be informed before you build!

Timber Framing Schools

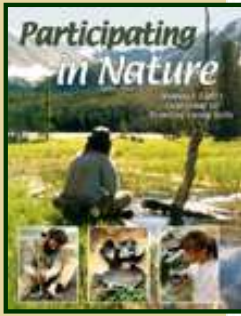
- [Fox Maple School of Traditional Building](#) Brownfield, Maine.
- [Heartwood School](#)

Earth Construction: Rammed Earth, Ceramic, Earthbag, Cob, Cast Earth, Adobe & Mudbrick Links

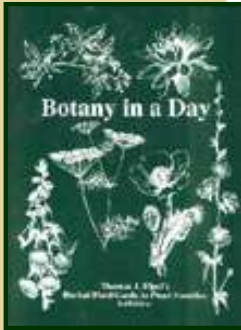
- [David Easton's Rammed Earth Works](#)
- [Ramseal International: Products and Repairs for Rammed Earth and Terra Tiles](#)
- [Rammed Earth Construction with Photos](#)
- [Micander Rammed Earth Construction-Good Photos](#)
- [Burlington Construction, Inc.-Good Photos & Text](#)
- [Kindred Rammed Earth, Inc.](#)
- [California Institute of Earth Art and Architecture -- Earthbag Construction](#)
- [Cob Email List-Server](#)
- [New Mexico Adobe and Rammed Earth Building-Code](#)
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- [Rammed Earth Construction-Australia](#)
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Earth Construction: Rammed Earth, Ceramic, Earthbag and Cob Books & Videos

- [The Rammed Earth House](#) - by David Easton and Cynthia Wright
- [The Rammed Earth Renaissance \(Video\)](#) - by David Easton and Cynthia Wright
- [Building with Earth and Straw](#) - by Bruce King, P.E.
- [Ceramic Houses and Earth Architecture](#) - by Nader Khalili
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- [The Hand-Sculpted House](#) - by Ianto Evans, Michael G. Smith, and Linda Smiley



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Earth Construction: Rammed Earth, Ceramic, Earthbag, Cob, Cast Earth, Adobe & Mudbrick Schools

- [Kleiwerks: Cob, Slipstraw, Earth Plaster, Bamboo](#)

Earthship Links

- [Earthship Biotecture-resources, designs, and workshops](#)
- [Earthships: Useful Overview](#)
- [Earthships Landing: Pictures](#)
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- [Earthship Lane](#)
- [Allen and Pat Gooch's Earthship \(New Mexico\)](#)
- [Dennis and Gerry Weaver's Earthship \(Colorado\)](#)
- [3rd Millennium Construction Society \(B.C., Canada\)](#)
- [Vic Cook's Giant Earthship \(Indiana\)](#)

Earthship Books Available Through Amazon.com

- [Earthship: How to Build Your Own - by Michael E. Reynolds](#)

Monolithic Dome Links

- [Monolithic Domes](#)

Insulation Alternatives

- [Good Shepherd Wool Insulation](#)
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- [The Association for Better Insulation](#)
- [New & Alternative Insulation Materials and Products](#)

Masonry Stove Resources

- [Masonry Heater Association](#)
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- [Maine Wood Heat Co., Inc. - Masonry Stove Kits and Plans](#)
- [Peter Moore Masonry, Inc. - Contractor in Vermont](#)
- [Consumer Energy Information Briefs: Masonry Heaters](#)

Masonry Stove Books from Our Home-Builder's Store:

- [**Masonry Stoves: A Brief Overview**](#)
- [**Living Homes: Integrated Design & Construction**- by Thomas J. Elpel](#)
- [**The Book of Masonry Stoves** - by David Lyle](#)

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The Real Goods Independent Builder Designing & Building a House Your Own Way

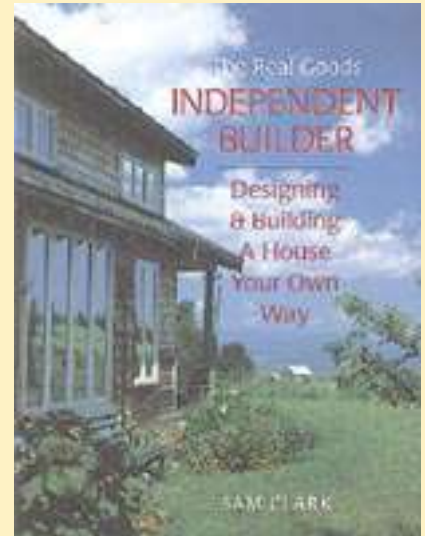
by Sam Clark

"A successful project requires getting a lot of simple decisions right. My goal is to help readers succeed at this process, and also realize their imaginative design goals." -- Sam Clark

This is a comprehensive manual of design and building methods for owner-builders as well as professional builders and their clients. In addition to presenting specific building techniques, the book explains the design principles and planning processes that underlie all good building, so that readers can develop their own exceptional designs, independently.

The Real Goods Independent Builder develops subjects not covered thoroughly in other books, but critical to success: Designing small houses that seem big; Understanding innovation; Estimating and controlling costs; Incorporating ergonomics and accessibility; Doing drawings and scale models, and making contracts that work.

"I am planning to build an owner-built house next summer, and have read upwards of 50 books on the subject. The Independent Builder is by far the best. It shared wisdom in addition to information." -- Mark Harrison of Jaffrey, New Hampshire



The Real Goods Independent Builder \$30.00

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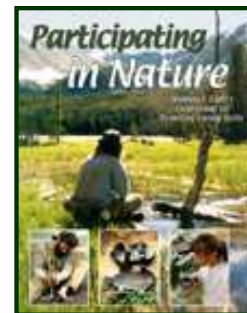
General Inquiries flutesong@hollowtop.com	Customer Assistance orders@hollowtop.com
--	--

-These e-mail addresses are occasionally changed to evade spammers.-

Please Note: We receive a steady stream of e-mail questions from web surfers all over the world, on topics as varied as these:

- What woods work best in my area for starting a bowdrill fire?
- Is it better to insulate the inside or outside of my basement walls?
- What is this plant with pink flowers in my back yard?
- Are there any insects in the U.S. that are poisonous to eat?
- Can we build a log house with green wood?
- How can I go about starting my own wilderness survival school?

We also receive many e-mails and phone questions from newspaper and magazine reporters researching stories, as well as inquiries from a variety of television programs. We continue to do our best to respond to your questions to the best of our abilities. However, given the volume of letters we receive, we are not quite as timely as before in our responses!



Keep in mind that **computers, the internet, and people all make mistakes.** If we don't answer your e-mail, then there is a chance that it never arrived here. Also please make sure you are sending it with the correct e-mail return address, as we have spent a lot of time answering some questions, only to find that the e-mail addresses they came from were invalid. Any e-mails with attached viruses are deleted without being read or responded to.

Our responses are prioritized first to our **customers** with questions about orders, pricing, billing, or shipping. Expect to hear back from us within a day or two usually, unless we are away from the office. Of course, you can also call us at **406-685-3222** or write to us snail-mail at the address below.

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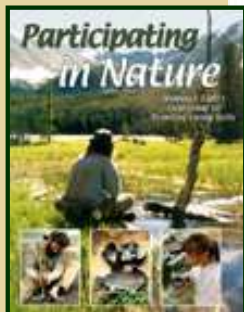
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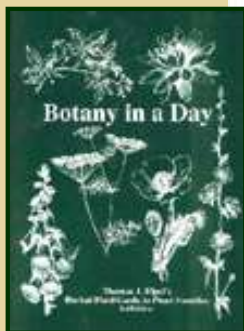
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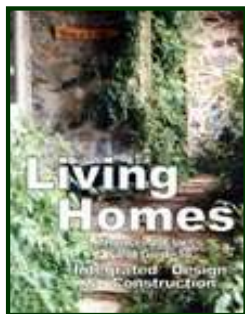
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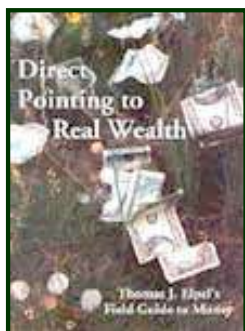
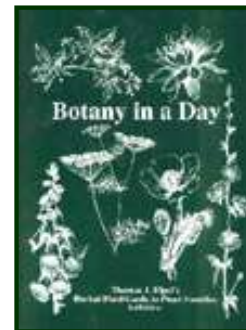


Botany in a Day



We are slower at responding to how-to questions about **primitive skills, plant identification** or **home construction**, mostly because a single inquiry can take a few days to mull over the question, and an hour or more to answer it. But we will answer your question as long as we feel qualified to do so. At the very least we will try to steer you in the right direction. Expect an answer in 2-4 weeks on these type of questions, potentially longer during summer months.

We are slowly in the process of creating some question and answer pages on the website to avoid answering the same questions again and again. As a courtesy to us, please read Tom's books (shown here) before asking questions, so that we do not have to spend so much time on subjects that have already been covered in-depth. Any topic you still have questions about after reading Tom's books is definitely fair game, and we will bend over backwards to answer it thoroughly.



The questions we are most likely to delete without any reply at all are the ones about **edible insects**, such as "what types are poisonous?" or "what is the nutritional content of grasshoppers?". Although we are the web host for the **Food Insects Newsletter**, we really know next to nothing about the subject ourselves (we would like to learn more). Please contact The Food Insects Newsletter directly for any questions you have for them.

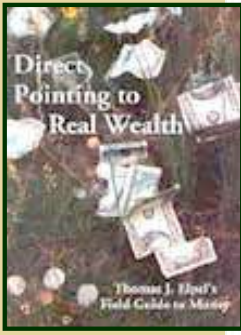
For questions to the **Society of Primitive Technology**, please use the contact information on their web page. Thanks!

Thanks to Cindy for providing the link to the e-mail encoder. It translates e-mail addresses into numerical code to insert into the html to help trip up robots that are seeking e-mail addresses to send spam to.

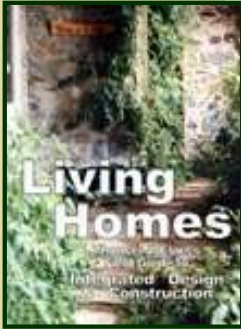
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-Participating in Nature-

Thomas J. Elpel's Field Guide to Primitive Living Skills
(5th Edition)

Get in touch with your wild side! Primitive living is a way of learning about nature by participating in it. Instead of merely camping in the wilderness or passing through it, you can become part of the process. You learn about nature by using it to meet your needs for shelter, fire, water, and food. You set aside the trappings of modern culture and step directly into nature with little or nothing, to experience nature on its own terms.



Tom's guide gives you a direct, hands-on experience of the world around you. With this book you have the opportunity to discover the thrill of staying warm and comfortable without even a blanket! Experience the magic of starting a fire by friction. Butcher your own deer and braintan its hide to make warm buckskin clothing. Learn about edible plants of the Rocky Mountain region, plus processing techniques and "primitive gourmet" skills like making wild strawberry ashcake pies or stir-fry cooking without a pan.

This book is the source for in depth coverage of tire sandals, bedroll packs and pack frames, felting with wool, quick bows and bone arrowheads, sinews, hide glue, trapping, fishing by hand, water purification, birch bark canisters, willow baskets, primitive pottery, wooden containers, cordage, twig deer, stalking skills, simple stone knives, flint & steel, bowdrill and handdrill fire-starting.

Participating in Nature includes dozens of innovative skills and an incredible 350 pictures and illustrations plus a thoughtful philosophy. Tom does extensive experiential research. He places an emphasis on publishing new information that is not found in any other source. **5th Edition. 198 pages. November 2002. \$25.**

-Environmental Note-

This book is printed on **100% post-consumer recycled paper**, bleached without chlorine.

Everything but the cover was printed with soy based inks.

\$1.00 from every copy sold is donated to 3Rivers Park to help purchase habitat for people and wildlife in the Missouri Headwaters watershed in southwest Montana.

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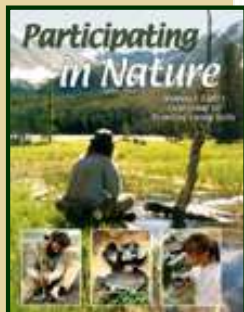
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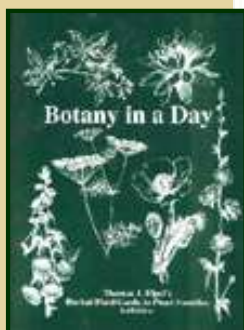
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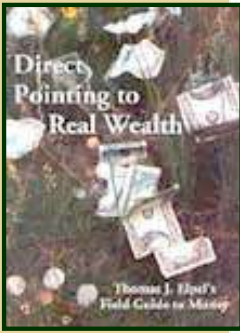
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"I've read MANY books on survival. Enough that I rarely find fresh ideas in a new one I read. But yours is full of things that I haven't read in many other books. Thanks not only for the fresh ideas, but also for the fresh format. The



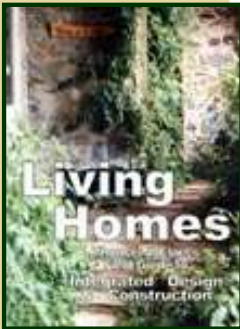
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narrative is wonderfully inspirational. I almost feel like I'm out in the field with you. I don't know if we'll ever meet (I hope we do), but if not I feel like I know you through your writings."

--David W.
Attala, Alabama

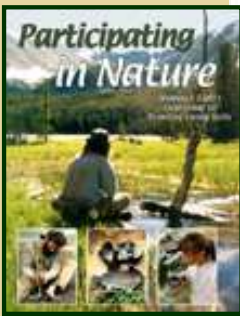
"I have your Participating in Nature book and read about the syrup. I have a big weeping birch in my yard and put 2 half inch taps in it last week and the last few days I have been getting 5 gallons of sap a day! I boiled 5 gallons of sap down to 1/2 pint of some of the best syrup I have ever tasted! I just wanted to say thanks for writing such a great book!"

-- Rob Simonich
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Clancy, Montana



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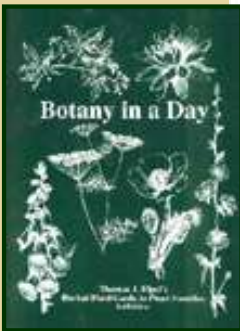
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What's New on all our websites?

I hear that many of you return again and again to check out what's new on our websites. So I am now listing updates here for easy access. Updates are kept on this page for approximately one year. Thanks for stopping by!

September 2003

What's New in the Primitive Living Store:

NEW! -Volume 3 in the Art of Nothing Video Series

Mountain Lakes: a survival fishing trip

August 2003

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NEW! -Why Grassfed is Best! by Jo Robinson

NEW! -Salad Bar Beef by Joel Salatin

July 2003

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NEW! -Sotol Fire Plow Fire Sets!

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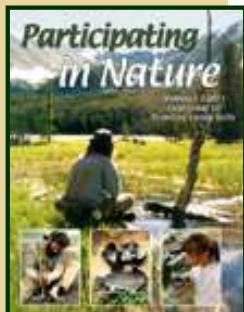
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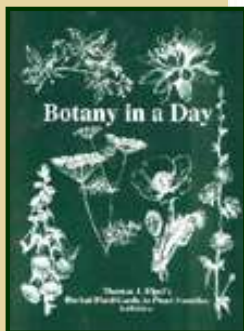
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NEW! -We've Gone Solar!

NEW! -Lots of Home-Building Question and Answer Pages!

04-03-2003

What's New for April:

NEW! -Iodine Crystals for water purification

03-06-2003

What's New for March:

NEW! -Genuine Braintan Buckskin

NEW! -More Home-Building Books, plus Question & Answer pages

NEW! -Canoe Craft: Woodstrip Construction by Ted Moores

NEW! -Exploring Common Useful Plants of the U.S. (video) by Christopher Nyerges

02-13-2003

What's New for January-February:

NEW! -From Crabgrass Muffins to Pine Needle Tea by Linda Runyon

NEW! -Building a Birchbark Canoe by David Gidmark

NEW! -Indian Fishing by Hilary Stewart

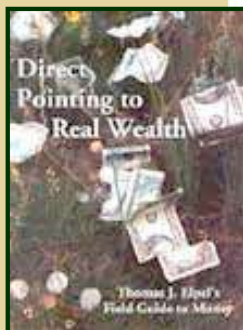
NEW! -Thebes Points & Their Variants Video by D.C. Waldorf

NEW! -Ishi & Elvis by Jim Hamm

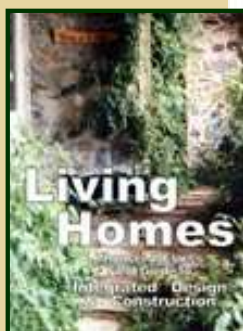
NEW! -How to Make Indian Bows and Arrows the Old Way by Douglas Spotted Eagle

NEW! -How to Make Primitive Pottery by Evard Gibby

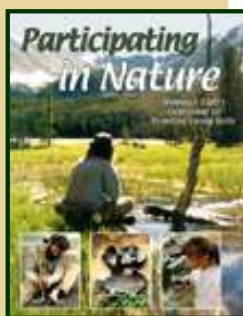
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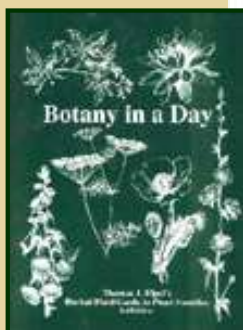
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 - NEW! Dry-Scrape Tools for Hide Tanning**
 - NEW! Lots of Home-Building Books**
 - NEW! Genuine Mongolian Gers (yurts)**
-

12-06-02

What's New in the Primitive Living Store:

Bow-Making, Primitive Archery & Atlatls

-NEW! Sinews and Hide Glue

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What's New?

We built a new Main Menu

Check it out!

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We added a whole new domain!

www.wildflowers-and-weeds.com
with new menus throughout all the websites.

11-20-02

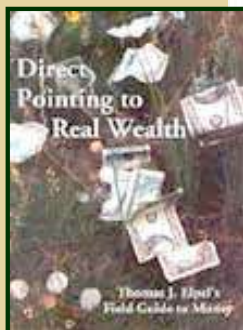
What's New in the Primitive Living Store:

Unique Books & Videos by Thomas J. Elpel

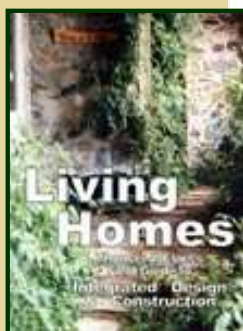
-NEW Edition! Participating in Nature
with 50 more pages and 150 more photos.

11-03-02

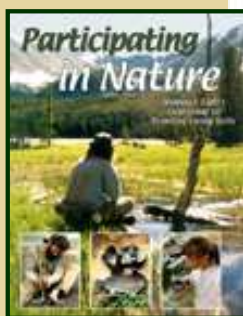
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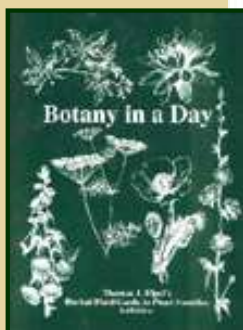
[Direct Pointing to Real Wealth](#)



[Living Homes](#)



[Participating in Nature](#)



[Botany in a Day](#)

Awareness Books, Tapes, Resources and Perspective

-NEW! Hatchet by Gary Paulson

10-13-02

What's New at the HOPS Store:

Flint Knapping Books & Videos

NEW! -2003 Flintknapping Calendar

Awareness Books, Tapes, Resources and Perspective

-NEW! The Secrets of Natural Movement videos by John Stokes

What's New on the Primitive Living Skills Page:

An update to [Thomas J. Elpel's Class Schedule](#)

09-10-02

What's New at the HOPS Store:

Unique Books & Videos by Thomas J. Elpel

-NEW! The Art of Nothing Wilderness Survival Video: Mountain Meadows
with Thomas J. Elpel and Melvin Beattie

07-23-02

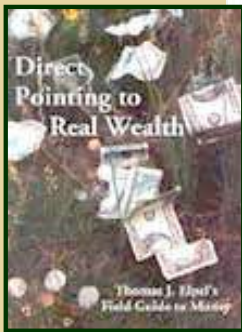
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Unique Books & Videos by Thomas J. Elpel

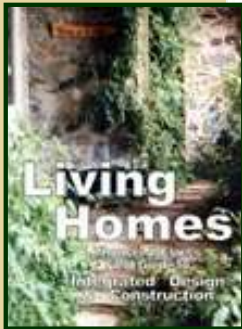
-NEW! The Art of Nothing Wilderness Survival Video: 3 Days at the River
with Thomas J. Elpel and Felicia Elpel

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The Art of Nothing

Wilderness Survival Video Series

Video companions to the book

Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills

Also based on the article The Art of Nothing by Thomas J. Elpel.

Have you ever dreamed of being able to walk out into the woods to survive with nothing but the clothes you have on? You are not alone. In a society that is very disconnected from the natural world, many individuals find themselves wondering about what lies beyond the pavement. We know that our ancestors lived by their bare hands and wits alone, but how did they do it? How would you do it? What would it be like to be so connected with the natural world that you could just leave everything behind and walk away into the woods? It is easier than you might expect.

You might think you would need to take a lot of classes and learn a gazillion skills to survive, but the real secret is in knowing how not to need very many skills at all. For example, if you've made a bowdrill fire set with a steel knife, you may wonder how to make a set without a knife. So how do you make a good enough stone knife to work wood as nicely as your steel knife? *You don't*. By breaking sticks and abrading them on rocks you can make a completely serviceable bowdrill set without the need for a fancy knife at all, as you will see in Volume One of the *Art of Nothing Wilderness Survival Video Series*.

But you won't get just a laboratory-style skills demonstration in these videos. Instead, Thomas J. Elpel and his special guests take you camping in the real world and connect the dots, demonstrating how each of these skills are applied together to meet your basic needs of shelter, fire, water, and plant and animal foods. Also included in the videos are wild mushrooms and unique tools and cooking techniques, plus great scenery and wildlife footage, so you really get a multi-dimensional sense of the skills *and* the place.

Each video takes place in a different setting in different seasons, with Thomas J. Elpel and his guests demonstrating completely different skills to meet their basic needs. *The Art of Nothing Wilderness Survival Videos* are recorded on **certified quality recycled VHS tapes** for an environmentally friendly product!

Volume One

Three Days at the River

with nothing but our bare hands

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A Place for People
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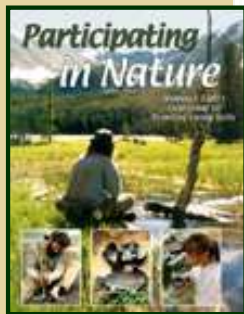
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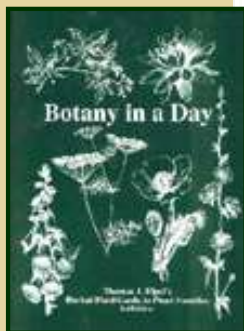
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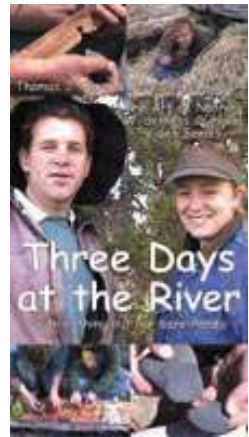
[Participating in Nature](#)



[Botany in a Day](#)

No knife. No matches. No food, sleeping bags or other gear. Join Thomas J. Elpel and 13 year-old daughter Felicia for this extraordinary primitive camping experience in southwest Montana. In the cottonwoods along the Jefferson River they demonstrate all the skills required to meet their basic needs, starting with nothing but their bare hands. Skills include:

- **Shelter:** Grass sleeping bag on hot ground.
- **Fire:** The cottonwood root bowdrill set.
- **Water:** Boiling water in found bottles and cans for purification.
- **Edible Plants:** Cattail Roots, stinging nettles, rose hips, burdock, mustard greens and milkweed shoots.
- **Fungi:** The edible tree mushroom.
- **Meat:** Porcupine--killing, skinning, butchering.
- **Cooking:** Shishkebabs and hot rock stir-fry.
- **Tools:** Discoidal stone knives and digging sticks.



3 Days at the River. ISBN: 1-892784-11-4. May 2002. 91 Minutes. \$25.00

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? [Click here](#) to find out. *Three Days at the River* is only available in NTSC format.

Tom,

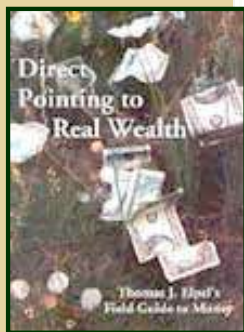
Received my video (3 Days at the River) last week, and I had to write to tell you it was very entertaining and educational. I'm a firm believer in your "art of nothing" philosophy. It is about time someone promotes that type of thinking toward outdoor recreation.

*Walk in Beauty,
Zak Baker
(used with permission)*

Art of Nothing: 3 Days at the River \$25.00 Quantity:

-Please scroll down the page for the "Add to Order" button.-

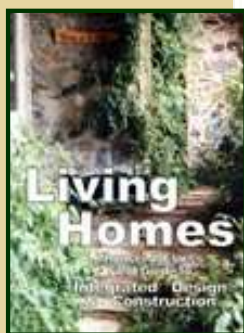
Volume Two
Mountain Meadows
camping with almost nothing but the dog



[Direct Pointing to Real Wealth](#)

With little more than stone knives and the dog, Thomas J. Elpel and cousin Melvin Beattie venture into the Rocky Mountains to survive with whatever they can find and improvise from their surroundings. Among the wildflowers, wildlife and scenic meadows of southwestern Montana, they demonstrate all the skills needed to meet their basic needs, including:

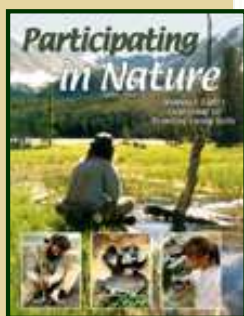
- **Shelter:** A debris shelter with hot rocks.
- **Fire:** The mullein on sage handdrill set.
- **Water:** Purifying water with Aerobic Oxygen.
- **Edible Plants:** Sweet cicely, wild sunflower, dwarf huckleberry, musk thistle stems and "artichokes", brook saxifrage, rose petals.
- **Meat:** Ground squirrels--killing, skinning, butchering.
- **Cooking:** Cooking on an upright rock slab.
- **Tools:** Glass-knapped knives & the jo stick.



[Living Homes](#)

Mountain Meadows. ISBN: 1-892784-13-0. July 2002. 90 Minutes. \$25.00

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. *Mountain Meadows* is only available in NTSC format.

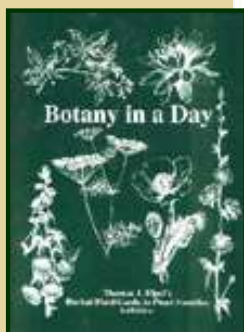


[Participating in Nature](#)

Hi Tom & Renee,

I have received your videos 3 Days at the River + Mountain Meadows. Fantastic work!!! They are two of the best videos I have ever seen. You did a great job, and I can't wait until you do more.

*Thank You,
Ted Barber
(used with permission)*



[Botany in a Day](#)

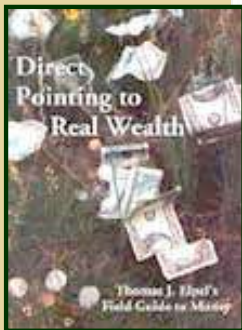
Dear Tom,

I recently purchased two videos that you produced (3 Days at the River and Mountain Meadows). I guess because of my background, I more/less have the same philosophical approach to the learning and teaching of these skills - from that of a naturalist. As such, I extend to you "a job well done". I look forward to more of them.

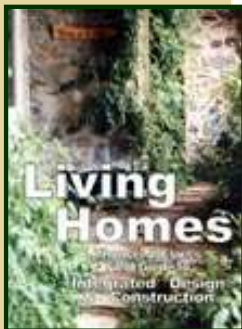
*Take Care.
Ray Vizgirdas
Fish and Wildlife Biologist
(used with permission)*

Art of Nothing: Mountain Meadows \$25.00 Quantity:

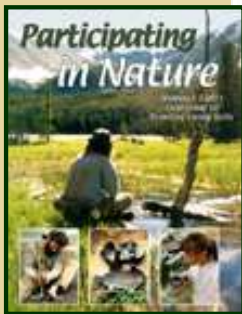
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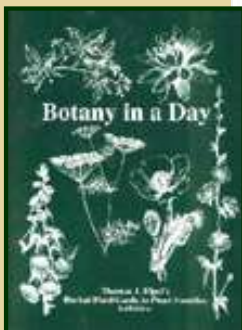
[Direct Pointing to Real Wealth](#)



[Living Homes](#)



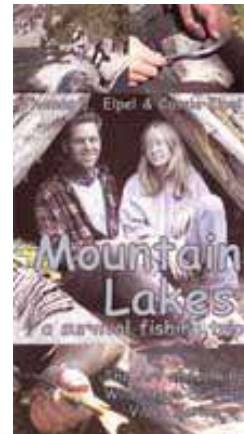
[Participating in Nature](#)



[Botany in a Day](#)

Volume Three **Mountain Lakes** a survival fishing trip

With little more than a flint & steel kit and a copper drinking cup, Thomas J. Elpel and daughter Cassie trek five miles back into the Rocky Mountains for a few days of fishing, fun, and survival living. Among the spectacular lakes and mountain peaks, they demonstrate all of the skills require to meet their basic needs, including:



- **Shelter:** Rock and log shelter with a fire.
- **Fire:** Flint & Steel Kit + Making char cloth.
- **Water:** Drinking from mountain streams.
- **Edible Plants:** Wild onions and glacier lilies.
- **Meat:** Mountain Suckers-fishing by hand, snagging by hook, plus fishing laws.
- **Cooking:** Cooking fish on hot coals, plus steaming wild vegetables in a stone oven.
- **Tools:** Tin can knives, plus forging the nail knife and making a pine bark pot.

Mountain Lakes. ISBN: 1-892784-14-9. July 2003. 104 Minutes. \$25.00

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? [Click here](#) to find out. *Mountain Lakes* is only available in NTSC format.

Art of Nothing: Mountain Lakes \$25.00 Quantity:

**Discount: Order all three
Art of Nothing Wilderness Survival Videos and save \$15.00.**

All Three Art of Nothing Videos (Save \$15) \$60.00 Quantity:

When will Volume 4 in the Art of Nothing Series be out?
Probably not until December 2004 at the earliest.
We have our hands full with a lot of other projects right now!

Ordering Information

Order on-line with your Visa, Mastercard, or Discover. Simply enter the quantity of

each item you want in the little white boxes, then click the "Add to Order" button. We also accept checks and money orders. For orders by mail, e-mail, or telephone, you can still use the on-line shopping basket to tally the order and postage. Then print or copy the information and send it in to:

**Thomas J. Elpel's
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PO Box 697
Pony, MT 59747-0697
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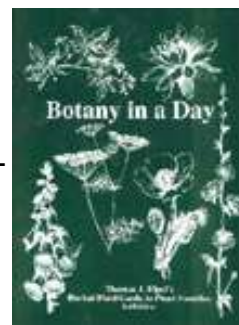
-Botany In A Day-

Thomas J. Elpel's Herbal Field Guide to Plant Families

(4th Edition, January 2000)

Botany in a Day is changing the way people learn about plants! Tom's book has gained a nationwide audience almost exclusively by word-of-mouth. It is now used as a text and recommended by herbal and wilderness schools across North America. Instead of presenting individual plants, Botany in a Day unveils the patterns of identification and uses among related plants, giving readers simple tools to rapidly unlock the mysteries of the new species they encounter throughout the continent.

Too often people try to learn plants one-at-a-time, without rhyme or reason. Now you can cut years off the process of learning about plants and their uses. Tom's book helps you beyond the piece-meal approach to botany and herbalism towards a more "whole" approach. Within 1 1/2 hours you can understand the big picture of botany and herbalism. Learn how related plants have similar features for identification. Discover how they often have similar properties and similar uses.



Tom's book takes you beyond the details towards a greater understanding of the patterns among plants. By mid-morning you can be in the field, matching flowers to the patterns in the book. Instead of learning plants one-at-a-time you will discover that you can learn them by the dozens--just by looking for patterns.

Most plant books cover only one or two hundred species. *Botany in a Day* includes more than 100 plant families and over 700 genera--applicable to many thousands of species.

By the end of the day you will have a functional knowledge of botany. You will be able to continue growing your knowledge of plants and plant patterns--in the wild, in your garden, among house plants, even at the florist. Understand the magic of patterns among plants, and the world will never look the same again!

All of the interior pages of *Botany in a Day* were printed with soy inks on 100% recycled paper. \$1.00 from every copy sold is donated to 3Rivers Park to help purchase habitat for people and wildlife in the Missouri Headwaters watershed in southwest Montana.

4th Edition, January 2000. 2nd Printing, October 2001. Tom made minor corrections and additions throughout the book for the new printing and added an all new *Index to Plants by Common Names*. (That makes four indexes in the book.) 201 pages. **Cost: \$22.50.**

"Botany in a Day truly has the potential to become one of the most useful botany and herbal primers ever written."

--Peter Gail, Ph.D.
Goosefoot Acres Center for Resourceful Living

PO Box 18016
Cleveland, OH 44118

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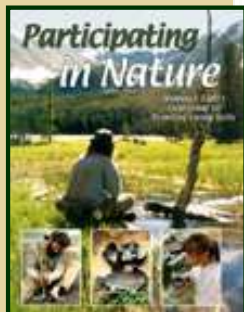
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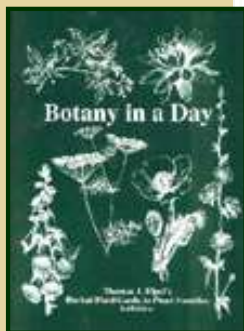
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Participating in Nature



Botany in a Day

"Botany in a Day has my highest recommendation for anyone--beginner or expert-- interested in plants. Herbalists, naturalists, gardeners, and especially those involved in teaching outdoor and survival skills will wonder how they ever managed without this superb book."

--Susun S. Weed, Director
Wise Woman Center
PO Box 64
Woodstock, NY 12498

"Botany in a Day is exactly what I needed for my botany classes. It goes beyond what is available in the standard field key, providing a wealth of information on individual families. Now my students are able to key local flora confidently, knowing they have reached the correct family by referring to Botany in a Day's detailed descriptions and pictures. They can become truly acquainted with the family's characteristics, constituents, medicinal uses, and patterns. I personally love all the stories about the edible plants, which describe in delicious detail how long it takes to collect and prepare each one."

--Garima Fairfax
Rocky Mountain Center for Botanical Studies
2639 Spruce Street
Boulder, CO 80302

Botany in a Day \$22.50

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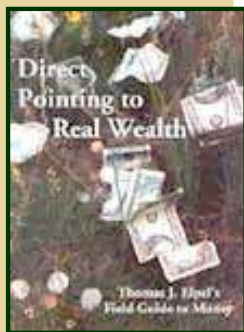
-Discount-

-Order both *Participating in Nature* and *Botany in a Day* and save \$5.00.-
-Order all four of Tom's books and save \$17.50.-

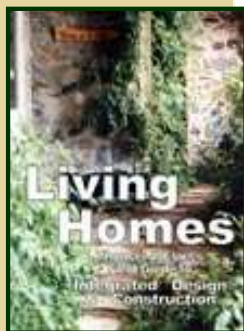
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Living Homes + Direct Pointing to Real Wealth + Participating in Nature + Botany in a Day \$75.00 Quantity:

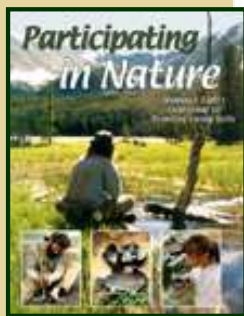
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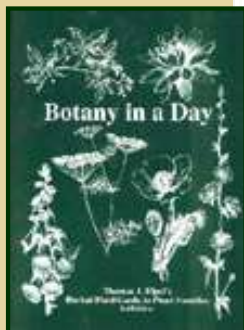
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with Thomas J. Elpel & Special Guests

(Recorded on quality recycled VHS video tapes.)

3 Days at the River with nothing but our bare hands.

Mountain Meadows camping with almost nothing but the dog.

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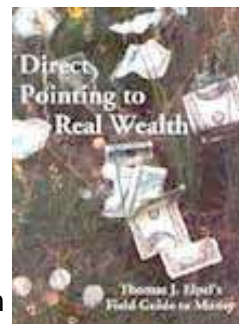
-Direct Pointing to Real Wealth-

Thomas J. Elpel's Field Guide to Money
(5th Edition)

All living organisms consume energy, modify resources from the environment and produce waste. That is an inescapable fact of life. But in nature all material wastes are recycled as inputs to other living organisms. The only true waste is diffuse, low-grade heat.

In order to create a truly sustainable economy we must mimic the ecosystem so that the waste of every household and business becomes resource inputs to other enterprises, and the only waste produced is diffuse, low-grade heat from renewable resources like solar.

In *Direct Pointing to Real Wealth* Thomas J. Elpel demonstrates that it is inevitable that we will create an ecologically sustainable economy. Tom turns conventional thinking on its head and outlines steps you can take to increase your prosperity right now while closing the loop on waste and speeding the transition to a greener world.



Direct Pointing to Real Wealth is an enlightened look at the nature of money. Discover how the economy is like an ecosystem and how money is a token we use to represent calories of energy in the ecosystem. Tom's unique approach to money takes you beyond the numbers game to a direct examination of the laws of physics, biology, and economics. These laws are the same today as in the Stone Age, when people worked only a few hours per day and had much more leisure time than we do now.

Whether you are raising a family or running a business, Tom's book gives you a fresh new look at economics, ecology and how to achieve your Dreams. Break through perceived limitations to discover a world of prosperity and abundance! 5th Edition. May 2000. 182 Pages. **Cost: \$20.**

Direct Pointing to Real Wealth Table of Contents

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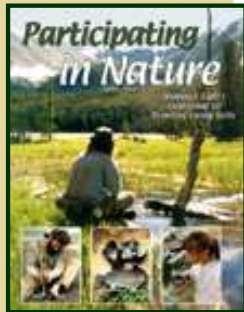
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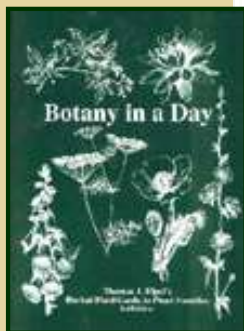
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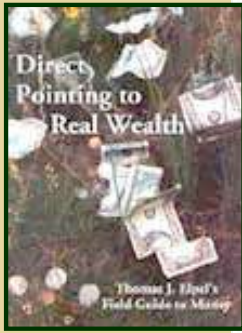
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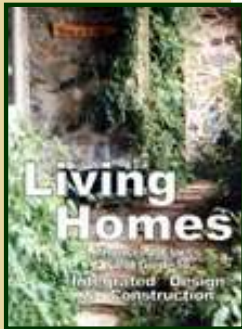
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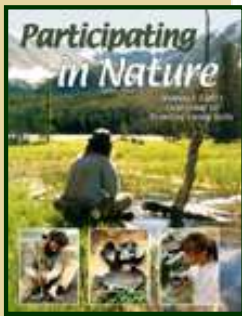
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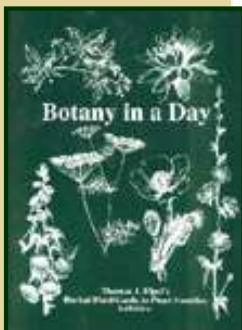
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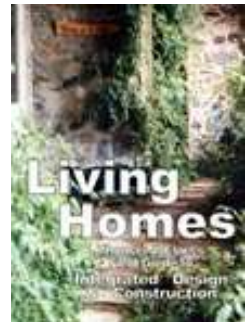
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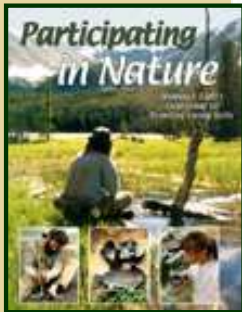
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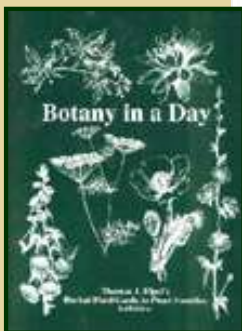
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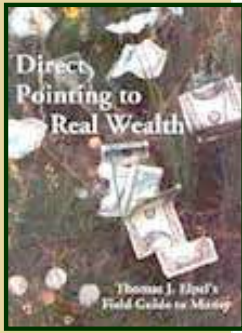
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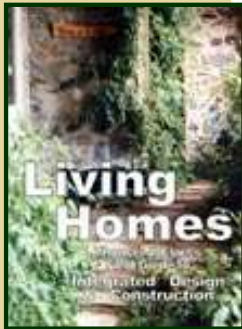
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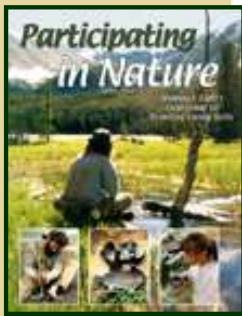
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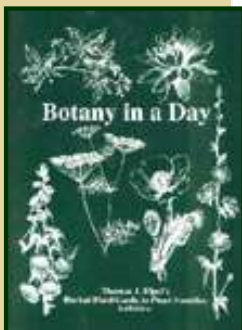
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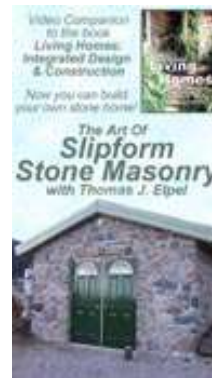
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Building a House on Limited Means

The Elimination of all that is unnecessary to achieve a Dream

By Thomas J. Elpel

We are very goal-oriented in Western culture, and we often count our successes by how much we accomplish. Eastern cultures can be very goal-oriented as well, but sometimes with a very different approach. While a westerner sits on his laurels at the end of the day and adds up what he did, an easterner might sit on his laurels and add up what he eliminated having to do.



As a simple analogy, you might say that a western artist does sculpture with clay, assembling an entire work piece by piece, while an eastern artist does sculpture in stone, eliminating everything that is not part of the final goal. It is two fundamentally different approaches to a similar

point. Yet, there is still more to this analogy than that. The western sculptor may shape clay all day long, but the eastern sculptor sits in front of his stone and meditates on it. Then, at the end of the day he picks up his chisel and hammer and makes one strategic hit, revealing all at once a whole portion of the art!

Our approach to achieving our dreams was more the eastern approach than the western one. With this approach Renee and I have been able to completely build and pay for our dream home on a combined annual income averaging only \$10,000 to \$12,000 per year.

I pretty much grew up in the pages of the old *Mother Earth News* magazine. All through high-school I collected and read and reread every issue of *Mother* that I could find, accumulating a wealth of ideas and dreaming of how to someday assemble those ideas into a way of life. Over the years there were a number of articles on the Japanese farmer Masanobu Fukuoka, and his "no-plowing, no-fertilizing, no-weeding, no-pesticides, do-nothing method of natural farming". His approach was essentially to research, meditate, and eliminate all the unnecessary work in growing his crops. I did not really understand Fukuoka's approach at the time, but I connected with it on an subconscious level. In many ways I was already doing a similar thing--by picking out ideas that would allow me to eliminate all the obstacles on the way to my dreams.

In Zen it has been said that, "Reverence is the elimination of all that is unnecessary." In

high-school I envisioned a life in harmony and reverence with nature, and researched ways to eliminate all that was in my way of that goal.

Financing the Dream

In high-school the teachers were always telling us that we had to study hard so that we could find good-paying careers as adults. I found it irritating that they would paint such a dismal picture of the future. I did not realize at the time that most of my classmates considered it normal. I had a lot of Dreams in life, and the idea of getting a job and working for the next forty years just scared the heck out of me. Thus I was highly motivated to find a no-job path to success.

Renee and I started dating during our senior year of high-school and were already drawing house plans by time we graduated in June of 1986. We both tried different things for two years, then did a 500 mile walk across Montana in 1988. With that experience we decided we could do anything, so we set a wedding date, got jobs and started saving money. Our financial strategy was simple.

Most people rent a house, have a lot of expenses, work real hard, and maybe put 5% of their income away towards their dreams. But you have to work an awfully long time to get anywhere that way. We took the opposite approach and lived on 5% of our incomes while we put 95% away into savings. We got jobs leading stone-age wilderness expeditions, so it was pretty easy to keep expenses down. We had a sizable nest-egg by the time we married in 1989, so we bought land, pitched a tent, and started building. Living in a tent and cooking rice and beans over the campfire allowed us to continue putting virtually all of our income into our Dream. Today, with no house payment, and low energy bills, we are able to eliminate the need for jobs through much of the year.





Designing our Home

Our art teacher in high-school told us that art is never finished, that you just have to pick a point to stop working on it. The same is true of architecture. You can never completely "perfect" a set of blue prints, but the more time you meditate on it, the better off you will be.

The most important point to understand is that everything happens "on paper". How much a house costs, how it looks, how comfortable it is, how energy-efficient it is--

all these things occur on paper before you pick up even one tool. A little additional time in the planning stage can save you tens of thousands of dollars in construction and maintenance. That is time well spent.

Too often, however, builders simply draw a few boxes on a piece of paper, scoot them around until they are reasonably satisfied with the layout, and start building. The result is houses end up being more costly and less energy-efficient than they should be. Proper planning can make the difference between whether or not you get the house you really want.

Starting in high-school, we spent four years researching and designing our home. Even so, we were still polishing details in our plans when we started building. We simply reached a point where we had to put down the pencil and "pick up the hammer" (actually a cement mixer).

Our approach to designing was simple. We stuck to the basics. We protected the house on the north and east sides by building into the hill. We covered the south face of the house with glass, and created the greenhouse as a sort of an "airlock" between the main part of the house and the outside.

People expect a solar home to cost a lot more, but it does not have to. The main difference between a solar and non-solar home is that the solar home has most of the windows on one side. There are no more materials involved; it just takes longer to come up with a blueprint that aesthetically works inside and outside. Similarly, solar homes often have some fancy heat storage system, such as a wall of masonry, or a stack of water jugs just inches behind a wall of glass, or perhaps a gravel heat sink under the house with a system of pipes and blowers to store and retrieve the warmth. These are extras that are tacked onto a house, and there was no way we could afford such extravagance with our income--so we eliminated them as unnecessary. But we needed walls and floors, so we simply built the walls of stone, and the floors of tiled concrete, to get the advantages of thermal mass without sinking money into a specialized heat system. To eliminate the need

for ducting, we put our wood stove in the middle of the house and created an open floor-plan for easy air circulation.

Everywhere in a house there are ways to eliminate complexity. For instance, when builders pour a concrete wall for an earth-bermed house they often build an insulated frame wall inside the house. This becomes the equivalent of building two walls--an extravagance we could not afford. So we used a sand-texture paint to give the concrete the appearance of a plastered-adobe wall, and put rigid insulation outside, against the wall, held in place by dirt "siding". Putting the insulation on the outside kept the thermal mass on the inside. The west side of the house was added on last, and is the only part of the main level that is truly exposed to the weather. Thus it is the only part of the house with insulation sandwiched in the wall.



By simply arranging our building materials in an energy-efficient layout we were able to create a warm house without throwing a lot of money into sophisticated materials or insulation. This also enabled us to eliminate the need for thousands of dollars of central heating. As it is, our main heat source is our wood cook-stove in the kitchen.

We chose the wood stove not as a matter of economics, but as part of our quality of life. (I grew up around my Grandma's wood stove, and simply would not settle for anything else.) We have no backup heat when we leave, but the house temperature gradually drops to 50 degrees (F) and stays there.

Remarkably, we can cook all day on our wood stove right through the hottest parts of summer, without cooking ourselves out of the house. Creating an open loft above the kitchen area allows the heat to flow straight up, so we just let it out the upstairs door. We evacuate the heat from the greenhouse the same way. Incidentally, our water system runs through the fire box of the stove, giving us near-scalding water at the faucet, at no extra cost. On sunny days we get "automatic" hot water from our solar panel, also free. In the winter time we initially fill our hot tub with free hot water from the tap, then pay only a few dollars more per month to keep it hot with an electric element.

Our house may look expensive, but the reality is that we only have about \$10 a square foot into it. Yet I have seen some million dollar homes that looked like junk. Appearance, like energy efficiency, is more a product of design than of cost. You can take the same materials and arrange them poorly or arrange them well. This is where art comes into architecture. We both had a background in art from high-school, but it does not take much

artistic skill to design a good-looking house; it just takes time. Believe me, our first house plans were pretty funky, but after four years they started looking pretty good. You may not have much artistic skill to begin with, but if you picked up a pencil and sketched your cat or dog for the next four years then you would probably get pretty good at that too. We developed a sense of architecture by just doing it, and now we are much faster at it. Most importantly, however, the investment of time allowed us to meditate on our plans, so we could eliminate extra work and materials and save many thousands of dollars.



The Building Process

Our house was well researched and planned, yet there were still many unknowns. In particular, neither of us really had any building experience to give us a basis in reality. Our house plan was more of a house hypothesis. It seemed like a good idea, but would it work? There was only one way to find out. One thing we learned walking across Montana is that the only way to get anywhere is to take it one step at a time and see what comes next.

A previous owner once started development on the land we bought, so there was already a concrete slab on site, measuring approximately 30 X 95 feet. Coincidentally, our tentative house plans fit one section of the slab, and its footings, to within a couple feet in each direction. We threw out our house plans and grabbed a box of crayons. After a couple days of gesturing and imagining,

we had a final, life-sized plan, with every wall out-lined right on the slab.

But first we buried 1,100 feet of plastic pipe from the spring and cistern to the house, put up a new temporary power pole, and had the phone company install a telephone in our tent. Then we had to set forms and pour a concrete wall on the north and east sides of the house, where it would later be back-filled with ten feet of earth. Our first masonry experience consisted of three cement trucks and 17 yards of concrete!

Doing our slip-formed stone walls after that was considerably less intense. We used Steve Parsons' book, *Stone Houses: A Design and Construction Handbook* (out of print), as our primary guide in this department. We set forms along the crayon lines on the slab and started building. Through our research we had identified the slip-form technique as an easy, low-skill way for amateurs like us to put together straight, good-looking stone walls. We used simple forms, mostly 2 feet tall and 8 feet long, framed with 2 x 4's and faced with plywood. These are set on each side of the wall, wire-tied together, and braced apart. Stones are placed inside the forms with a good face against the plywood, and concrete is poured behind them. The walls can be faced with stone on one side, leaving a concrete wall on the other side, or faced on both sides. Most of our walls are faced on both sides.

Reinforcing steel is placed horizontally and vertically throughout the concrete.

All along the way we strived to eliminate costs. We salvaged old lumber from the dump. We used old steel cables, barbed wire, and steel fence posts for much of our rebar. Our rocks were free from the local hills and fields. We did not have much money, but we found a lot of resources. Eventually the house became my full time project, and Renee earned the money to support us. Every time we had any money we would spend it all on some big project. Then she would go back to work, and I would go salvage a few boards somewhere and keep building. If we had the money all at once then I am sure the house would have ended up costing twice as much. But every time the money ran out we simply became more resourceful. Building without money causes a person to meditate a bit longer, to redesign individual projects to fit the available materials.



During our second summer we put up the logs for the upper story. I might emphasize that it is generally not advisable to switch building materials in this kind of a project. It requires twice as many tools and twice as much knowledge. But for us this was the equivalent of a college education, and we did not have enough knowledge at this point to be able to do anything else with our lives anyway, so we had time on our hands. Fortunately Renee's parents attended a log-building class, and learned about an exciting new low-skill, low-cost method of working with logs. I peeled all of our logs in a few days using a tool called a Log Wizard^a. It is essentially a planar blade that mounts on the end of a chainsaw. With the help of Renee's family we put up the main part of the log work in about ten days. Later we helped them to build their 3000+ square foot log home.

This method of log building we used went fast because it was so simple. It eliminated a lot of the complexities involved in the process. We did not do any notching, and we did very little to make the logs fit together. In fact, there were 2 inch gaps between the logs in some places, yet that is okay with this method. We drilled holes and pounded 1/2 inch rebar through each set of logs, every four feet along the walls, as well as through the corners. This rebar schiscabobbing holds the logs together without notching, and amazingly even prevents the logs from settling at all, so you can safely put in doors and windows without any special engineering. The spaces between the logs are later filled with strips of insulation and chinked with standard masonry mortar. Galvanized nails are first pounded in every three inches along the logs to give something for the mortar to anchor itself on. Vertical poles are set in place to support the ridge pole, so it does not put any weight on the walls. The roof is pretty much standard construction, with 2 x 10 rafters, R-30 fiberglass batts, skip sheathing, steel roofing. The ceiling is sheet-rocked.

Construction usually proceeded slowly throughout the process, due to our chronic lack of money. We moved into the house that second year, although with no doors or windows and no insulation in the roof. When we were both home we took turns around the wood cook-stove, with one of us sitting on the oven door, and the other standing behind the stove. Our frigid Montana winter stopped about three feet from the stove. Renee said she was warmer when she was at work, leading teenagers on wilderness expeditions for three weeks at a time in Idaho. This might all seem a little rough, but I later realized that we saved at least \$150,000 in interest payments by eliminating the need for a loan. That is not a bad wage for a couple years of camping out! We kept working on the house, and by spring it was quite survivable; by the next winter it was downright livable. Eventually we even got an indoor toilet, and later built a 600 square foot addition.

In Perspective

Economically, we were able to boost the value of our \$10,000 income up to about \$50,000 or \$60,000 a year, tax free. We did this by adding value to the resources we purchased, and even more by avoiding interest payments on a loan.

Also, building our own home was the equivalent of a college education for us. Our house was our diploma, built and paid for. We had few marketable skills when we started, but many skills by the time we finished. We even built and sold another stone house along the way, and we plan to do more.

Most importantly, however, we got our Dream home, and the freedom to decide each day what we want to do. That freedom is important because we have a lot of interests. We are heavily immersed in the primitive, or stone-age skills, which we research, practice, publish, and teach through our own wilderness programs. That in itself is like going to school for a couple degrees--it takes a lot of time. We also research and publish on environmental economics, and we are working on plan to be able to "prefab" stone houses, to make them economical for more people to own. Each of these areas of interest requires that we have the freedom to sit back and meditate, to take the time to find out what complexities we can eliminate, so we can pick up the chisel at the end of the day and make our one strategic hit, to achieve our goals smoothly and easily.

For all the benefits we gained out of building our own home, I would still not recommend it to every person. Building a home has a way of becoming an education and a career. Do not try building a house only because you think you will save money; it does not work that way. Focus directly on your Dreams and make them your reality. Do that and you will always be successful.

Hello Tom & Renee.

My wife and I have been pouring over your [Slipform Stone Masonry Video](#) and [Living Homes](#) book. Do you have more details on your home listed anywhere? The home we've

been designing is very much like yours. The biggest difference is that our "wall o' windows" on the south side didn't have the greenhouse feature. The other difference is that we have a bathroom off the Master Bedroom where you have the opening between the kitchen area and the upstairs. The more I look at and study your floorplan the more I like what I see. Do you happen to have a floor plan with the room dimensions available for study. If not, could you tell me if the floor plan on page 10 of Living Homes (4th Edition) is to scale? If so, how about the inside dimensions for a couple of the rooms and I'll figure out the rest.

Thank you in advance.

*Hugh & Myra
(used with permission)*

Hugh & Myra,

I am honored that you like our house plans so much. The drawings in the book are approximately to scale. One inch is equal to approximately 11.3 feet. East-west the house is about 63 feet long, outside-to-outside.

That sounds good to have a bathroom upstairs where we have the loft. I like our loft a lot, although I think we could get all the benefits of it with about 1/4 of the area. The rest of the space could be put to some use.

There are a few other modifications you might think about, or that we might change if we were to build this house again. First, our bathroom is exceedingly small by most people's standards. It works for us, since Renee and I are not the type to spend hours in there staring at the mirror or doing make-up. However, we did put a vanity in the girl's bedroom for that purpose. It would be a good idea to dedicate more space to your main level bathroom. If nothing else, at least it makes the house more sellable. A few more built-in closets would also be a good idea.

Another modification I would suggest is to move the fireplace, if you have one. We like to pull the chairs up close and put our feet up on the hearth, but that blocks the pathway across the room to the door. It might have been better to put the fireplace on the wall against the bathroom, except that our breaker box was right there.

Also note that our living room and my office are quite dark, although we actually like it that way. We like the living room dark for watching TV, and I like my office dark for working on the computer. Even without much outside light I usually have my light off in here.

You would be very welcome to send copies of your plans as they come along. I would take a quick look over them to see if I notice anything you might not have thought of. I hope this has been helpful!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

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Slipforming is the process of using forms on both sides of the wall as a guide for the stonework. The forms are filled with stone and concrete, then "slipped" up the walls to form the subsequent levels. Slipforming makes stone work easy even for the novice.

In this unique video, Thomas J. Elpel and Robert Taylor build an insulated workshop out of stone, demonstrating the building process from site excavation right through to putting the roof on and finishing the inside. Working through the month of June in Montana, they brave the rain and snow, gusting winds, searing heat and stunning rainbows to bring this project to fruition.

The video is designed as a companion to Tom's book *Living Homes*. The principles of design and construction are out-lined in the book, enabling the reader to create dwellings customized to their own unique situations. In this video you will see just one application of those principles, but in vivid detail from start to finish. With both the book and the video you too will be able to design and build in a way that is completely unique to your own Vision. *The Art of Slipform Stone Masonry* is recorded on **certified quality recycled VHS tapes** for an environmentally friendly video! November 2001. ISBN: 1-892784-10-6. 1 hr. 50 min. **\$25.00.**



I received my order today. The video is the best how-to video I've ever seen. Keep up the good work!

Thanks,

Hugh & Myra

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The Art of Slipform Stone Masonry Video \$25.00

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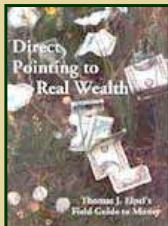
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This Website Created on a lovable **Macintosh** computer!



[Direct Pointing to Real Wealth](#)

A new stone workshop in just one month! Robert arrived here from New York City on June 4th to learn stone masonry. We went to work immediately setting forms to pour the footings and the slab. Exactly one month later--on the 4th of July--we put on the metal roof! Along the way we somehow shot video of the entire process, and still took a couple well-deserved days off. The building is 12 feet wide and 16 feet long, as measured on the inside.

The original idea behind the project was simply to create a storage shed for our camping gear and bicycles. But we couldn't just build any old shed... it had to look good beside our stone house, and that meant building the shed with matching stonework and the same kind of roof. And since we were building with stone, I also wanted to test out some ideas which I had previously proposed, but never actually tried-- that is, framing the entire structure with insulation panels, then slipforming the stonework up the outside. In other words, this would be a pretty elaborate and highly insulated storage shed!

Soon we added cute little windows to the plans for the south wall, with more windows in the doors, plus complete wiring and lighting inside. We started thinking "workshop" or even "studio" more than "shed". Ultimately we may have to build something else to hold our bicycles and camping gear...



Anyway, after pouring the slab, we framed the building out of insulation panels. I planned to order 4' x 8' panels of beadboard insulation with one sheet of oriented strand board (OSB) glued on the inside, marketed as the "R-Control Panels". (For a directory of suppliers, please [click here.](#)) But first, I asked about secondhand, damaged, or scrap panels at the local factory. They brought me out back to a growing heap of scrap panels beside the building and let me take all I could for free! Otherwise, the scraps were to be hauled off to the dump, and the company was so busy that they didn't have time to make new panels to sell me anyway. Now, I would have preferred panels with the OSB board on just one side instead of both, but for the price, how could I complain?

Putting the walls together was like assembling a puzzle, working from all different sized pieces, squares, triangles and rectangles. It took a little head-scratching, but two days later we had the walls up and the windows and doors framed in. Choosing the roof pitch was easy, we just used a set of matching triangular panels.

The next step was slipforming up the outside with stonework. Since a large part of the walls were underground anyway, we "cheated" and poured concrete walls wherever it wouldn't show, then added stonework on top of that. Bringing in a truck and pouring the concrete cost a bit more, but really sped up the process. Unfortunately, in this fast-paced project, I failed to properly secure the forms, so the concrete "blew out" the side and made quite a mess... all of which is thankfully underground and out of sight.

After that embarrassment, we turned to the slower and more relaxing process of setting stones and mixing our own mortar. The slipforms serve as guides for the stonework, so you can just set the rocks in against the wood face and then pour concrete and rebar in behind it. It makes the difficult art of stone masonry so easy that anyone can do it.

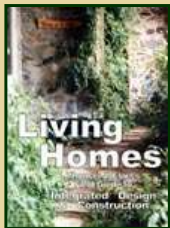
The weather flip-flopped from freezing cold to boiling hot to gusty winds, to rain and rainbows. It snowed the day before Robert arrived, then snowed again on the 14th, dumping six inches on our little town. We took that day off from work.



Before we finished building the stone walls, we stopped and built roof trusses, then cut notches in the insulation panels and set the trusses in place. We resumed our slipform work and went right up between the trusses, permanently anchoring them into the concrete and stonework. Working near the top of the walls was easy, since the building is set back into the hill, none of the walls were too high off the ground. And the stones were free from the local mountains. We just had to drive up the road to get them. However, the "trimless" style I used around the windows and doors required more specialized squarish stones than the rocks we used for regular slipform work. We made a lot of extra trips up into the mountains, looking for just the right rocks.

Although the workshop absorbed most of our time, I still had to run the business and process book orders each day. Somewhere along the way, I took time off and drove the 3 1/2 hours to Missoula for a business errand and a 6 a.m. television interview on *Montana Today* about my book, [Living Homes](#). That was a fast trip there and back.





[Living Homes](#)

Now, if I had purchased beadboard panels in 4' x 8' sheets for the roof, then I would have used a few log purlins for support and otherwise spanned the opening without the need for trusses. However, since we were using odd-shaped scrap panels, we had to build the trusses to hold them up. That added to the cost of the "free" insulation panels. We also screwed down a layer of 7/16" OSB board across the trusses to further support the scrap insulation panels.

But first we acquired a bunch of white paint free from the thrift store (they didn't want it in the first place), mixed it all together, and painted what would become the ceiling-side of the OSB board. That was during a wind and dust storm, of course. Since the storm was also spitting rain at us, we threw the freshly painted panels up on the trusses, flipped them paint-side down, and screwed them in place wet paint and all. That actually worked remarkably well!

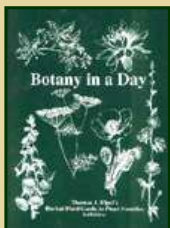


Insulating the roof was another puzzle of insulation panels. We set the pieces in place, then screwed them on from inside the shop. Expanding foam sealant filled the gaps between the panels. While waiting for the roofing to come in, we installed the windows and doors and rough-wired the inside. Then we grouted the stonework, using a mix of sand and masonry cement to give the stonework a very finished look.

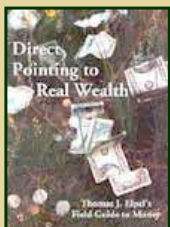
In the picture shown here, the shop is virtually complete. The remaining work slowed almost to a standstill when Robert left, since I was behind in the business and hadn't spent much time with the family for a whole month. Then I worked on the inside, finishing the walls. Because the walls consist of so many puzzle pieces, and not all of them are completely flush, I decided to put a plastic mesh over the entire surface and "plaster" it with ready-mix joint compound. That worked remarkably well, and seemed to be not too much more expensive or labor intensive than sheetrock would have been. Then I painted it, and finished the wiring. I also recycled a couple of old slipforms into a workbench along the south side where the windows are.

Each night after work I loaded the video on the computer and chopped it down to a few good minutes of material. Later I went back and narrated the video, using the iMovie program on our new iMac. There are more than 1,100 audio and visual files carefully melded together in this movie. With that much material, it took as long to make the video as it did to build the workshop!

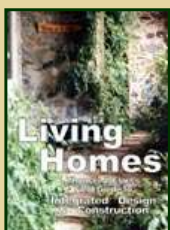
Note that the video is not a replacement for the slipforming material in my book [Living Homes](#). The book covers the all important "how-to" of the process, while the video covers in detail "what we did". Basically, every project is completely unique and different, so the techniques shown in the video are different from any I've used in the past, or will use in the future. Likewise, there is obviously tons of material covered in the video that can not be covered in the book, so I recommend the video as a companion to the book. **Cost: \$25.00**



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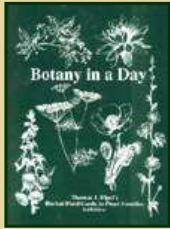
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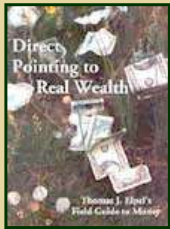
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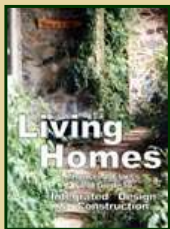
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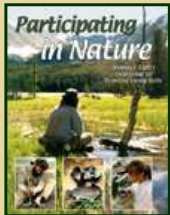
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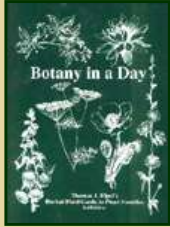
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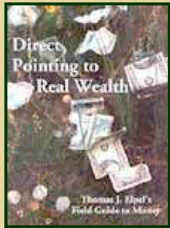
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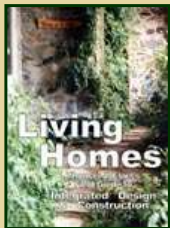
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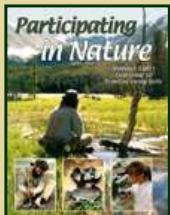
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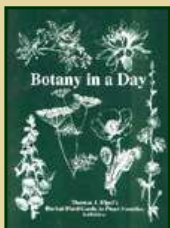
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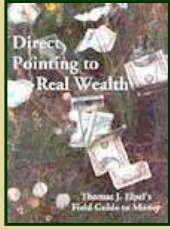
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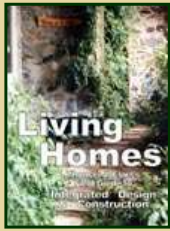
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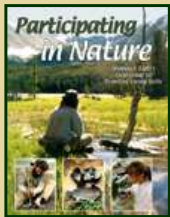
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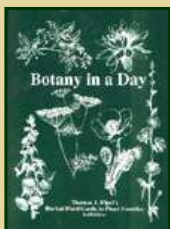
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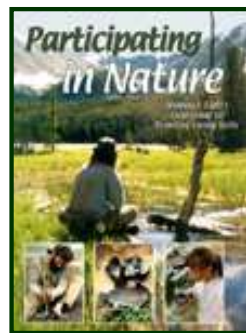
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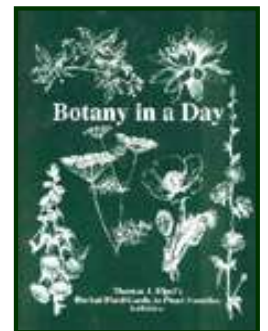
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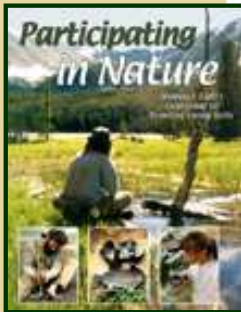
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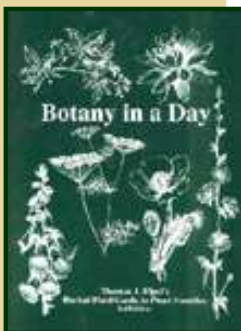
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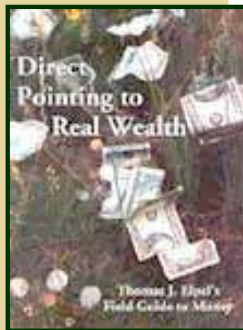
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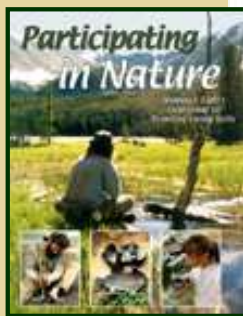
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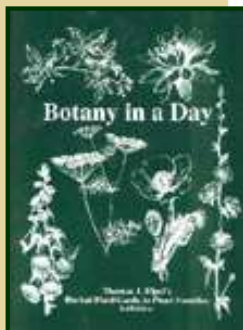
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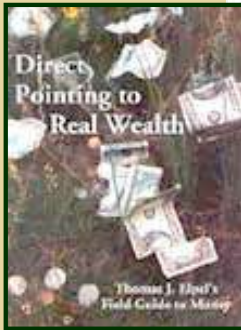
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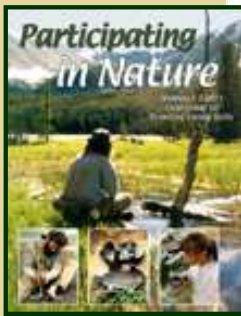
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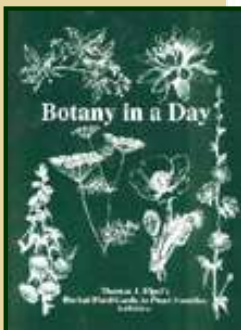
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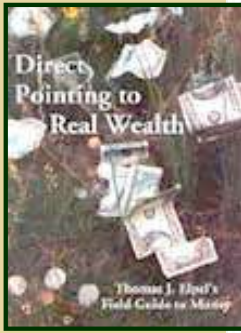
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Slipform Stone Masonry -- The Next Generation

Forward by Thomas J. Elpel

In my article *The Art of Slipforming* in the December 1997/January 1998 issue of *The Mother Earth News*, I proposed a new method of slipform stone masonry, where the entire house would be framed with polystyrene beadboard insulation panels before beginning any stone masonry. The beadboard panels would serve as forms inside the wall and the stone masonry would be slipformed up the outside. That way it would be easier to build straight, plumb walls with less labor and fewer slipforms. The beadboard panels would also eliminate expensive wood framing on the inside of the walls while maximizing energy efficiency by eliminating thermal gaps through the framing. At least that was the theory. I hadn't actually tried it myself.

The article in *The Mother Earth News* was my first step in writing the book [Living Homes](#), which took another four years and three interim comb-bound draft editions before it was finished. The new fourth edition with color cover and paperback binding is now available.



Early in the process of writing the book I received a phone call from Dani Gruber in western Colorado. She read the article in *Mother* and wanted to test out the new method of slipforming I had proposed. Dani asked a few questions, which I answered to the best of my ability. I sent her draft copies of my book to help guide her. As far as I know, the Gruber house is the first structure ever built with the

technique, and I'm thrilled (and relieved) to say that it actually worked!

Part way through the process Dani wrote me the following e-mail letter with attached pictures, which she gave me permission to post here. Later she wrote a more extensive article about the process, which is included after the letter. As you can see from the photos, Dani was a very inspired builder. Their home is three stories tall with about 5,000 square feet of space inside.

After hearing so much about the project, I finally decided I'd better drive to western Colorado to see the house for myself, so I went down there in March 2001. The Grubers had just moved into the house, living in the downstairs while construction continued in the upper levels. I had the pleasure of being their very first overnight house guest! I included tips and photos gleaned from the project in the newest edition of [Living Homes](#).

In June of 2001 we built our own project with this new method of slipforming, although on a slightly smaller scale. We built a small workshop of stone beside our home, and produced a [step-by-step video tape](#) of the process.

-Be sure to read Dani's funny stories from the jobsite, posted at the end of this page.-

October 12, 2000

Tom,

I want to thank you so much for forwarding your book. It's been over a year since you sent it - and I've been following it closely ever since. In case you do not recall, I phoned you about the beadboard panels which you suggested for "the next generation" slipformed stone houses. Well, I am happy to say I tried it. I eventually found beadboard panels in Denver. I used was with 5 1/2" beadboard panels with oriented strand board glued on one side. As you can tell by the photos, the house is a large one. And you inspired me to such an extent that, with help, I even tackled turrets!

My father, (who is 73 and sports a very dry sense of humor) assures me the people doing the slipforming all died shortly afterward from the sheer effort. (This is the same guy who I showed the picture of Scott and Helen Nearing and asked him how old he thought they were. In the photo they are obviously in their 70's and 90's. Dad confidently told me he thought they were 25 and 30 - that slipforming makes everyone look like that!)

In truth, he is my biggest supporter. He's eager for a different kind of house. He mixed almost all of the mortar for me as I placed the rocks and hauled the mortar with coffee cans. (Just goes to show that where there's a will. . . .) After my muscles became accustomed to the weight of the coffee cans, and we got higher, I graduated to a mop bucket for the cement. Filling it half full and making many, many, many trips back and forth, I was sure glad to see the last rock!!!

Your book was fabulous. I'm pretty sure none of your audience has read it as thoroughly, nor as repetitively as I have. While it may be mundane to you - I wouldn't have minded another chapter on actually building the slipforms, complete with screw size, bracing, etc. The diagrams did a very good job - but for the female share of your readership, we like to know these things. My dad helped me get them straight (a rather intriguing process to me) and my husband also helped assemble them. I went through several packages of drill bits - but they look really nice. As you suggested, they have held up well and make excellent scaffold planks. They've worn many hats and seem to be holding up very well.

My home has gone through many changes. It started as a 24 x 64 home, then grew to a

32 x 64 two-story home. It's always easy for the people who aren't picking up the rocks to urge you to "go bigger". Showing no backbone of my own - it is now a 3-story home!

Sincerely,

Dani Gruber

Slipforming

The Next Generation

© Danielle N. Gruber February 2001

"Are you building a castle?" Sure, why not. "Are you nuts?" Sure, why not.

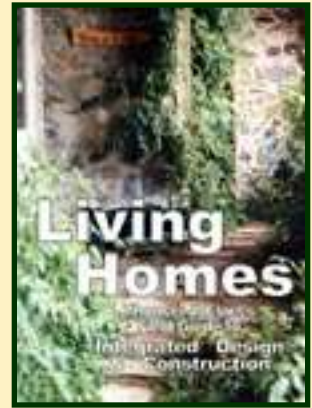
Forward

From the peaks of the mountains to the floors of the valleys, one can occasionally spot beautiful, simple rock homes dotting the landscape. For me, the love of a rock building was founded in a little rock barn which I yearned to remodel into a home. The rocks were cracking, and the cement was giving way, and yet the building was rich in it's simplicity. The windows would never have passed inspection. They were all very high, too high to look out of. But the light which cascaded through them, bounced off the walls and gave a glow to the floor below. Magic things happened there, I was sure. I loved that barn, and I vowed to someday build something similar for myself. But, as I researched the project, I heard from countless people warning that homes built of rock were uncomfortable. "Those homes are cool in the summer and downright cold in the winter," they'd say. So, I decided to do more research. As luck would have it, shortly thereafter, *The Mother Earth News* magazine had a story about a man named Tom Elpel, who was slipforming homes in Montana. Mr. Elpel had some great ideas about warming up cold rock homes. One idea was to use polystyrene beadboard insulation as an interior form. He had not tried the method, but thought it would work. I agreed and gave it a try.

Slipforming using the beadboard panels was a terrific idea. Tom Elpel's ground work in traditional slipforming was clear, concise, and very helpful. I say honestly, I could not have completed the slipformed portion of my home had it not been for him and his dedication toward documenting the process. Today, I have a home that is beautiful, warm and energy efficient, and it contains my pride at having played a part in its building process, along with my father, who graciously mixed virtually all of the cement in a \$200 mixer for me. It is with thanks and gratitude to Tom and his family, and my father and my family, that I am documenting my process to help pave the road a little farther for the next generation of slipforming.

The Process

The first step, for me, was to read Mr. Elpel's book, [Living Homes](#), and the Reader's Digest *Back to the Basics*. These books contain clearly how to begin construction of the most important part of the slipforming process, the slipforms themselves. I built my slipforms exactly as Elpel suggested, with two additional implements: a large clamp, and a square. The clamp came in handy when the green 2 x 4's twisted and the square kept the interior, 21" boards lined up while screwing them together.



My home was 32' x 64', so I made 24 slipforms each measuring 2'x8'. Four were for each end, and eight for each side, plus a couple of small fill-in forms. Looking back, I could have done it with less, because, on my lot using the beadboard panels, it was impossible to easily access all sides. You can start with one full wall, or even half of one wall. However, as Elpel suggests, these forms are wonderful for use as planking, and creating this amount gave me some for scaffolding planks, some to use where I was working, and more to use in preparation for the next day's work.

Slipforms completed, I began searching for the beadboard panels. Mr. Elpel gave me a reference to a company in Montana, but the shipping was beyond my hopes. They referred me to a company in Denver, Colorado called Advanced Foam Plastics. While their product had not been used in this application to their knowledge, they offered a product which had traditionally been used for roofing insulation and is more readily available everywhere. It was 5 1/2" of polystyrene attached to 1/2" of oriented strand board (OSB). It is a very strong, very efficient board which is often used on roofing. They suggested it might work. The nice thing is that the panels can be built at any height from the standard 8' height up to 12'. I wanted 9' ceilings, so that is what I ordered.

Slipforming using beadboard panels is similar to traditional slipforming. The footings are built the same, except extra width is necessary for the beadboard panels. Since the floor inside this home had not been poured, I elevated the panels by 2 inches, using a recycled 2"x 10" wooden plank (the same I had used to form the footings) underneath them. Pulling the 2 x 10's out afterwards was difficult. If I built this same home over again, I would order the panels long enough to compensate for the future floor, and place them directly on the footing.

The cement and rock portion of the wall is 9", and the insulated panels add another 6", so the total wall is 15" wide. That 15" wall needs an additional 4" for the slipform on the outside, and an additional 4" ledge for the beadboard panels on the inside. This brings the total width of the footing to 23". I opted to add an additional 1" to make my measurements an even two foot. Giving yourself an extra inch costs little in concrete, but is wonderful in the event any of your forms slip.

My home was built into a hillside. The back wall was back-filled so rock work was not

necessary. The front of the home was resting on the slope, so I made my footings 3 feet wide along the leading edge. Since my home is sitting on a 40' vein of river rocks, I poured a footer 10" thick and used 6 one-half inch rebar runners along the 2' sides. I increased it to 8 one-half inch rebar runners along the front.

Inserting the vertical rebar into the footer: A confusing aspect was how to insert the 10' vertical rebar into the cement, leaving it 9' or higher, swaying in the wind. If you insert the long vertical rebar runners into the cement as it cures, and the rebar wobbles, even a little, you have compromised the strength of the attachment into the footer. Many people suggested cutting the rebar into two foot increments as we poured the slipformed walls. But, because the rebar temporarily supported the panels, keeping them from falling over, I wanted to keep the rebar as high as possible.

Elpel mentioned that in the past he had driven the vertical rebar through the fresh concrete of the footings into the ground beneath, but later learned that this allowed rust to creep up the rebar and compromise the strength of the connection between the footing and the wall. To avoid this, we inserted six-inch long, 1/2" PVC pieces into the cement every two feet immediately after the footers had been poured. The PVC held tight, and later, after the concrete had cured sufficiently, we hammered the rebar into those PVC pieces. The fit was very tight, and allowed no wobbling of the rebar within the hole. Of course, the rebar above the hole was able to sway, but it was held tight into the footing and allowed no seams along the vertical rebar. While this 9' of rebar was awkward, the most important benefit to leaving it that length was the rebar acted as a vertical brace for the beadboard panels. The panels leaned on the rebar. While this might not work in high wind areas, it helped to temporarily support the panels until we secured them in place.

The first beadboard panels: The first panels I put up were the corner pieces. I am a strong woman, and managed to get the first corner up by myself, but it took the patience of Job, and would have been significantly easier with 2 or 3 people. Anyone who saw me trying to do it alone would have thought I was a nut, and might have been right. I put the 9'x4' panel, OSB board side toward my back and piggy-backed it over to the corner, where I had set out a couple of 2x4's to brace it once I got there. Carefully, I backed up and set the edge of the panel in place, then reached for my 2x4's which were within arms reach, and braced the OSB board side of the panel. With one person on a windy day, this would have been impossible, and would have resulted in the panels falling, or creating a kite-like atmosphere while you try to piggy back it. Unless you are really head strong, I would recommend 2 people.



The vertical rebar on the other side was very helpful, and I was glad I had not cut it off. It literally held the first panel in place while I ran to get the next one. Getting the first two corner panels in place was tricky, especially since it was critical to get them square.

The space between the beadboard panel and my exterior slipform was 9". Spacers cut to this length made tightening the forms much easier. One caution: If you tighten the forms too tight, the spacers protrude into the beadboard. This makes getting them out while you are pouring concrete difficult. It also makes positioning of the rocks difficult. Put spacers in your forms, but my advice would be to keep them "girl-tight," not "man-tight."

At this point, with the vertical and horizontal rebar in place, and with the first bead board panel up, I set the remaining panels in place. With scrap 2"x10"s, I put a 45 degree cut on each side and pre-drilled 3 holes on each side of it to make screwing it into the OSB easier. This gave me a wedge which I could then screw into the corner, holding the corner at an exact 90 degrees. I used a square, which to the horror of my male helpers, I called the "L." Once the two panels were up and square, I screwed the wedges into the corners. By the fourth corner, my father had thought up an easier way to accomplish the same end. Get a relatively large piece of scrap lumber, maybe 3 - 4 feet wide and long. Make sure it has a square edge on two corners of it, then screw a 2x4, level horizontally on each side of the panels, about half-way. Position the plank on top of the two ledges you created and screw your plank into the ledges. This accomplishes a nice tight corner which will not sag or change over the time necessary to complete your home. It seconds as a make-shift shelf to keep small tools.

The pieces adjoining the corners are easily placed. It helps to have scrap lumber around. Scrap pieces roughly 4" x 7" were wonderful to screw evenly across the joints between one panel and the next. Three or four of these scraps make the seams almost unnoticeable.



Wire-reinforcing: With rebar and spacers in place, and the first beadboard panels in place, you are ready to wire-tie the slipforms to the panels. This is an important step because too many wires in the slipform make it difficult to set rocks in place. I found that I needed about four sets of wires: two near the bottom, two near the two-foot level of the slipform at about 1' and 3' along the beadboard panel. Pre-drilling holes through the OSB board on the

panels made the job easy. This job is possible for one person, but is much easier with two. It is so easy, that I had one of my kids yell when my tie wire had popped through the insulation. From there, I could pull it through and insert it into the slipform as needed. But occasionally, as you are pushing the wire through the OSB board and into the beadboard, the wire does not make a straight route and winds itself into the beadboard, never to appear on the other side. This is why it is easier to have someone on the other side. Once I looped the wire around the rebar, then through the slipform, I tightened it with a common nail. The nail anchors the beadboard to the cement.

One visitor suggested that I use the slipforms on both sides of my wall, which sounded so intelligent that I had to try it. The interior slipforms were placed right over the OSB board on the panels. What I did not foresee was the difficulty of fastening the wire ties this way. If you forego the interior slipform, the panels are strong enough, and the wire tying is easy. But with an additional slipform on the interior, the benefit of the wire tying is lost because you need to cut the wire to remove the slip-form. First, you do not need the slipforms on the inside of your wall. The panels are strong enough. But secondly, when you wire tie to the panels, you do not need to cut the wire. Both ends of the wire are fed through the panel leaving no tie on the interior wall. This is good because when you apply your interior treatment, in our case, drywall, there was no need to remove the wire ties. We did try the slipforms on both sides, but wire tying the walls then had to go completely through both sets of slipforms. Removing them meant cutting the wire. This left no remaining tie to secure the panels to the concrete. With our method, if the panels should ever come free of the cement, they will never fall off the wall, because the wire ties holds them in place.

Anytime you trek into new frontiers, there are ideas which look logical on paper, but simply are not effective. Using slipforms on both the interior and exterior proved to be one such idea. Another suggestion was gluing the insulation to the wall later. With much thought and a couple of phone calls, this concept was thrown out too. Without tying the panels into the wall, the weight of the drywall might eventually tear them away from the cement. One day, sitting in your living room, your whole wall might fall on top of you. We avoided this possibility, but I bring it up because anyone building a new home gets lots of advice and some of it is incredibly tempting to try.

Incidentally, I telephoned the beadboard panel company to ask if wire tying would be necessary. They could not insure the bond between the cement and the panel over time. Weight and gravity, they thought, might make the panel eventually separate from the cement without wire ties, so I opted to put them in. (A note from Tom:



We are now recommending to simply drill shallow holes into the beadboard such that the concrete fills the voids and grips the panels like little fingers.) A bonus to the wire ties, is that, if you drywall, you can attach the drywall directly to the panel right over the wire. No wall preparation is necessary. A cement worker who looked at the inside of my home, insisted that we would need to fir out each panel before applying drywall, or the drywall would be a headache. I'm happy to say he was wrong. I've never done an easier drywall job. The panel, up toward the top, was not exactly level, but the slight deviance was minimal and with paint and drywall, it is almost impossible to see.

Protecting the panels in wet weather: Leaving the bare OSB board out over the first winter, with no roof to protect it, scared me. A friend of mine, who is quite knowledgeable about wood, told me to paint the OSB board on each panel with a coating of half turpentine, half boiled linseed oil. This treatment waterproofs the panels sufficiently, that the OSB board did not show disintegration over the winter. Living in the Rocky Mountains, that was a testament to this treatment.

The beadboard has a flexibility which is both an asset and a drawback. It is important to keep a level close by and check the wall often. When you are going up 2' at a time, the upper level of the wall can sag out of level. It is easy to return it to level if you catch it before the concrete has been poured, but impossible if you don't catch it before the concrete cures. In two corners, toward the top, the panels began to sag a little. Since it was maybe an inch out of square, we did not lose sleep over it, and it covered easily with drywall, but it would drive a perfectionist crazy, and unnecessarily, I believe.



Removal of forms: It was my experience, that in the fall, with moderate temperatures, the concrete and rock combination set up sufficiently in 5 hours. At that time, we carefully removed the forms and chipped out what cement was not desired, then left the cement alone to continue to cure overnight. A couple of times we were not able to chip off the cement until the next day, and it was much more difficult. In one section, we left it until the following night, and, in the dark, with bugs and lights, we hammered the concrete out. Sparks were flying from the hammer and the chisels, and we vowed never to do that again. The wall was no worse for the wear, but removing the cement was almost impossible.

The system we found most workable was to start at about 9:00 in the morning. My 73 year old father agreed to help me by mixing the cement in the electric mixer. (Tom Elpel said you could buy these mixers for a couple of hundred dollars. That's exactly what we paid and the mixer is still working fine after

mixing almost all the cement in our large home.) My dad would mix the cement and pour it into a wheelbarrow where I would scoop it up in coffee cans and carry it to the wall where it was easy to control and pour. Men came along and thought it would be so much easier to carry five-gallon buckets of cement, but, as I suspected, they all had dental appointments after a couple of hours.

I knew I couldn't afford to get hurt, and a coffee can of cement is not that heavy. The pace was easy to keep up, and after a couple of weeks, I got strong enough that I graduated to mop buckets, filled half-way. For three hours every morning, for three months, my dad mixed cement, and I carried it in either coffee cans or mop buckets. At noon, when the heat was unbearable, we would quit, eat, nap and recuperate. Occasionally, I would take the truck and go get more rocks and unload them. Often, I would prepare the next days forms during the afternoon, so that the next morning, we were set to go. I will add, it is amazingly tempting to try to carry more cement. My husband came up to help one day and filled the mop bucket to the top because he did not want to make two trips to the mixer. When I went to lift that bucket, it was heavy and hurt my shoulder. I was nursing that shoulder for 3 weeks. Better to make 100 trips and not be hurt than 1 trip and knock yourself out of play.

Lots of people came to visit the site. Most tried to find a more efficient way to get the concrete to the wall. I have come to believe that my pace, while slow, was perfect. By 5:00, when the forms were removed, I was happy to be chipping a reduced amount. My forms never broke. The two times I tried to hurry, I regretted it. One was on the back wall where we poured cement from a cement truck with no rocks in it. My bracing slipped and the weight of the wall pushed out the cement. Luckily,



that part of the house was going to be backfilled. But the extra time to straighten the wall was not "efficient." I would have been better off to spend the extra time and not lose ground. The lesson remains, if you have patience, you won't be as likely to hurt yourself, you'll be more apt to finish the project, and with the beadboard, you are already doing two or three jobs in one since you are doing your exterior siding (rock) the structural wall (cement), and the insulation (the beadboard) and it's all ready to apply drywall to the OSB board.

Filling the holes and gaps between levels: When the first level of slipforms is removed and the cement is cleaned out from between the rocks, you have a very clean looking wall. Setting the second set of forms one level higher leaves gaps and holes through which the new cement escapes and runs down the wall you just spent hours cleaning. This happened to me and plugging these holes was nearly impossible with wet cement pushing out the plugs. After some experimenting, I discovered that I could break off chunks of scrap beadboard insulation slightly bigger than the holes and wedge those scraps into the holes to prevent the new cement from escaping. It also did a much better job of preventing drips and streaks. It is not fool proof, but reduced the cleaning work substantially. Later, after the concrete has set up and the form is removed, the insulation plugs are easily removed and saved for the next level of holes and gaps.



Windows and doors: The windows were purchased at a local discount window outlet earlier than we began building. Shopping for the windows first, is a great way to save a lot of money. When you have an oddly shaped window hole, the stores see dollar signs as you walk inside. But, purchasing the windows long before the

building began, I was able to take advantage of top-of-the line windows at reduced prices, simply because I could use a 41" x 63" window. Tom Elpel clearly describes how to construct your window frames. Putting them into the wet cement, wedged between the slipforms and the panels, was more of a challenge.

To save money, I recycled the 2 x 10" lumber we used to form the footings. It was rough-cut lumber from a local company, so it was a full 2 x 10 inches. Since the cement part of my wall was only 9", I had to cut a ledge into the beadboard so the window frame would fit. This worked nicely because it helped hold the window frame in place. I hammered 30-40 nails and screws into the bottom of my window frame, then, when we approached the mark on the beadboard, we set the window into place and tapped it into level.

Careful measurement is necessary when the windows holes are cut into the beadboard. I left over-lapping beadboard around each edge so that when the window was placed inside, the insulation would come to the edges of the window and not the edges of the frame.

Interesting Advice And Questions From Bystanders

As overheard by me, from my father. *"Oh yeah, she thinks she's going to build a rock house. We'll see. I bet when she gets a couple of feet of rock done, she'll get smart."* (Later, after there was 14' of rock across the front and sides of the house and my dad was still mixing concrete.) *"By God, she never did get smart."*

A mechanic: "Did you cut each rock in half before putting them into the wall?" No. But what an idea! (Not!)



A legal assistant: "So, you are going to put your framing inside these foam panels?" No, there is no framing. "Oh, so your architect thought this up?" No, I couldn't afford the architect. "What! No framing!" This dear friend brought her engineer father to save me from myself. I told him about Tom Elpel's book, and about the elderly Nearings and their experience. He walked around the site a long time

and was silent. He went home and was silent all afternoon. Finally, at dinner,

notwithstanding the conversation, he blurted out, "I don't see why it won't work!" (And, no, there is no framing.)

An attorney: "Are those real rocks?" My response: "I think so, but gee, I didn't look THAT close."

Same attorney: "So, you ordered those rocks and then put them together in that pattern?" (This same attorney protested a gravel pit consisting of the very same rocks I used which is less than 50 yards from my house. Why, in the world, would I import rocks when I am stumbling over hundreds, if not thousands of them to get to and from my home? "Oh.")

A different attorney, sneeringly, "So, you're building with rocks and cement. . .how nice. . . .Will it be one story or two?" I don't know, I replied. "What!!! You've started it and you don't know!!!" Not yet, I answered. Then they exchanged silent glances which said, 'See why we need building codes here!' Later, this same attorney jumped out of his expensive SUV and gave me a Japanese welcome! "You've built a castle!" he said. "I cannot believe it!"

A Greek neighbor who refuses to believe that a woman could do this: "Who is building this house?" I am. "No really, who is building this house?" Well, technically, my dad is helping me. "Oh, so you won't tell me. . . ." Then he jumped into his car and roared off. Later, I hired a terrific carpenter and framer to help above the 9' level. But the entire rock portion of the home was, in fact, built by my father and me and occasionally a friend or two who happened by at the wrong time.

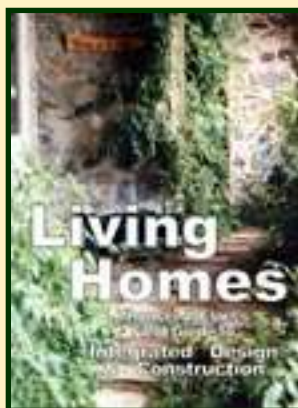
By my father: "I'm quitting and going to work for your mother. The pay is the same and the benefits are better." My mom runs a gift shop. Both of us pay nothing, but her pay included hot coffee. Mine was all the pop he could drink. And not the good name brand kind either.

"Darn it all to heck!" Overheard by a carpenter after working with me for several months. We had Bad Word Baseball in effect. Three bad words and you had to bring donuts the next day. This kept their filthy language at a minimum so I did not take it home to my innocent children. Evidently it was working!

250 miles away: By a carpenter, at a bar to my husband's brother: "Man, there is this lady building this rock house in a small town where I live. The whole thing is going to fall down. I snuck up there and walked around. The cement is crumbling already. You can see it laying on the ground where it is falling off the wall. She's got no headers over her windows and the whole thing is made with foam. I sure hate to see them fail. They've put a lot of work and money into it so far. (This story caused panic among my in-laws who were almost all afraid to bring it to my attention. Finally, one e-mailed my husband and whispered his concern. The "crumbling concrete" was the cement that I had scraped off

from in between the rocks. No worry. The headers for the windows? We weren't even that high yet. Of course, we put U-channel metal headers over each window and door that were structurally engineered for correct size. The foam, well, it was Elpel's idea.) Later, the same carpenter came back. After he had walked through the dried-in home, he was eating his words admitting that he'd never seen a home built like this before, but was impressed.

My father: "If I'd have known what you were building, and that you were going to stick it through, I'd have quit earlier!"



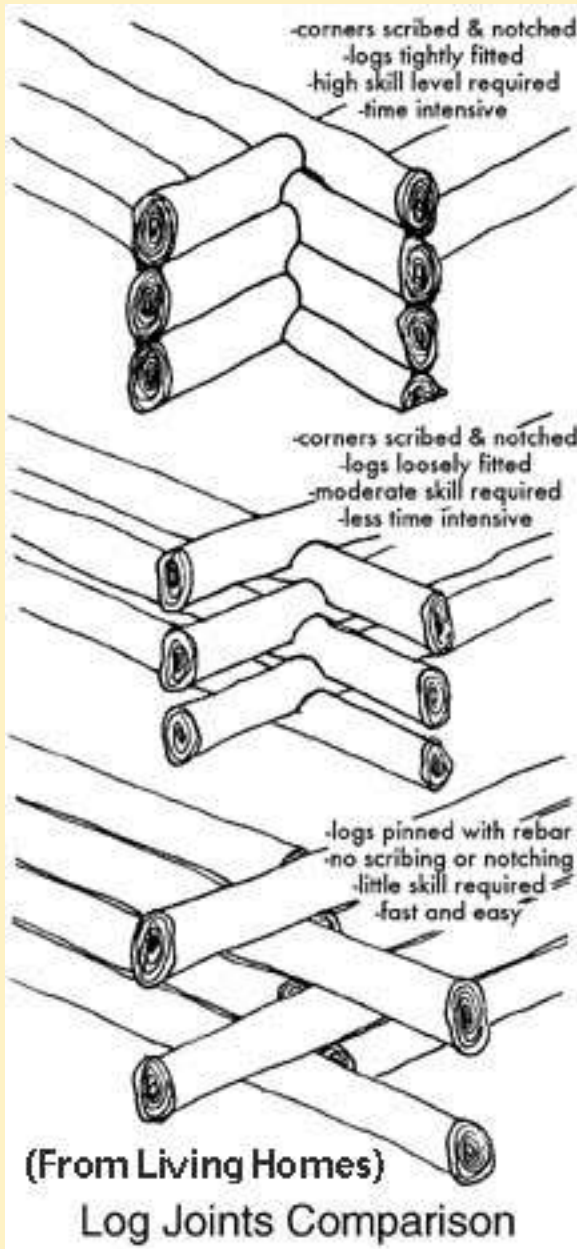
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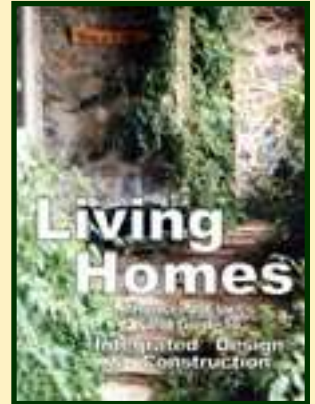
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Low-Cost, Log Home Construction the Easy Way!



Traditional methods of log-building have been passed down from a time when people went out into the woods and built cabins with little more than an ax, a saw, and an adz. Those techniques required a great deal of skill and much time to carefully scribe and notch the ends to fit together. The logs had to be notched because it was the only way to tie the pieces together as a stable structure. Some methods included scribing and fitting the entire length of every log. But few people in today's world have the necessary craftsmanship background nor the requisite amount of time it takes to learn this art form. Fortunately you do not have to become a master craftsman to be able to build a high-quality log structure in relatively little time.



Today there are inexpensive modern materials available that greatly simplify the process of log building so you can put up a house with very little in the way of skill, time, or money. With the "butt-joint" method, you use a big electric drill, lots of cheap reinforcing bar (otherwise known as "rebar"), and a sledge hammer to pin the logs together with essentially no scribing, no notching, and no close fitting. The final product is even stronger than a

scribed and notched log home.

Structurally, there are many advantages to the butt-joint method versus original log-building techniques. For instance, the traditional scribing and notching immediately weakens the logs at the joints and creates vulnerable places for moisture and rot to set in. Also, traditional log houses tend to "settle" over time, potentially wreaking havoc with doors and windows. These log homes have to be carefully engineered with hidden spaces above doors and windows, so that the logs can settle without destroying the openings.



On the other hand, the butt-joint method has no vulnerable notches for rot to start in, and all the pieces are so shiscabobbed together with rebar that there is no settling. The window and door frames can be nailed directly to the logs without worry.

Renee's family first learned about the butt-joint method through a class with Skip Ellsworth in Seattle. They practiced on our house, then we helped them build their house, as shown here. Complete instructions on the butt-joint method of log-building are included in my book, **Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction**

Living Homes: Integrated Design & Construction \$25.00 Quantity:

-Please scroll down the page for the "Add to Order" button.-



"How-to" Build This Log Cabin for \$3,000

by John McPherson

Want to build a log cabin? I recommend this book as a nice companion to *Living Homes*. Although the process is different from the one we use, I think a second perspective is always a good idea. "How-to" *Build This Log Cabin for \$3,000* does not include a lot of detailed text, but it doesn't have to either. The McPherson's are really good and photographing EVERY step of the process, so you can look at the pictures and

follow along. There are more than 300 photographs and several line drawings to take you through the entire process. 1999. 140 pages. Cost: \$25.00

"How-to" Build This Log Cabin for \$25.00
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Log Construction Manual

The Ultimate Guide to Building Handcrafted Log Homes

by Robert W. Chambers

Log buildings are embedded deeply into North American history and culture. For more than one thousand years, builders have been weaving logs into homes, shelters, barns, and churches. Today, however, the buildings where we live and work are rarely handmade from natural materials. In this context, handcrafted, scribe-fitted natural log buildings are an attractive and uplifting alternative to conventional buildings and building materials. This book tells you what you need to know to build your own log home and also reveals the deep rhythms and patterns of log construction. Author Robert Chambers shows how to take naturally shaped, tapered, round logs and scribe-fit them one to another so that they look like they actually grew together in the woods.



The Log Construction Manual is filled with information available nowhere else, including the Log Selection Rules, Chambers's simple method for choosing which log to use next; instructions for building hip and valley log rafters and roof trusses from full-round logs; step-by-step directions for laying out the sill logs for virtually any floor plan, including hexagons, prows, and more; state-of-the-art compression-fit saddle notches and underscribing to keep fits tight over time; details on scribing and cutting long grooves and corner notches just like the pros; and more.

Chambers also offers advice on organizing and financing a log home project and has loads of experience to share on cutting costs and avoiding common pitfalls. He presents practical ideas for saving money and controlling costs. Although handcrafted log homes are expensive to buy, they are within reach for many as owner-managed building

projects. Written concisely with great care in explaining important details, the *Log Construction Manual* brings clarity, insight, depth, and even humor to the log builder's craft. This is a comprehensive book for log home owner-builders, beginners as well as professionals.

Log Construction Manual \$32.00

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Calories

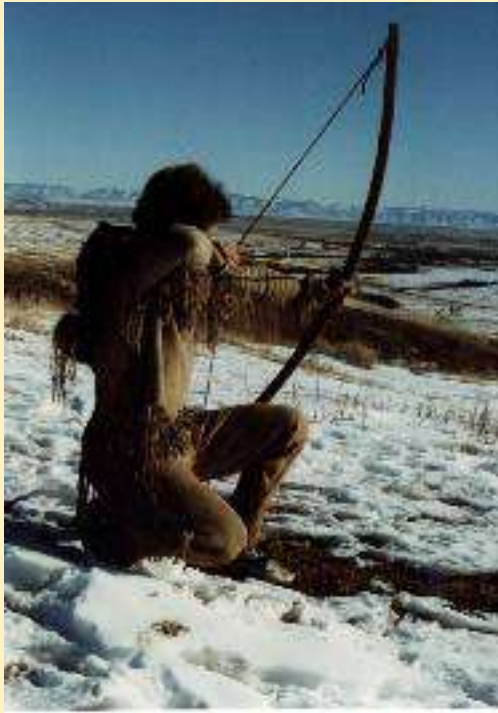
The Currency of All Economies

Adapted from [Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money](#)

Most economists rely on computer printouts of numerical data for their financial planning. By comparing one series of digits with another they can find the immediate trends in the economy and take advantage of those trends. To most people that seems normal. To me it always was, and still is, artificial. I have always wanted to help both people and the environment, and I learned at an early age that knowledge of the economy could be one tool to reach that end. However, I wanted more than just the knowledge of how to generate a positive series of numbers. I was looking for something bigger. I was searching for universal truths. I wanted knowledge about the economy that was constant from year to year, from culture to culture. I wanted knowledge that would be useful to a poor person or a rich person, in our culture, or in any culture. The truths about economics that I found were not in the New York Stock Exchange, but in anthropology and nature.

Little has changed since the stone-age. We still have the same basic needs today as in millennia past for such things as physical and mental well-being, shelter, fire, water, and food-it is only the way we meet those basic needs that has changed. For example, as hunter-gatherers we met our needs largely on our own; each of us produced every aspect of our culture, from shelter to clothing to entertainment. Today we have the same needs, but we more often meet those needs through the network of society, trade, and money. Nevertheless, if we look beyond the illusion of money we will discover that our economy today-like the economies of all past cultures-is based not on dollars or Deutsche marks or yen, but on calories of energy.

The calorie is a unit of measuring energy. Specifically, it is the amount of heat required to raise the temperature of one gram of water one degree Celsius. The caloric value of food is measured by igniting the food to find out how much heat it releases. As human beings, you and I require approximately 2,500 calories of energy to fuel us through each day. The calories we consume come from the sun. Plants convert sunlight into food that we and other animals can eat. Petroleum and coal also contain calories of solar energy, but that energy was captured by plants millions of years ago. The calories from these and other sources are ultimately the basis of all economies.



The economies of our ancestors may have seemed different from ours, without all the institutions of finance that we have, but they were still surprisingly similar, even before there was money, and even before the very first trade or barter ever took place. Our ancestors of long ago may not have had money, but they still had to make decisions that were economical. For example, there were a great many edible plants and animals in their environment which they could harvest and consume for calories, but not all animals or plants were economical to hunt or gather. There were many food resources which were difficult to gather, so more energy would be expended than gained in the process. The result was a caloric deficit. For a food resource to be economical, the people had to be able to gain enough calories of energy from the food to replace those expended, plus enough extra to expend on other chores and activities such as

making tools as shelter, sleeping, or singing and dancing.

At first they harvested only food calories. Later they started harvesting additional calories, in the form of firewood, which I call fuel calories.

Money is simply a token we use today to represent calories of energy. Strictly speaking, we use it to represent human energy, or human productivity. Each of us produces goods or services to exchange to others for the goods and services we need. We put a great deal of energy into the goods and services we provide, as does everyone else. Money represents that energy and makes it easy for us to swap our energies. I can make a product and sell it, and I get paid for the energy I put into it. I can then take that money and buy a product from another person. I give them my money to compensate them for their energy. Ultimately I have exchanged my energy for theirs, and money is just something that makes the exchange process easier. For simplicity we can say that money is a token that represents calories of human energy or labor.

Money also represents fuel calories, but not directly. One person can spend a day (and a couple thousand food calories) harvesting tens of thousands, even millions of fuel calories. That fuel can be firewood, petroleum, uranium, or any other type of fuel. A relatively small amount of human labor can be expended to acquire a tremendous number of fuel calories. These fuel calories can then be put to work for us to increase our production. One person can only consume a couple thousand calories of food per day, and is therefore limited in the amount of work they can do per day. But a person can also burn hundreds of thousands of fuel calories to run machinery and increase out-put. Fuel calories are like cheap slave labor; on average, it gives each of us the calorie equivalent of having between 100 and 300 slaves working for us 24 hours a day.ⁱⁱ We expend a few food calories to harvest a lot of fuel calories, and we spend a combination of food and fuel

calories to produce the products of our culture.

It could be said that money only represents calories of human labor, since it takes human labor to harvest the fuel calories. Yet each of us uses a combination of food and fuel calories to do our work, so it is convenient to say that money is a token that represents both food and fuel calories. The fuel calories are obviously worth less than food calories, since they are so easy to come by. We easily expend millions of times more fuel energy than food energy in our country, yet the fuel calories still only account for three to four percent of the cost of producing all the goods and services of our countryⁱⁱⁱ. This means we have only about three to four percent of our culture expending labor to harvest all that fuel. The rest of the cost goes towards the people putting all that fuel to work to create our products. The specific ratio of food to fuel calories does not really matter, as long as you understand that money is a token we use to represent both.

Today every product we pick up has been shaped by food and fuel calories. For example, a simple drinking glass is made from the resources of the earth mined and shaped with the food calories of human endeavor, combined with the fuel calories from one or another source. The people that produce those food and fuel calories provide the basis of our entire economy. Directly or indirectly, we produce goods and services for the people who produce the energy that fuels us through our tasks. In return they pay us in calories of food or fuel to cover the energy we expended, plus they give us extra calories which we can trade to other people for the services and goods we need. We might think we pay with money, but actually we pay with calories. We earn calories at our jobs, then we pass them on to others to support them, in exchange for their goods and services. The stuff we call money is just a token representative of calories. Without money we would have to carry around bags of food, and bottles of gas, or batteries with electricity. Money is simply a token which represents calories and makes life a lot more convenient.

The only problem with money is that people get caught up in the illusion that it is real wealth. They manipulate numbers in an effort to make money, but they fail to create any real wealth. You can hear people doing this every day in advertising, get-rich schemes, and political speeches. Their proposals may seem sound according to the math, but if you think in terms of calories you will find that their plans seldom bring about real wealth. This book will help you to think about calories, rather than money, because the flow of calories points directly to real wealth.

Ultimately, all aspects of our economy are tied to calories, including inflation, insurance, stocks and bonds, and interest. Consider, for example, insurance. Insurance in a primitive economy meant having neighbors who would share some of their calories with you if you had an accident, and you would do the same for them in their time of need. Insurance is similar today. We all pay calories into a common fund, and any person or family that is in need draws from the fund. For example, if a person's house is destroyed then that person withdraws enough calories from the fund to rebuild the house. Having built our own house, I can tell you that you expend a lot of calories building a house. So the person

whose home is destroyed withdraws a large amount of calories from the common fund to fuel the carpenters as they rebuild the house, plus enough extra for the carpenters to exchange for the goods they need. There is only one main difference between insurance in our economy and insurance in past economies. In past economies every member produced calories and contributed them to the insurance pool. In our economy today the insurance agents do not produce for the pool. We sustain them with a share of the calories we produce, and they in return serve us by overseeing the pool of calories and by doling them out to those in need.

Similarly, banks are essentially places where people can store calories when they have a surplus, or where they can borrow them when they do not have enough. Primitive banking may have started when a farmer borrowed calories from a neighbor's surplus to fuel the family as they built their house. They may have borrowed a certain number of calories with the promise to repay them when they grew crops the following season. This year they would build their house. Next year they would raise crops and repay the loan, and they would give back additional calories, which we call interest, to pay for the service. Today bankers are able to sustain themselves without actually producing any calories of their own. They are able to sustain themselves by loaning us calories with the stipulation that we must eventually pay them back more than they lent us.

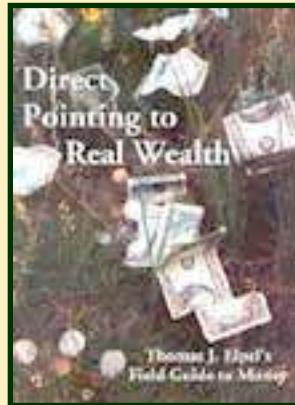
Besides borrowing calories from banks, most of us also store them in banks. Banks are usually a safe place to store our extra calories until we need them. Bankers have found that they can loan out our calories to other people as a means to earn calories for themselves, as long as they can give ours back when we come for them. If many people store their calories at the bank then it is unlikely everyone will come on the same day to withdraw their funds; therefore the bank can loan out most of the total they have in store.

Even inflation can be discussed in terms of calories. Inflation is simply a word we use to describe the changing relationship between calories and the tokens that represent calories. Inflation has occurred when a given amount of tokens (money) cannot be exchanged for as many calories as in the past. Inflation is usually caused by the source that makes tokens, typically a government, and can be additionally affected by banking institutions. This is the subject of a later chapter.

Stocks and bonds are also related to calories. When you invest in stocks you become a banker and a gambler. You loan a business the calories they need for sustenance while they build their business. You then get a share of the profits when their business is up and running, exchanging goods and services for the calories people bring in. If they do well then you get extra calories back as profit. If the investment fails to bring back a net gain, then the business fails and the calories you invested were expended as sweat and tears, but no gain.

All in all, very little has changed since the stone-age. Throughout the ages the calorie has remained the universal measure of economic wealth. Each of us is simply working to

harvest more calories than we expend.



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"How many a poor immortal soul have I met well-nigh crushed and smothered under its load, creeping down the road of life, pushing before it a barn seventy-five feet by forty, its Augean stables never cleansed, and one hundred acres of land, tillage, mowing, pasture, and wood-lot!"

-Henry David Thoreau, Walden

Wealth & Work

A Ten Thousand Year Old Pattern

Adapted from **Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money**

When we think back to our ancestry in the stone-age we sometimes pity them; we pity the poor people who had it so rough that they had to work their every living moment just to find enough food to keep them alive. But ironically, our ancestors typically worked much less than we do today. They had less work, less stress and less depression. Indeed, it is sometimes said that you could hear the laughter of a native village from two miles away!

Anthropologists have documented that cultural advancements usually result in people working more, not less. For example, studies in the 1960's of the !Kung people, a hunter-gatherer society in Africa, showed that they worked roughly half as much as people in industrialized societies. The !Kung worked only about twenty hours per week, or three hours per day, for their subsistence. Their other chores, such as building shelters, making tools and cooking, added up to another twenty-some hours per week for a total of 40+ hours per week. By contrast, those of us in industrial cultures work about 40 hours per week at a job and 40 hours more at home and after work (commuting, shopping, cooking, washing, cleaning, fixing), for a total of roughly 80 hours per week.

The Shoshone Indians, once a hunter-gatherer culture in the Great Basin Desert, had a life-style that was probably similar to that of the !Kung people. Observers from our own culture in the 1800's often called the Shoshone lazy because they never seemed to work. They were not lazy; they just did not need to work. They carried everything they owned right on their backs, and it did not take them long to manufacture such a small quantity of material goods. Their life-style simply did not require them to work all the time.

Understanding these relationships between material goods or "wealth" and the work it takes to produce it is crucial to the effort of gardening the economic ecosystem to produce a life of health and abundance, both for ourselves and for the planet.

Do not be mistaken into thinking that hunting and gathering is an efficient way to earn a living. I know from firsthand experience because I've spent a large part of my life learning

and teaching stone-age living skills. A hunter-gatherer typically harvests only two or three calories of food for every calorie expended. By contrast a farmer with an ox and plow can grow and harvest about thirty-three calories for each calorie expended. A modern American farmer can produce 300+ calories of food for each calorie of body energy expended. This might be easiest to think of as plates of food. For every plate of food consumed, the hunter-gatherer harvests 2-3 new plates full, the ox and plow farmer harvests 33 plates full and the industrial farmer harvests 300 plates full. Granted, industrial farming consumes vast quantities of fossil fuels to produce those 300 plates full of food, and that is an important subject we will return to. The purpose for now is to understand that with the aid of technology and energy we've been able to greatly increase the level of production per person.

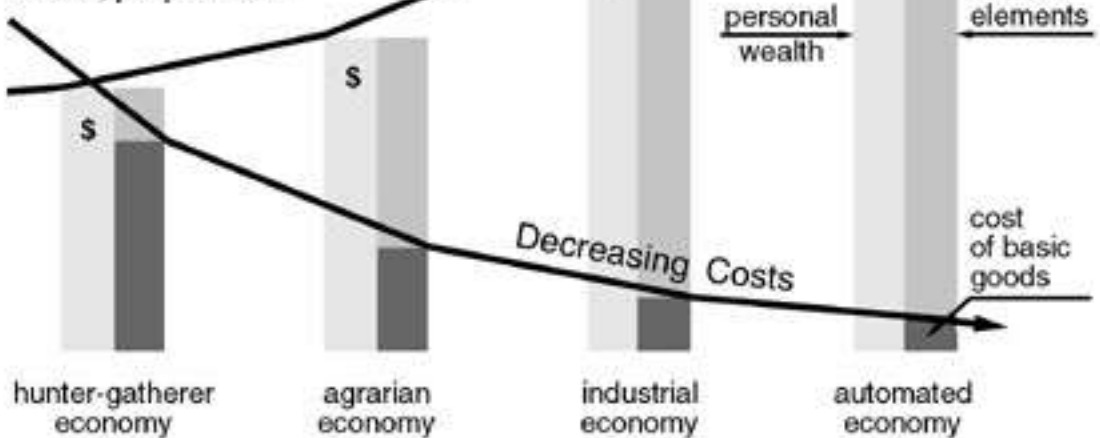
Ultimately, the people of a hunter-gatherer society work less only because they produce less material wealth than people of other cultures. To understand this better, consider the wild animals. Think about deer, or birds, or coyotes, for instance. Have you ever seen or heard of an animal dying from hypertension, or getting ulcers from work stress? Probably not. You might see them forage intensively for a few hours, or they might nibble away all day, but rarely do you see them foraging frantically just to stay alive. They spend much of their time wandering, playing, or basically just "hanging around". There is a certain efficiency to a life-style where, for the most part, the only job you ever have to do is to eat. Life was probably pretty casual for our ancestors before they learned to make tools.

The evolution of tools made our species more efficient, but it also meant we had to work more. As animals, all we had to do was eat, but with the arrival of the stone-age we also had to make tools, shelters, clothing, jewelry, dishes and gather firewood. The evolution of tools meant that we could spend less time actually foraging, but it meant that we spend more time dealing with all the new chores. Still, on the whole, work was not too demanding. With the continuing evolution of culture, however, we found ever more and more work to do. The evolution of farming gave us a new level of prosperity, but it also gave us more work. When we started living in one place we began building fancier, more permanent shelters, complete with furnishings. We started living in bigger groups, and we found a need for some form of government, such as a spiritual leader, to maintain the stability of the community. That meant that those of us who farmed had to contribute a share of the food we harvested as a sort of tax to feed this non-farming person. Originally we only had to harvest enough food for ourselves, but with the advancement of culture we suddenly had to harvest additional calories of food for other people, from leadership, to toolmakers to artists.

Imagine being a tailor, one of several within a simple economy. You custom-cut and hand-stitch garments to exchange for your food, shelter, and other needs. Like other local tailors, it takes you a week to make an outfit for one customer, so your total annual production is 52 complete outfits per year. Therefore, those 52 outfits are equal in value to everything that you trade for and consume within the year. But then you get this idea, "What if I could make a device to assist with the sewing, so that I could produce more garments in less time. Then I could sell more garments and make more money, or I could take extra time off to hike in the woods."

Increasing Wealth & Decreasing Costs

Advanced economies increase personal wealth and decrease the cost of basic goods, but the added wealth is spent on new cultural elements that did not exist in more primitive economies. Some new expenses are inevitable, such as higher taxes to maintain social order in a more complex society or the cost of paying for clean water or clean air, which the environment formerly provided for free. But there is still plenty of surplus wealth to spend on new frills like bigger houses, cars, telephones, junk food, or virtual reality entertainment centers, which were not a choice in more primitive economies. The irony is that despite more wealth, people in ad-



vanced economies often feel more impoverished. There is a larger gap between what you have and what you could have, and a larger gap between the rich and the poor. In the most primitive economies nobody has anything anyway, so there is nothing to miss! The most important point to keep in mind may be that in an advanced economy you have more wealth and more choice, and therefore, more control over your own destiny!

So, after completing each day's tailoring work, you tinker with gadgets until at last you have built a simple sewing machine. Soon you are producing three outfits per week, or 156 garments per year, and your customers are still paying what they used to. For awhile you are the richest person in town. You spend a little less time working and more time playing and shopping. But then two things happen to burst your bubble.

First, with the extra garments on the market, not all the outfits are being sold. But it cost you less to produce them anyway, so you lower the price a little bit, knowing that you can still make a fantastic profit. However, the other tailors have meanwhile noticed both your spendthrift ways and your lower prices. In order to stay competitive they also invent sewing machines, so that each tailor is now producing 156 outfits per year. But with so many garments on the market, the value has to fall. In the end you are producing more clothing, but making less profit per unit. That's good news for your customers, who

previously could afford to own only two outfits at a time. Now they can afford three outfits, so consumption increases.

However, even with increased consumption, there are still too many garments on the market. A price war ensues until none of the tailors are making a profit at all. Finally, one of your competitors drops out of the business completely and finds a new line of work. That reduces the number of garments in production, allowing prices to rise somewhat, although never as high as before. Ultimately you are making the same income that you were before inventing the sewing machine, but now you have to produce 156 garments per year instead of 52!

Producing those extra garments isn't any more work than before, just a bit more complicated. You used to sit out on the front porch stitching away all day long, but that isn't an option any more. With the increased throughput you need to stay focused on the sewing machine, operating and maintaining it, plus you need to order more material and make more space for it. If the sewing machine breaks or the wrong kind of material arrives then you've got added stress, because you have to keep production up to make a living.

Despite increasing production and making the same income as before, you are still much better off. Because while you were increasing your production capabilities, so was the butcher, the baker, and the candlestick maker. Each of their industries experienced the same ups and downs as yours so that production increased, prices plummeted, and some of the competitors were forced out-of-business to seek other forms of work. Given the lower prices you are able to buy more meat and bread and candlesticks for your family, so you are ultimately producing more wealth and getting more wealth in return, even while your income is unchanged. You even have a little extra money to donate to a neighbor who is struggling. The accompanying graph illustrates the increasing wealth and decreasing costs in primitive and increasingly advanced economies.

But what about all those workers who were forced out of tailoring, meat processing, baking, and candlestick making? They are not needed in any of the traditional roles, so they ultimately create new niches in the marketplace. One starts a laundry service to help clean all those extra garments, and one becomes a carpenter to build closets to hold the extra clothes. Another invents the oil lamp and sells both the lamps and the oil, so that you can stay up later into the evening, visiting in the parlor or reading a new book-written by someone who coincidentally used to be a candlestick maker.

The community could not have afforded such extravagance before, but now, with increased production and lower prices, everyone has a little extra wealth to spend in new ways. Soon there is a new standard, so that bigger houses, freshly laundered clothes, reading entertainment and oil lamps are no longer extravagances, but "necessities" everyone must work for.

On top of that, with the increased production and consumption, there are new waste problems to deal with as well. As a tailor, you once put any scraps of cloth on your garden for mulch between the rows. But now you produce more waste than you can use, so it has to be hauled away at an extra expense. A service that was once handled for free by the environment is now an expense. Besides, with the cost of produce falling like everything else, it makes more economic sense to sew more garments and trade for your veggies than to grow them yourself, so you let the garden go by the wayside.

Ultimately you are significantly wealthier than before, but you are also working harder too. Nobody said you had to pay for oil lamps and oil or books and freshly laundered clothes, but you would feel deprived if you didn't, so you work a little harder to give your family all the good things that life has to offer. And then one day you get this idea, "What if I could make a better sewing machine, so that I could produce many more garments in less time. Then I could sell more garments and make more money, or I could take extra time off to hike in the woods."

As you may sense from this story of the tailor, the simple act of streamlining production efficiency has unintended consequences that reverberate throughout the economic ecosystem, ultimately changing an opportunity to make more money into a new standard for production and consumption that must be maintained just to stay even with middle-class society. Several points from this story deserve further emphasis, including that increased production 1) forces people out of old jobs to find new niches, but also makes us wealthier, 2) gives us more products and more freedom to choose, but also makes us work more, 3) results in a greater surplus to share with "non-producing" individuals such as government officials, nonprofit organizations, or the poor, 4) suggests that we will witness still more changes in the future, except 5) that increased production also seems to require increased throughput of materials and energy, and therefore causes greater ecological impact.

1) Increased production forces people out of old jobs to find new niches, but also makes us wealthier. At the beginning of the 20th century America was a nation of farmers, with most families producing enough food for their own consumption, plus a small surplus for trade. But industrialization of agriculture has allowed fewer and fewer farmers to produce more and more food. At the dawn of the 21st century only 1% of our population is still employed in farming, producing the food supply for the rest of us. (This figure is somewhat skewed, since millions of other people are still employed processing the food supply, but even the combined total employed in farming and food processing is a mere fraction of what it was in 1900.)

The transition from a nation of farmers to a nation of non-farmers was inherently painful. Evolution of the economic ecosystem led to many new advancements in production efficiency. Old niches in the ecosystem were wiped out and new ones created. Nearly

every decade of the past century brought an exodus of people abandoning the family farms for jobs in the city, to produce completely new goods and services. The death of the family farm was agonizing and demoralizing for every Mom and Pop and their children forced to sell their holdings to start over in this unknown new world. Change is scary in any form, especially when you are not in control of it. But if we had not changed then we would be living in something like a third-world country today.

Consider that in a developing country a farmer's entire assets may amount to ten cows. His annual surplus may consist of only five or six half-grown cows each year. Now, would you really be willing to trade a year of your hard work and effort for a year of his?

In our own country a rancher may raise a thousand cattle and produce an annual surplus of several hundred animals. Every crash in the cattle market from overproduction and under-consumption leads to the tragic death of still more family farms and consolidation into ever larger farms and ranches. Individuals hang on precariously as long as they can, until a drought or some other natural disaster finishes off their operation. But this painful process also means that the remaining ranchers will produce a greater surplus for exchange. Your wages will buy more beef than ever, and the latest ranchers to lose their lands will become employed producing new goods and services. Industrialized farming may mean that 1% of the population has to produce enough food for themselves and the other 99% of the country, but it also means that 99% of the population is working to produce goods and services for farmers!

For example, videos did not exist before the 1970's, but today there are millions of people employed in the business to manufacture, distribute, lease, and sell VCR's, videos, and camcorders, and their next generation kin, the DVD's. What were all these millions of people doing before these technologies were invented? It is hard to say specifically, but many of them would have been farmers if it weren't for farm consolidations. Increasing farm production allowed videos and many other new goods and services to enter the marketplace, giving us all access to small luxuries that our ancestors never had.

2) Increased production gives us more products and more freedom to choose, but also makes us work more. Some people talk about reducing the work week from five days down to four. They look around at the technology that allows us to produce wealth so easily, and it seems as though we are near the point where we will be able to shorten the work week. But the reality is that we have more expenses and more possessions than ever before. We talk about working less, but the truth is that more and more Americans are working longer, taking on second or third jobs just to "survive".

For young adults it is especially difficult, because they want and expect everything they had in their parents house, and they want it now. They are thrilled to get a job and start making payments on a car, a stereo system, and rent for an apartment. Pretty soon they

are spending more money than they earn, yet they have little to show for it except an endless stream of bills. The decision whether to work or not is free choice, but people like all the stuff our culture produces, and they willingly sell their souls to employment to pay for it. It is only after the bill arrives that they feel buyer's-remorse, caught in a trap of forever walking the treadmill of work. Mostly I think that people don't realize they have a choice, since they've never imagined anything else. For example, many people drink soda pop every day of their lives, although our ancestors certainly never had that luxury. The minimally "health conscious" might purchase diet sodas to avoid weight gain. Now, a diet soda is supposed to be a good buy because there is only one calorie per can. However, human beings need about 2,500 calories per day for sustenance. Therefore, at 50¢ per can it would cost \$1,250 per day to live on diet sodas. Clearly there is no economic incentive to buy diet sodas, but people buy items like that every day and wonder why their broke!

One of the problems with increased production efficiency is that a smaller and smaller segment of the population is left providing for all the basic survival needs of the culture, such as food, water, clothing and shelter. When we indulge in a night of video rentals and soda pop we are in effect agreeing to work harder to provide for the people employed providing those goods and services. They are no longer providing their own food, water, clothing, and shelter, but we agree to do it for them in exchange for the luxury of a movie theater in our homes. The exciting thing is that there is no law that says we have to spend our hard-earned money that way. Each of us is completely in control over our decisions to spend or not to spend, to work or not to work. As you will see later in the book, there are many opportunities in life that you may have never considered.

3) Increased production results in a greater surplus to share with "non-producing" individuals such as government officials, nonprofit organizations, or the poor.

Video rentals or soda pop are hardly essential goods and services, but increased production results in an income surplus to spend, so we do, thereby providing people in those occupations with all that they need. Similarly, think about how many people work for the city, county, state, or federal government. Each government employee may provide a valuable service to the public, but the rest of us have to work to cover their basic needs. Still, we are all a little richer with increases in production efficiency, so we can afford to pay higher taxes, some of which will be transferred to the poor, and we can afford to donate to environmental or social causes.

Greater production efficiency means there is more wealth to spread around, but it also means there is more demand for a share of the handouts. With every increase in efficiency there is a greater potential for some individuals to make much more income than other individuals, as opposed to more primitive economies where nobody has anything anyway. Giving money to the poor helps to close the gap a little bit, so that the poor are wealthy compared to our ancestors, even though they may be poor compared to

mainstream society. Already we channel about 40% of our tax dollars directly from those who have money to those who do not, through programs like welfare, social security or medicaid. Individuals make additional contributions to social and environmental causes every day.

Nonprofit groups are gradually learning to capitalize on the available and abundant surplus to support their programs in big ways. For example, some non-profits have linked up with credit card companies to receive a small percentage of all sales when people use their card, or they have linked up with stores on the internet to get a percentage of sales for all the customers who pass through their gateway. With dramatic new increases in production efficiency just around the corner, we may soon see nonprofit social and environmental organizations with multi-billion dollar budgets. Unfortunately, all that money won't be enough to close the growing gap between the have's and the have-not's.

4) Increased production suggests that we will witness still more changes in the future. As we move into the 21st century we are transitioning from an industrial economy where people use machines to produce material wealth to an automated economy where computers use machines to produce material wealth. Many people would say that the booming economy and soaring stock market which started in the 1990's was the result of free-trade and the subsequent corporate exploitation of low-cost labor in China and other parts of the world. While free-trade is certainly a contributing factor, I suspect that the primary cause of the economic surge is due to increased automation.

A large portion of our trade with China and other countries with low-paid workers involves trinkets for kids meals at fast food joints and other disposable toys. Most of these items are in the garbage can within a few days of purchase. That kind of trade does not increase our wealth, but only decreases it. The main cause of the economic surge is likely from increased production due to newer and better computers.

Computers were in use before 1990, but they were expensive and didn't do very much. New computers and computer networking, especially the internet, has led to many increases in production. An obvious example is Amazon, which offers customers many more books in one store. Customers do the work of placing orders via their own computers, while Amazon's computers do the work of automatically monitoring inventory, ordering books, paying bills and routing the customer orders to the right bins in the right warehouse. Amazon sells more books with less labor, so they are able to offer discount prices on many books that you would not get through traditional booksellers.

What we will see in the coming decades is increased automation in every sector of the economy. Already there are printing services that can keep an author's books in storage on a computer and print only as many copies as are ordered. If only one copy is sold today, then only one copy is printed. Soon we may see businesses like Amazon where paper and ink is delivered and put in place, but otherwise computers do everything from taking the order to printing, packing, and dropping it in a bin for the post office. There will

also be many more electronic books where computers handle every part of the transaction without human involvement. What will these kind of technologies mean for the world we live in?

Just imagine if you were a tailor and you had a computerized factory where customers picked the styles they wanted via the internet, then typed in their measurements. Computers would custom cut, sew, pack, and mail every garment without human hands. Computers would handle all the billing and ordering-maybe even the returns. There would be work to maintain the equipment and put the rolls of fabric in place, but even those jobs have the potential for automation. Instead of hand-stitching 52 complete outfits in a year, you might push the "on" button and stitch 52,000 in a day. We are already millionaires compared to our ancestors, but in the decades to come we will be millionaires again, compared to where we are now. But can this cycle keep going forever? When do we have enough?

If trends continued into the future as they have in the past, then we would expect middle class families to own at least "one space shuttle per family" in future decades. With production costs falling and wealth therefore rising, it would be the affordable family sedan-even if it still cost 1,000 times the price of a car.

Many individuals are finally saying "enough" and deciding that it would be better to slow down productivity a little bit, for example, by sending more farmers back to the land to tend small, organically grown plots. People are also realizing that they have the freedom to do something besides work and spend, so they are making new choices.

Yet the vast majority is still enamored with increasing wealth and disposable life-styles. For example, with a booming economy more middle class Americans are buying gas-guzzling SUV's and even motor boats, which once belonged only to the "rich". But is this endless pursuit of growth and material goods sustainable?

5) Increased production also seems to require increased throughput of materials and energy, and therefore causes greater ecological impact. There are advantages and disadvantages to every type of economy, simple or advanced. The hunter-gatherer economy is the most simple economic structure. It doesn't produce much material wealth, but it doesn't require much work from the people either. The land provides food, water, and fuel free for the taking, so there isn't that much work to do, and waste management is as simple as moving to a new site when the old one is a mess. As long as the population remains within the carrying capacity of the land, then the system is completely sustainable.

An agrarian economy is a slightly more advanced economic system. It provides more food from the same land base to support a larger population. Production and

specialization of labor increases, and those who are not needed for farming are available to provide new goods and services that were not practical in a hunter-gatherer economy. Some new goods and services are required, such as mining for iron and forging it into plowing implements, while others are new luxuries, such as larger musical instruments that hunter-gatherer peoples could not possibly carry with them. Overall, the agrarian economy increases wealth, but leads to new problems.

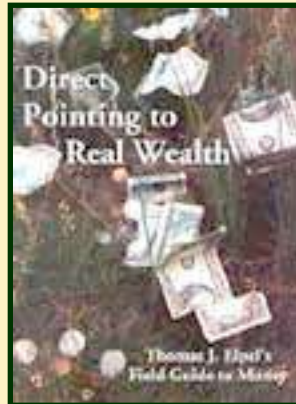
One problem is that increased production requires additional inputs of resources and energy and leads to more waste and pollution. The level of environmental disturbance is much greater than in a hunter-gatherer economy, and some of the goods and services that were formerly provided for free from the environment now require human labor to provide. For example, tilling the land to plant a crop displaces the wild foods that were formerly free for the taking. Surface water that was formerly drinkable may become polluted from people and animal waste, necessitating a well. Wastes that were formerly recycled where they lay now have to be hauled away.

An industrial economy leads to similar increases in production and personal wealth, but also requires a much greater throughput of resources and energy. Like the agrarian economy, the industrial economy requires more resources and higher-quality resources, such as more refined metals. The level of environmental disturbance increases greatly, and society has to take on additional roles that were once provided for free by nature. For example, an agrarian economy may disturb some land in logging and mining, but given enough time the environment recovers on its own. An industrial economy, however, disturbs so much land that reclamation work and tree planting is required, adding more work for people. Waste management, which was once a matter of dumping garbage in the nearest ravine, takes on new complications when dealing with toxic compounds that leach back into the food and water supply. Contaminated ground and surface waters require sophisticated treatment systems to clean the water both before and after use.

Given that advanced economies require so much throughput, it may seem that creating a sustainable modern economy is simply impossible, that the fate of the planet is sealed. However, there is more to it than that. In order to get a fresh perspective on how to make the world a better place, we must first come to terms with the industrial economy, that it is here to stay and it will continue to grow and consume. As strange as it seems it is possible to support an industrial economy without consuming the entire planet, as is laid out in the subsequent chapters.

In conclusion, there is no doubt that we are wealthier today than ever before. Life is relatively easy in the sense that we do not have to work very hard for anything. We only work harder because we are working for more than we ever did before-and that is a choice we have control over. The exciting part is that advanced economies provide more opportunities to choose how we spend our time and money, though few people realize it. In a hunter-gatherer society you have little choice to be anything but a hunter-gatherer. In more advanced, complex economies you have the freedom to choose what kind of work

you want to do and even how much work you want to do. As you will see, it is even possible to have a prosperous life-style without damaging the world we love!



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Thomas J. Elpel's -Best Picks-

The Most Important Books & Ideas For the New Millenium

If you could only learn about a handful of ideas in your lifetime what would they be? Through the pages that follow I have out-lined my favorite picks. This small handful of books, organizations, ideas, and people are the resources I consider essential to understanding the past, the present and the future of our world. These are people and ideas that are truly making the world a better place for all. Obviously these resources have been highly influential to my own thinking, living, and writing. When you read about these ideas you will easily recognize them as the roots behind my own book **[Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money.](#)**

Most environmental literature in circulation today promotes the idea that all human impact is bad, that we can never be a good influence on the world. The best we can hope for is to reduce our impacts to a point where the earth can absorb and sustain our presence. The reader is left with the impression that the only real way to make the world a better place is to get rid of people. Right or wrong, it is not a very useful perspective.

Since early in high-school I have sought out the best ideas I could find about how we could live and prosper in harmony with the earth. I was consistently amazed to discover that there were already workable ideas for virtually all of our known problems, but just a lack of awareness about those ideas. However, not all of the books and ideas that follow are tools, some are educational only, to give a better understanding of the world we live in... always an essential step towards making positive change.

The ideas are NOT listed in order from most to least important. Rather it is an intuitive order of ideas that build one upon the other. You are encouraged to read them in sequence. I will later add a few more pages to this series. **The books suggested in these pages are available through Amazon.com.**

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Page 2: [The Natural Way of Farming: Masanobu Fukuoka](#)

Page 3: [Holistic Resource Management: Allan Savory](#)

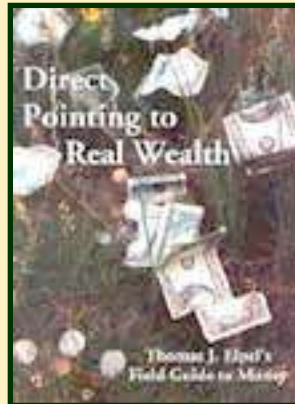
Page 4: [Rocky Mountain Institute: Amory and Hunter Lovins](#)

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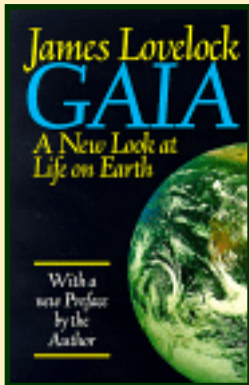
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The Gaia Theory: James Lovelock & Lynn Margulis

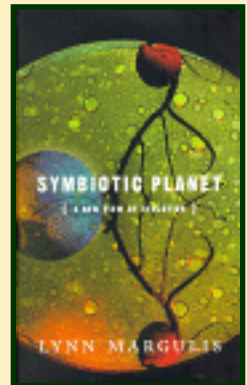
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As far as science can determine, life started on earth a minimum of 3.6 billion years ago. The fact that life started at all on this planet is certainly a miracle, yet it is equally miraculous that life has continued to survive. The sun has increased its heat output by 25% in the natural course of its own life-span, yet the temperature on earth has remained comparatively constant. Without the presence of life on earth, the oceans should have either frozen or boiled by now, or the water molecules should have broken apart and the lightweight hydrogen atoms escaped into space, taking with them any possibility of water on this planet. Even without freezing or boiling, the oceans should have become too salty to support life by now, given the amount of salts that wash off the continents each year.

It appears that life on earth is somehow cooperating to modify and maintain the biosphere in a condition that is favorable for life, almost as if the earth itself were alive. Of course the earth is not alive, and the effect is completely spontaneous—the result of billions of individual plants and animals simply attending to their living needs, yet collectively creating something so much greater.



In the late 1960's two British scientists, James Lovelock and Lynn Margulis, put forth the Gaia Theory to propose that separate organisms could unconsciously modify the environment in a way that is favorable for life.

The principle of the Gaia theory is simple. Life has modified and been modified by the biosphere, a process called coevolution. The organisms that survive and thrive on the planet are those that help maintain the biosphere in a way that is favorable for life.



An easy way to understand this concept is through an analogy that Lovelock calls "Daisy World". A hypothetical planet is colonized by black and white daisies. The black daisies absorb light as heat and warm the planet, while the white daisies reflect light and keep the planet cool. Too many black daisies cause the planet to overheat, making the world uncomfortable for them, but better for the white daisies. Too many white daisies cause the world to become too cold, thus favoring the black daisies that can absorb heat.

The real biosphere is much more complex, with billions of independent life forms functioning as a spontaneous check-and-balance system to maintain the

biosphere in a way that is comfortable for life as a whole. Plants, for instance, have pumped carbon dioxide out of the atmosphere and buried the carbon in the form of calcium carbonate (limestone) on the ocean floors and in fossil fuels. This has reduced the greenhouse effect and kept the planet cool, even while the sun has become warmer. Likewise, moisture over the ocean forms around sulfur particles outgassed by marine algae, thus bringing much-needed sulfur to the land organisms while also controlling the amount of cloud cover over the planet.

Bacterial colonies along the sea shores coat salt crystals with a sort of varnish that inhibits the salt from dissolving back into the water. This helps to remove salt from the oceans, while the combined weight of the salt and limestone deposits on the continental shelves may even be responsible for triggering plate tectonics-the movement of the continents across the globe. There is no detectable entity managing the globe, but each of the independent life forms on earth seems to contribute to the stability and success of the whole.

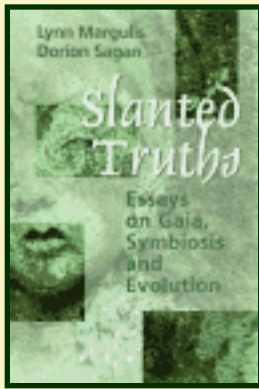
Like the natural ecosystem, our economic ecosystem is diverse, highly complex, but still spontaneously organized. Without any one person or committee in charge you might expect that there would be resource shortages every day, yet our stores are virtually always filled with the items we want.

The economic ecosystem is an artificial entity that we have created, and yet it almost has a life of it's own. Each of us affects and is affected by this ecosystem. Our simplest decisions and purchases cause subtle changes in the economy. The economy likewise affects our decisions, bringing us certain goods and services at certain prices, all of which are variable based on the current economic "climate". We created this economy, yet no one is in control of it, and like a living entity without dimension, no one knows exactly how to control it! The economic ecosystem is the result of millions of individuals each making decisions which they perceive will bring the greatest personal benefit.

The above text was adapted from **[Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money](#)**

Books related to the Gaia Theory

Gaia : A New Look at Life on Earth by James E. Lovelock
[Order from Amazon.com](#)



The Ages of Gaia: A Biography of Our Living Earth by James E. Lovelock

[Order from Amazon.com](http://www.amazon.com)

Slanted Truths: Essays on Gaia, Symbiosis, and Evolution by Lynn Margulis

[Order from Amazon.com](http://www.amazon.com)

Symbiotic Planet : A New Look at Evolution by Lynn Margulis

October 1998. Hardcover.

[Order from Amazon.com](http://www.amazon.com)

Microcosmos: Four Billion Years of Evolution from Our Microbial Ancestors by Lynn Margulis and Dorion Sagan

Reprinted May 1997.

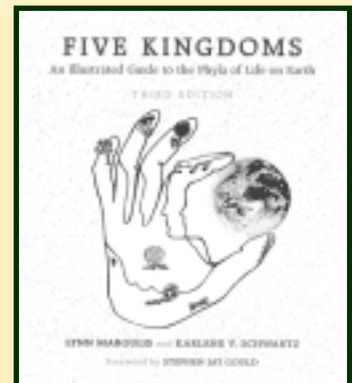
[Order from Amazon.com](http://www.amazon.com)

Five Kingdoms: An Illustrated Guide to the Phyla of Life on Earth

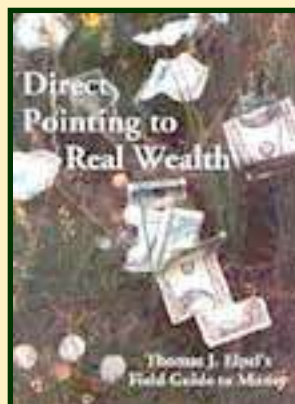
by Lynn Margulis, Stephen Jay Gould, Karlene V. Schwartz, Alexander R. Margulis

3rd Edition. January 1998.

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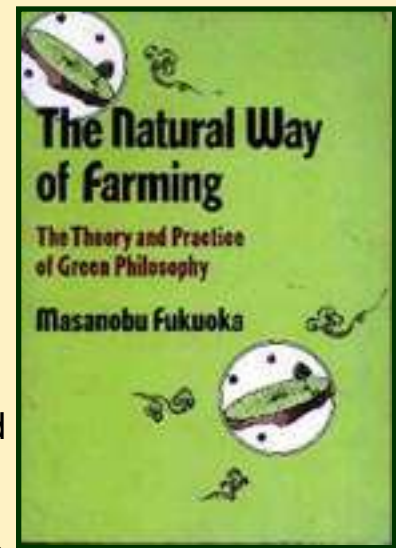
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The Natural Way of Farming: Masanobu Fukuoka

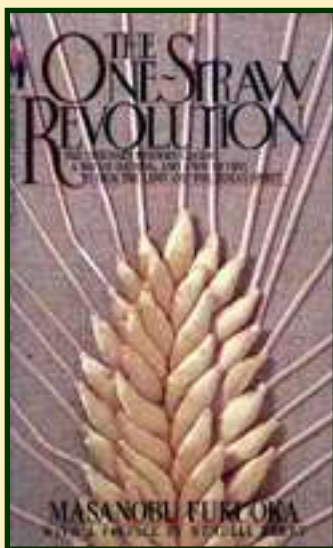
In Japan there is a farmer by the name of Masanobu Fukuoka who practices what he calls the "no-plowing, no-fertilizing, no-weeding, no-pesticides, do-nothing method of natural farming". To him the idea that people can grow crops is ego-centric. Ultimately it is nature that grows crops. He sees modern agriculture as doing-this and doing-that to grow crops, but it is meaningless work. With his do-nothing method he is able to get yields in his rice fields that are equal to the highest yields attained with chemical, do-something agriculture.



What he does do, at least by my translation, is manipulate habitat to favor the crops he wants to grow. He works within the laws of ecology to tilt the ecosystem in favor of the plants he wants. Then his crops virtually invade and grow like weeds.

Fukuoka was born in 1914 and schooled in the Western sciences of microbiology and plant pathology. He worked as an agricultural customs inspector in Japan until he became gravely ill at the age of twenty-five. After his sickness he was "reborn", realizing that "human knowledge was meaningless".

Western readers may be challenged by the "no method" thought riddles Fukuoka uses throughout his books, but there are real gems of Eastern wisdom there that apply to much more than just farming. Fukuoka's do-nothing approach was one of the most significant influences on my book **[Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money](#)**



Books related to "Do-Nothing" Farming

Unfortunately all of these books are currently out of print, but Amazon will search for used copies.

The Natural Way of Farming by Masanobu Fukuoka
280 pages. 1985.
[Order from Amazon.com](#)

The One-Straw Revolution by Masanobu Fukuoka
155 pages. Bantam Edition. March 1985.
[Order from Amazon.com](#)

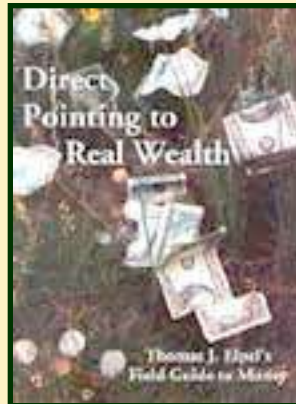
The Road Back to Nature: Regaining the Paradise Lost by Masanobu Fukuoka, Frederic P. Metreud

[Order from Amazon.com](#)

Links related to Masanobu Fukuoka's work

[The Fukuoka Farming Website](#)

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Holistic Management: Allan Savory

There is a common assumption that cows have a negative impact on rangeland. Cows eat the grass, and the only way for the plants to recover is to take away the animals. Some environmentally concerned people even want to remove all livestock from public lands. But the reality, as Allan Savory discovered, is that hooved animals play a critical role in the health of arid rangeland ecology. There is a magical relationship between the soil and the hooves of grazing animals. In seasonal rainfall environments the land rapidly turns to deserts without animal impact.

Historically western rangelands were grazed and maintained by massive herds of buffalo. The important part was not the buffalo, but the sequence of grazing. Predators forced the buffalo to stay clustered in tight herds for safety. Some herds were so massive that observers described them as miles wide and hours or even days long in passing. They destroyed everything in their path, trampling all the grasses, all the sage--every bit of organic matter--right into the soil. Their hooves and urine killed the moss while desirable plant seeds were pounded into the soil to germinate. Old or dead vegetation was trampled into the ground where soil microbes could break it down. The organic litter helped retain moisture for plant growth. Gradually the debris rotted and returned the nutrients to the soil. The roaming bison left the prairie to recover without further interference, allowing for lush and unrestrained growth.



Putting fences across the land and stocking it with cattle creates a new sequence of grazing, which logically has a different effect on the land. Without predators the cattle spread out and graze over wide areas--they no longer trample down standing dead grasses from previous years. This old material blocks sunlight, killing the new growth below. Old vegetation stands for years, slowly decomposing through oxidation and weathering. Valuable nutrients are locked up in the old growth--unavailable for living plants. With fences to keep the cattle contained, the young plants are eaten repeatedly as grazing animals return without allowing the vegetation to recover. Burning the range can accelerate desertification, stealing vital organic matter from the soil and putting it into the atmosphere to contribute to global warming.

Loss of organic matter also results in lack of soil structure, breaking down the granules or clumps of aggregated soil particles that allow air circulation and penetration of water and roots. Raindrops strike the exposed ground, pulverizing and separating the soil, just like you might find under the drip line of a house. The fine particles of silt, sand and clay dry to form a hard surface crust. Seeds cannot grow through the capped surface, and bare patches develop between the plants. Weeds, brush and grasshoppers thrive in the open patches. New moisture is lost as runoff and may cause floods. Water bypasses the water table and old springs can dry up. Freezing and thawing, plus wetting and drying can also

cause the top inch of the soil to become so porous and fluffy that seeds dry out before they germinate.

People assume that removing the livestock would allow the land to recover, but in reality, the complete removal of livestock accelerates the process of desertification. We are losing the land right out from underneath our feet, yet few people have even noticed. For more details please read my on-line article [The American Sahara](#). Allan Savory discovered, or possibly re-discovered, the important link between hooves and the soil. In his book, *Holistic Resource Management*, he outlines the ways we can use livestock to restore the health of the land. Savory also puts forth a holistic system for making sound land management decisions, which could literally change the world... if more people knew about it.



Allan Savory's work has been highly influential to my own writing. I bought the first edition of *Holistic Resource Management* as soon as it came out in 1988. I read it many times over. The new edition, called *Holistic Management: A New Framework for Decision Making* is even better.

Many of Savory's ideas were strongly influential towards my book, [Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money](#).

Holistic Management Resources available through HOPS

Holistic Management : A New Framework
for Decision-Making, 2nd Edition \$30.00 Quantity:

Allan Savory's video ***Creating A Sustainable Civilization*** is an excellent way to introduce people to the concept of Holistic thought and management, without overloading them with details. Every person I have shown this video to was thoroughly stunned by the presentation and message.

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. For our European customers we may be able to special order PAL format. Please send

an e-mail to us through our [E-mail Contact Page](#) to inquire.

Creating A Sustainable Civilization Video \$25.00 Quantity:

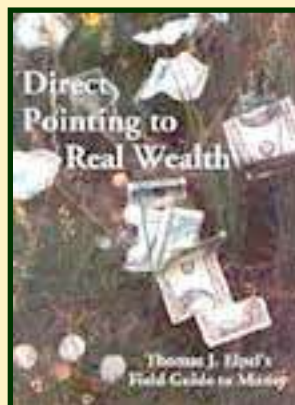
Holistic Management book + Sustainable
Civilization video (Save \$5.00) \$50.00 Quantity:

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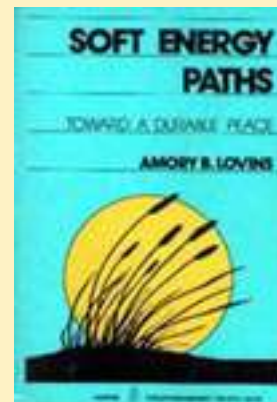
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Rocky Mountain Institute: Amory & Hunter Lovins

Amory Lovins was once described as the "top five" of the top ten energy experts in the world. In the mid 1970's other experts projected sky-rocketing energy demand in the decades to come. We would have had to build power plants at an exponential rate to meet projected demand. Amory Lovins called that the "hard path". He proposed an alternative, "soft path" using energy-efficient technologies to meet future demand.

Lovins invented the concept of "negawatts", so that utilities and governments could compare the cost of conservation measures against the cost of increasing power production. Negawatts represent power saved from one application that is made available to another application. For example, a compact fluorescent light bulb uses about a fourth as much energy as a standard incandescent bulb to put out a similar amount of light. Replacing one 100 watt bulb with one 25 watt compact fluorescent therefore "generates" 75 negawatts of saved energy to use somewhere else. Through Rocky Mountain Institute (RMI), Amory and Hunter Lovins provide information to utilities and governments, then they let market forces do the rest.



Time has proved Amory more than right. Energy production grew very little over a twenty year period because conservation measures allowed the existing energy supply to meet the needs of many more people and businesses. Amory and Hunter's ideas have changed the way power companies around the world do business. Between them they have saved enough energy to power a modest-sized country.

Their institute has grown in size and scope, so they now deal in many issues of sustainable living. The concept of negawatts evolved into "negagallons" to give city utilities a new way of evaluating water supply and demand. For example, they demonstrated that it was more economical for one Colorado city to retrofit homes with water efficient toilets, showerheads, and other conservation measures, than to build a new dam.



Another RMI project is to reinvent the automobile. The big auto-makers say it is impossible to increase the energy-efficiency of cars much beyond the current level, but that is only true in context of the materials and designs currently in use. It is very possible to build high mileage cars (150-300 mpg) that are cost effective and durable--but first you have to throw out all existing automotive technology and start from scratch.

Rocky Mountain Institute proposed building ultra-light gas-electric hybrid cars using high-tech composite materials. A small gas engine would generate electricity as needed, but otherwise the car would run on batteries. Braking would generate electricity to help recharge the batteries. These cars would be more efficient than the so-called "zero emissions" cars now being built. Zero-emissions cars are not that efficient, they just displace the pollution to the power plant that

generates the electricity. Ultra-lights, on the other hand, have a much greater total efficiency.

Hydrogen fuel cells will be easy to adapt to ultra-lights too. Fuel cells would not work well in conventional automobiles because they would have to be too big to generate enough power. But much smaller fuel cells can be incorporated into the light-weight cars, negating the need for gasoline engines.

RMI stimulated a few pioneer companies to begin developing ultra-light technologies. Then they told other auto-makers they should start developing the technologies too, or risk being left behind by their competitors. The result is that nearly two dozen corporations are racing to put the first ultra-lights on the market. Toyota is especially aggressive in the ultra-light market. They are selling preliminary models in Japan at half the cost of production--presumably to accumulate experience quickly. The idea of negawatts and negagallons rings similar to Masanobu Fukuoka's concept of "do-nothing farming" described on an earlier page, and RMI tilts market forces similar to the way that Fukuoka tilts succession in favor of his crops. Like Fukuoka, RMI has been a significant influence on my thinking and on [**Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money**](#). Natural Capitalism is by far the best and most up-to-date of these books. Be sure to visit [Rocky Mountain Institute](#) on the web.

Books by Amory & Hunter Lovins

Natural Capitalism: Creating the Next Industrial Revolution by Amory B. Lovins
Hardcover. 1999.
[Order from Amazon.com](#)

Reinventing Electric Utilities: Competition, Citizen Action, and Clean Power by Ed Smeloff, Peter Asmus, Amory Lovins
Paperback. November 1996.
[Order from Amazon.com](#)

Soft Energy Paths : Towards a Durable Peace: by Amory B. Lovins
-Out of Print- (Amazon will search for used copies.)
[Order from Amazon.com](#)

Least-Cost Energy : Solving the C02 Problem by Amory B. Lovins
-Out of Print- (Amazon will search for used copies.)
[Order from Amazon.com](#)

Energy/War, Breaking the Nuclear Link by Amory B. Lovins

Hardcover. January 1981.

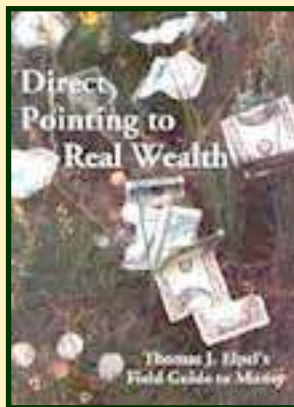
[Order from Amazon.com](#)

Is nuclear power necessary? by Amory B. Lovins

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Cultural Evolution

The idea that cultures evolve and change is so obvious that few people have paid any attention to it, but in order to understand where we have been and where we are going, it is essential to be conscious of how change occurs.

The existing literature on cultural evolution is hardly earth-shattering, but still significant. In his book, *Man's Rise to Civilization*, Author Peter Farb provides the most comprehensive account of the way that economic and technological factors influence the development of cultures. The book was first published in 1968, and I would say it was way ahead of it's time.

Author Marvin Harris also covers cultural evolution in his book, *The Sacred Cow and the Abominable Pig*, but only in relation to our food habits. Consider the diverse culinary practices around the world. Many people eat rats and cockroaches while most Americans nearly retch at the thought. Similarly Americans disdain the thought of eating dogs, cats, or horses. Hindu people think we are basically cannibals to eat beef, and the Moslems think we sin terribly when we eat pork.

Most of us in America may dislike the idea of eating horses, but according to Harris, horse meat has gone through many surges of popularity and unpopularity, both in America and Europe, according to economic trends. Horse meat becomes popular when other meats are more expensive, and becomes unpopular when the cost of other types of meat are more economical.

Similarly, while the Hindu people now abhor the idea of eating cows, that has not always been the case. The Indian people regularly consumed beef up until a few centuries BC at which time the rising population created more and more need for cropland, since crops can produce more calories and protein per acre than livestock. Stock needed to be kept for plowing fields, producing milk and producing dung for fuel. Over the centuries beef consumption dropped until only the wealthy priests consumed it. The disparity between rich and poor created an opportunity for the ethic of cow protection among the peasant masses. Hinduism became the dominate religion of the area because it reflected the economic reality of the area.

Harris suggests that we in America think mice, rats, and cockroaches are filthy not because of their habits, but rather because they are not economical sources of food in our culture. We could get protein by skinning and butchering mice, or by catching cockroaches, but it is not economical use of our effort, compared to our other choices. Therefore, argues Harris, we scorn the uneconomical choices as being bad or filthy, even while people of some countries consider the same foods as delicacies.

Of the two books listed above, I consider Peter Farb's as the more important one, but Marvin Harris' book is an interesting read too. Both have been moderately influential to

my thinking and my work on [Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money](#).

Books related to Cultural Evolution

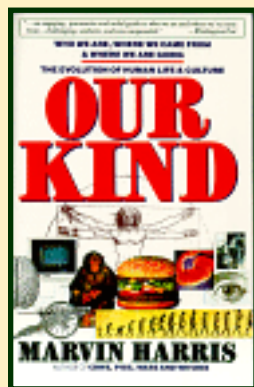
Man's Rise to Civilization by Peter Farb
-Out of Print- (Amazon will search for used copies.)
[Order from Amazon.com](#)

Cannibals and Kings: The Origins of Cultures by Marvin Harris
Paperback. Reprinted June 1991.
[Order from Amazon.com](#)



Good to Eat: Riddles of Food and Culture by Marvin Harris
Reprinted July 1998.
[Order from Amazon.com](#)

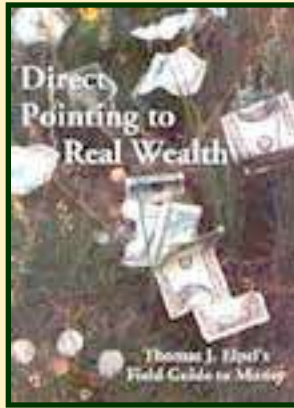
Theories of Culture by Marvin Harris
November 1998.
[Order from Amazon.com](#)



Cows, Pigs, Wars & Witches : The Riddles of Culture
by Marvin Harris
Paperback Edition December 1998.
[Order from Amazon.com](#)

Our Kind : Who We Are, Where We Came From, and Where We Are Going by Marvin Harris
Paperback. 560 pages. September 1990.
[Order from Amazon.com](#)

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Bionomics: Michael Rothschild

We say we are in the midst of the Information Age, but according to Rothschild in *Bionomics: The Economy as an Ecosystem*, every age is an information age. Information is the very fiber of both cultural and biological evolution. DNA is a biological means of encoding information, consisting of a unique set of assembly and operations instructions for each and every life form on earth. In the economic ecosystem, our products are our information. Every product is built of information we have gathered.



The evolution of human culture and technology has followed a cycle of development remarkably similar to the story of biological evolution. Change came very slowly at first. Our earliest ancestors began by using crude stone, bone, and wooden tools. This body of knowledge was copied by example from one generation to the next for thousands of years, before mutating into any new ideas.

But each new idea that came eventually led to another. The advent of human knowledge was like a snowball rolling in slow motion, gaining size and increasing speed over many thousands of years. Homo Sapiens first appeared about 200,000 years ago and spent most of the time since just developing basic technologies. About 35,000 years ago our ancestors started engraving information onto bones. This developed into a full-fledged written language in Sumeria just 5,000 years ago.

Our species was already replicating it's wisdom from one generation to the next, but the advent of writing made this copying more effective. It was still slow, because each piece of work had to be copied by hand. For example, a scribe might only be able to make one or two copies of the Bible in a year. It was the invention of the printing press that really put technological evolution into high gear.

The printing press allowed the cross-fertilization of ideas. For the first time in history, millions of books were put into print and distributed. Like the advent of bisexual reproduction in living organisms, the cross-fertilization of ideas led to an explosion of new knowledge. The industrial revolution was the result.

Today the innovation of the computer and the internet has led to a new cross-fertilization of technological ideas, as we communicate instantly all over the globe. The ability to collaborate with nearly everyone at once is continually leading to the symbiosis of ideas into diverse new products, transforming the world almost before our eyes.

Biological life forms mate to exchange and combine genetic information. This sharing of information leads to newer, more effective ideas for surviving into future generations. Knowledge is likewise exchanged in the economic ecosystem, leading to new and generally better products. Companies actively seek out new genetic material to keep their products evolving ahead of everyone else. The company that can put useful information

on the market with the least expenditure of energy is the company that survives the fiscal year to put forth a progeny of new ideas in future generations of products.

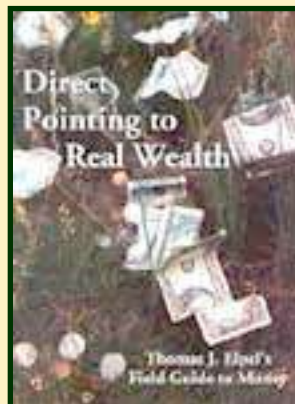
Michael Rothschild was probably the first widely published author to use the analogy of the economy as an ecosystem. There are some significant similarities between his book and **Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money**, but also many differences. One key difference is that Rothschild describes the economic ecosystem, but doesn't detail the specific tools that are available to "tilt succession" (market forces) in favor of a better world.

The analogy that the economy functions similar to an ecosystem may be one of the most important paradigms of the 21st century. We live in a rapidly evolving culture and a fast changing economy. To keep up in the new world almost requires a keen understanding of evolutionary theory and biology. Business and politics will never be the same once these ideas integrate into the mainstream.

Books about the Economic Ecosystem

Bionomics: Economy As Ecosystem by Michael L. Rothschild
Paperback Edition. April 1995.
[Order from Amazon.com](http://www.amazon.com)

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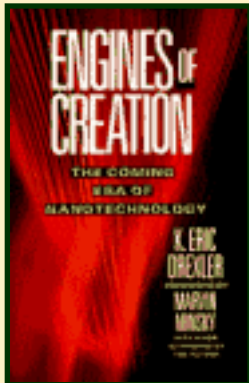
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The Engines of Creation: Eric Drexler

Molecular-sized robots, or nanotechnology, sounds like the stuff of science fiction, but with our technological capabilities doubling at a frantic rate, they may be part of our reality much sooner than we expect. Just how soon will molecular robots come into being, and what effect will the technology have our society?



In his book, *The Engines of Creation*, author Eric Drexler takes us through the fields of medicine, biology, and physics to detail each of the technological hurdles we must cross before nanotechnology becomes a reality. He makes a convincing argument that the younger people in this world will see nanotechnology in their life-times.

With the advent of nanotechnology we will be able to program these microscopic machines to build--atom by atom--virtually anything that doesn't violate the laws of physics. For instance, we would be able to build ultra strong and light-weight rocketships out of pure diamond--basically by shaking up the raw ingredients in an over-sized test tube. Molecular robots inside would grab the atoms they need out of solution and put them where programmed.

Equally important to the ability to build anything is the ability to disassemble or recycle everything that we do build. General disassemblers would do just that, separating any kind of garbage into its constituent atoms.

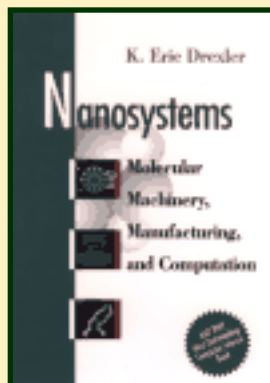
Obviously there is a certain risk to working with microscopic machines that are so small that it would be virtually impossible to find one if you dropped it. What would happen if disassemblers got loose and started disassembling the planet and everything on it? Eric Drexler even out-lines a plausible safe-guard against these kind of disasters.

The amazing thing about Drexler's book is that it was written "way back" in 1986, yet is still right on the mark. We have already crossed many of the technological hurdles Drexler out-lined, and at a pace faster than even he expected. For example, one of the pre-requisite technologies he described was an inter-connected world-wide information system with "hyper-links" for navigation. Although it is hard to believe now, the internet did not functionally exist back when he wrote the book. We have made similar advancements in the fields of medicine, biology, and physics.



The *Engines of Creation* was a critical missing link I needed to finish **[Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money](#)**. The important part is not so much where technology will take us on this journey, but the process of change along the way.

Books about Nanotechnology



The Engines of Creation by K. Eric Drexler

Paperback. Reprinted October 1987.

[Order from Amazon.com](#)

Or read the book on-line at the [Foresight Institute](#).

Nanosystems : Molecular Machinery, Manufacturing, and Computation by K. Eric Drexler

Paperback. 576 pages. September 1992.

[Order from Amazon.com](#)

Nano: The Emerging Science of Nanotechnology by Edward Regis

Paperback. July 1996.

[Order from Amazon.com](#)

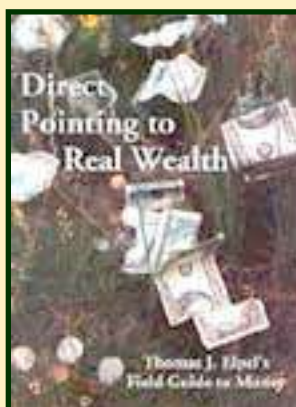
Nanotechnology : Molecular Speculations on Global Abundance by BC Crandall

Paperback. August 1996.

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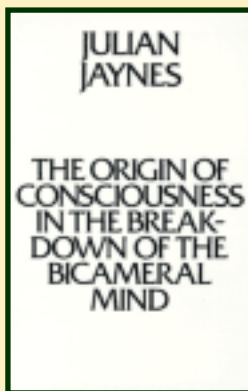
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The Cultural Evolution of Consciousness



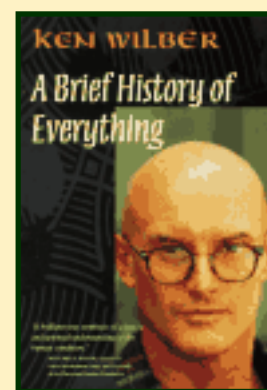
We all use our brains to think, but few people seriously take the time to think about thinking. Why are we conscious? Why do we think? The common assumption is that we think solely because we have big brains. It is assumed that our ancestors gradually evolved bigger brains, and consciousness came with the gray matter. But this exclusively biological theory for the origin of consciousness simply doesn't fit the archaeological record.

For instance, pottery was apparently discovered when one of our ancestors either intentionally or accidentally burned a clay-coated basket in a fire. For generations afterwards our ancestors made baskets, coated them inside with clay, and incinerated them to make pottery. Eventually they made pottery without the basket molds, but for many more generations they still scratched lines on the pots to produce the basket-like appearance.

Now I know that people from our own time would immediately forget the basket part and focus careful research on the properties of the clay. We would use logic and scientific methodology to quickly gain mastery of this new resource. Our ancestors had virtually the same brains as we do today, yet took generations to make simple leaps of thought. If they used their heads the same way that we do then they would have built computers and rocketships tens of thousands of years ago.

I am not suggesting that our ancestors were dumb. On the contrary, after practicing and teaching primitive survival skills for fifteen years, I am convinced that our ancestors had to learn far more than people do today to survive in the world. The difference is that in primitive societies children learned those skills by mimicking others, and through accumulated experience. From generation to generation they passed down vast encyclopedias of information about the world, but it was knowledge acquired without conscious thought, by copying it, the same way that babies learn to talk. We don't send them to school for that. They just listen, observe and copy. Dr. Julian Jaynes of Princeton University was probably one of the first people to theorize that consciousness is cultural, and not just biological. In his book, *The Origin of Consciousness in the Breakdown of the Bicameral Mind*, Jaynes makes the startling assertion that the first glimmerings of consciousness and introspection came only about 3,000 years ago--after our ancestors had developed languages, farming, and even after they had built cities.

The reason for the conscious awakening was simple: the mimicked behaviors and the accumulated experiences of the past were inadequate to deal with new and unfamiliar problems that arose from increasingly complicated societies. The evolution of our culture forced our ancestors to find new coping strategies for dealing with problems: they had to think and imagine new



possibilities.

As outrageous as the concept may sound at first, Julian Jaynes provides nearly 500 pages of meticulous evidence to support his hypothesis. He walks the reader through many ancient texts and artifacts pointing out details that point to a gradual awakening of the human mind.

Author Ken Wilber also covers the cultural evolution of consciousness in his book, *A Brief History of Everything*. Children today develop through many well-documented mental stages on the way to maturity, for example, from *magical* thinking to *mythical* and ultimately *objective* thinking, and for some, *holistic* thought. Among other provocative ideas, Wilber suggests that cultures evolved consciousness following a similar path that children mature through. His writing is difficult to read sometimes, but worth the effort.

Wilber especially talks of world-views and how they change as people and cultures mature. World-views are not philosophies, so much as patterns of thought. For example, a *magical* world-view was common through many stone-age cultures, like the Jivaro head-hunters of South America who brought home the heads of their enemies, skinned them, and through an elaborate process shrunk them to the size of a fist. They danced around the heads to get the magic out, after which the trophies were "powerless" and discarded with yesterdays news.

Magical thinking can be highly successful within the context of the appropriate culture. However, it is useless in a culture with a different world-view. This was demonstrated by a Brazilian man I read about in the paper who found a glowing piece of metal in a landfill (left over from X-ray equipment). He rubbed the metal on his private parts in the hopes of gaining special powers, but instead suffered severe injuries. Before we poke fun at such backwards thinking, it is important to keep in mind that in this rapidly changing world we are all in danger of becoming dated.

Although our cultures has essentially left magical thinking behind, much of our thought is still rooted in *mythological* thinking, defined by a God-and-the-Devil outlook, where all issues are black and white, right and wrong, and there is no middle ground. It is the world we saw on television decades ago, where the good guys wore white and the bad guys wore black.

Mythological thinking tends to be highly ethnocentric and nationalistic. There is tremendous allegiance to one religion, one team, one viewpoint, and everyone else is simply wrong. It was this pattern of thought at work in Iran when their soccer team beat the Americans in 1997 and the entire country partied in the streets for days, chanting slogans like, "We have beaten the Great Satan!" It is the same kind of world view espoused by the religious right in our country, which perceives no gray areas in issues like gun control, foreign policy, or the deviant sexual behavior of Presidents.

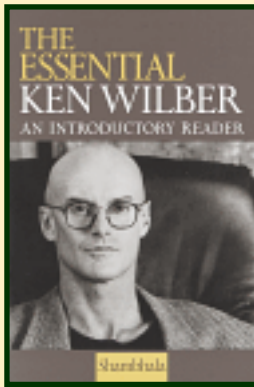
The mythological world view was relevant at the height of the Cold War when there was a clear line between who was right and who was wrong, but that line blurred even before Ronald Reagan battled the "Evil Empire". The falling of the Berlin Wall merely punctuated the death of mythological thinking in the modern era. The new world is much more complicated and full of shades of gray. To those who remain from the old guard, it is a scary time, riddled with United Nations conspiracies and the decay of society. The end of the world seems eminent, but it is only the extinction of a world-view that is inevitable. Our culture and thought is continuing to evolve.

The *objective* world view has been building momentum for decades, applying what might be called scientific reasoning or linear thought to the issues of an increasingly complicated, diversified world. Objective thinking reminds people that other religions or other ways of being are equally valid, that no one has the monopoly on the truth. It is a world view where there is more than one right answer and many shades of gray. This objectivity translates to unprecedented individuality, allowing for example, people to show up for work with nose rings and purple hair.

The objective world view may have gained a slight majority in our time, but already it is inadequate pattern of thought for dealing with an increasingly complex world where all cultures are rapidly melding into one. As the middle managers discovered at the close of the 20th century, linear thought and growth is simply unacceptable. Survival demands broad, creative leaps of integrated or holistic logic, connecting together many diversified concepts. Leadership is often coming from a younger generation that has grown up in the new world with a new mode for tackling problems. It is this difference in world views or patterns of thought that we call the "generation gap". Older modes of thought were not necessarily wrong, just incompatible with a world in flux.

Although Jayne's and Wilber's terminology are as different as night and day, their ideas fit together like a hand and a glove. They expressed ideas which were important for finishing **Direct Pointing to Real Wealth: Thomas J. Elpel's Field Guide to Money**. I spent many years working to tie the idea of cultural consciousness into the book, but couldn't ever find quite the right words until I discovered the works of Julian Jaynes and Ken Wilber. As always, the examples and the choice of words used here are my own.

Books about the Cultural Evolution of Consciousness



The Origin of Consciousness in the Breakdown of the Bicameral

Mind by Dr. Julian Jaynes

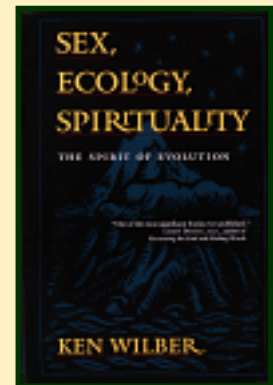
Paperback. 491 pages. Reprinted October 1990.

[Order from Amazon.com](http://www.amazon.com)

A Brief History of Everything by Ken Wilber

Paperback.

[Order from Amazon.com](http://www.amazon.com)



The Essential Ken Wilber: An Introductory Reader by Ken Wilber

Paperback. 176 pages. October 1998.

[Order from Amazon.com](http://www.amazon.com)



Sex, Ecology, Spirituality : The Spirit of Evolution by

Ken Wilber

Hardcover. 831 pages. February 1995.

[Order from Amazon.com](http://www.amazon.com)

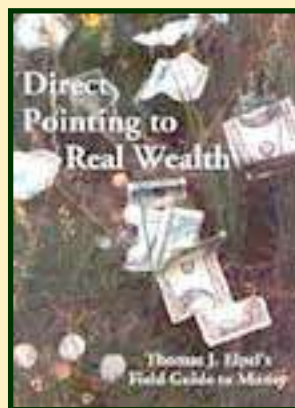
The Eye of Spirit : An Integral Vision for a World Gone Slightly Mad

by Ken Wilber

Hardcover. 432 pages. March 1997.

[Order from Amazon.com](http://www.amazon.com)

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-Direct Pointing to Real Wealth-

Thomas J. Elpel's Field Guide to Money
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All living organisms consume energy, modify resources from the environment and produce waste. That is an inescapable fact of life. But in nature all material wastes are recycled as inputs to other living organisms. The only true waste is diffuse, low-grade heat.

In order to create a truly sustainable economy we must mimic the ecosystem so that the waste of every household and business becomes resource inputs to other enterprises, and the only waste produced is diffuse, low-grade heat from renewable resources like solar.

In *Direct Pointing to Real Wealth* Thomas J. Elpel demonstrates that it is inevitable that we will create an ecologically sustainable economy. Tom turns conventional thinking on its head and outlines steps you can take to increase your prosperity right now while closing the loop on waste and speeding the transition to a greener world.

Direct Pointing to Real Wealth is an enlightened look at the nature of money. Discover how the economy is like an ecosystem and how money is a token we use to represent calories of energy in the ecosystem. Tom's unique approach to money takes you beyond the numbers game to a direct examination of the laws of physics, biology, and economics. These laws are the same today as in the Stone Age, when people worked only a few hours per day and had much more leisure time than we do now.

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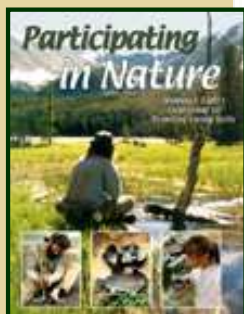
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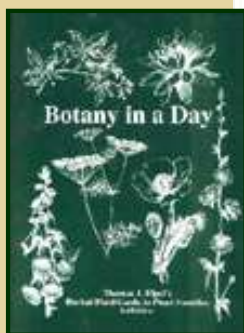
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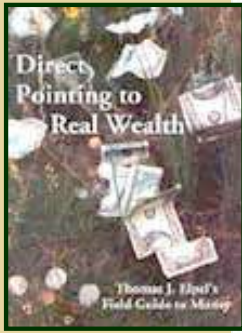
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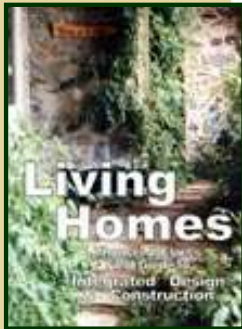
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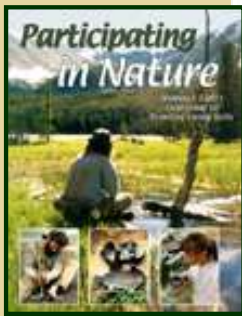
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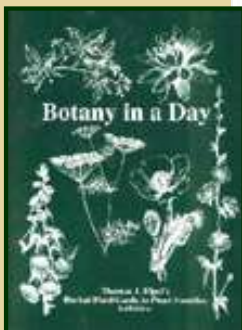
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Fire Plow Sets for Primitive Fire Making

by Thomas J. Elpel

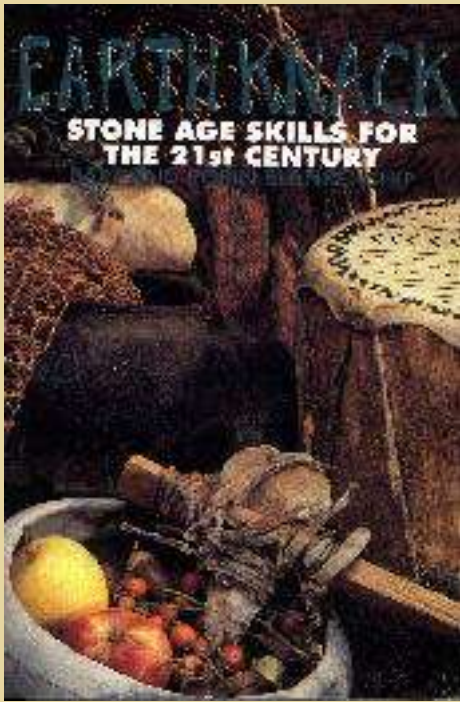
The fire plow may be the most primitive method of fire starting there is. You pick up one stick for a "plow" and rub it back and forth on another stick, called the "fireboard" or "hearth". The friction creates a groove in the hearth, and the hot, powdered wood worn out of the groove piles up at the end, hopefully to form a glowing coal. The coal is then transferred to a tinderbundle of dry, fluffy material and blown into flame.

The fire plow was historically used by native peoples in southeast Asia, northern Australia, throughout Polynesia and Hawaii, with limited use by some Native Americans. I first witnessed the fire plow as a teenager visiting the Polynesian Cultural Center in Hawaii. A big Polynesian man whipped out a coal in a few seconds and blew it into flame in a tinderbundle made from the fibers of a coconut husk. I've been fascinated with this wilderness survival tool ever since!

There are three keys to successfully starting a fire with the fire plow: 1) the right materials, 2) favorable weather, and 3) good technique. You will need at least two out of the three to get a coal with the fire plow.

The Right Materials: The best materials for the fire plow tend to grow in warmer climates, which is one reason the fire plow has been used in tropical regions. I don't yet know what woods were used in Polynesia, but the best material we know of here in the USA is the flower stalk of the sotol plant (*Dasyilirion wheeleri*) from the desert southwest. (Please see [Botany in a Day](#) for more details on identification.) Sotol works so well for the fire plow that you can get a coal even with marginal fire plow skills.





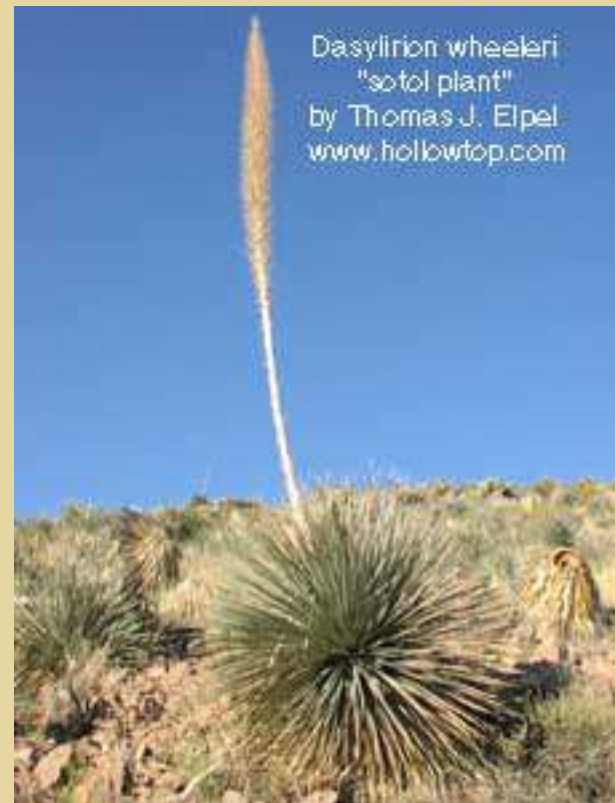
Cottonwood also works for the fire plow, but it requires well-honed techniques. Bart Blankenship, author of **Earth Knack: Stone Age Skills for the 21st Century** is one person who has developed proficiency with the cottonwood fire plow.

Favorable Weather: Climate was the other reason the fire plow was commonly used in warmer regions of the world. The fire plow is more sensitive to the weather than other friction fire techniques, because the heat is dispersed over the length of the groove, rather than being concentrated in a single point the way it is with a **bowdrill fire set** or **handdrill fire set**.

In cooler or damper weather it becomes more and more difficult to get a coal with the fire plow. Fortunately, the sotol fire sets work so well that you can still get a coal in cool damp weather, although beginners may need to first dry out their sets by a fire or in the oven.

Good Technique: The fire plow requires a combination of speed and pressure applied in a back-and-forth motion. Friction between the plow and hearth grinds away bits of wood powder from both surfaces to make a hot pile at the end of the groove. To generate an burning ember you need to apply enough friction to heat this pile of powder to 700 or 800 degrees Fahrenheit. Making lots of smoke is relatively easy. Getting a hot coal takes a bit more work.

The most challenging part is to rub the plow back and forth without hitting and scattering the pile of powder at the end. Fortunately, the sotol fire plow works so well that it is possible to get a coal from bits of hot powder spilling out the side or back of the groove, even if you do scatter the main pile. In other words, you can get good results even with marginal techniques. Practice with these sotol sets and you can develop your abilities to try the fire plow with more challenging materials like cottonwood later on. Additional instructions are included with the fire plow sets.



Please develop some proficiency with flint & steel, bowdrill, and handdrill fire-starting before trying the fire plow. You will probably find it surprisingly easy to start a

fire with the sotol fire plow once you have experience with these other primitive fire-starting techniques.

Our sotol fire plow sets are manufactured in Arizona by Vince Pinto, and every set is tested to make sure it works. Each set includes one hearth board (a 30-inch long piece of sotol flower stalk) with a test groove, and two fire plows. The flattened plow (charred on one end) is the exterior plow used on the outside of the flower stalk. Once you've worn out the outside of the hearth board, you can split it into two equal halves and use the interior plow to generate more fires. Basically, the exterior plow is made from the outside of the stalk, while the interior plow is made from the tip of the stalk, so that each one better matches the hardness of the exterior or interior of the hearth board.

Although this is a simple device to make, the materials are somewhat scarce, hence the higher price. Tinder material is sold separately, or can be gathered by you. **Sotol Fire Plow Set: \$32.**

Sotol Fire Plow Set \$32.00

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Oakum Tinder



Once you have a created a hot coal, you will need to place the glowing ember into a nest of light, dry, fibrous materials, called a tinder bundle. Good tinder bundles can be made from dead grass, sagebrush bark, or the inner bark of a dead cottonwood tree, and many other materials. Just look around for dry, fluffy materials and shape them into a nest-like form. In the mountains you can use "pine fluff", the dried flower parts of the pines which often accumulate in small piles around logs and boulders. As a curiosity,

very fine steel wool can also be used. The steel fibers are so fine that they catch fire and burn, one of those things you almost have to see to believe.

We hope that you the reader will learn to make your own primitive fire sets and collect your own tinder, but to get started you may want to use our quality "oakum" tinder. Oakum is made of fibers from the jute plant. Historically, oakum has been manufactured for plumbers, heavily greased and used for packing around steel pipe fittings. The oakum we have is ungreased, plain dry fibers. A small amount of "oakum" tinder is included with our [flint & steel kits](#). Tinder is sold separately for bowdrill, handdrill, and fire plow sets.

Make your tinder bundle into the form of a nest with a hole in the center to place the coal. Cradle the bundle in your hands, gently closing the front to wrap the coal inside. Be careful to not smother it, but only to blanket it to keep it warm. Blow with steady, even breaths between your hands and let the smoke spill out the backside until you have a flaming bundle, a ball of fire. Then place it in the fire pit and start adding small twigs and then bigger sticks.

Our oakum tinder is also helpful for group events, when a large amount of tinder is needed. We sell oakum by the pound. One pound makes about twelve average-size tinder bundles. We ship the oakum in recycled plastic bags (bread bags, etc.).

1 lb. Oakum Tinder \$6.50

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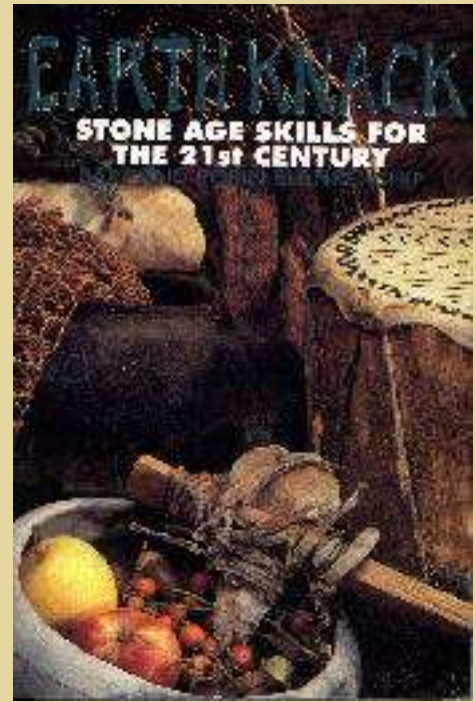
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Earth Knack: Stone Age Skills for the 21st Century by Bart & Robin Blankenship



Bart and Robin Blankenship present a wealth of knowledge in *Earth Knack*. True to the title, "Stone Age Skills for the 21st Century", the book is a selection of skills that are especially useful to the backyard primitive, including:

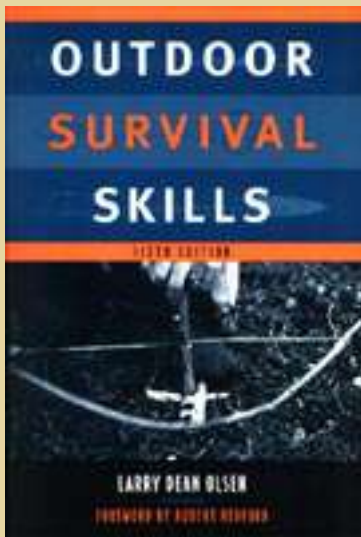
- spinning, cording, netting and card-weaving with natural fibers
- pigments and dyes, plus soap from plants
- basketry, gourd craft, bark containers, and log bowls
- pottery making
- primitive cooking
- tool making, friction fires, and musical instruments,
- hide tanning, hide glue, and the manufacture of clothing.

Whether you are headed out into the wilderness, or just into your backyard, the skills presented in *Earth Knack* are a great, hands-on way to discover the world around you. 1996. 192 pages. **Please Note:** Earth Knack was scanned into a computer for the reprint edition. Some of the original quality was lost on the photos, but all the drawings and text look good. Cost: \$15.00.

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Outdoor Survival Skills

Sixth Edition

by Larry Dean Olsen

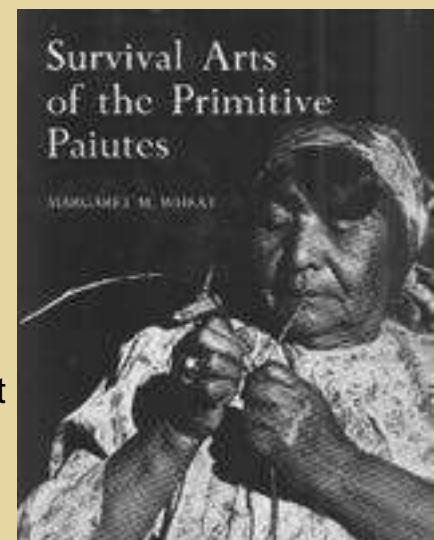
Outdoor Survival Skills was one of the first modern books published on wilderness survival with primitive skills. Larry Olsen has inspired thousands of people to reconnect with the past through these skills. The book covers all the basics: shelter, fire, water, plants for food and medicine, hunting, working stone and bone, bow & arrow, atlatl and dart, cordage, weaving, rawhide and tanning. Thirty years after it was first published, Outdoor Survival Skills is still one of the best texts on the subject. Cost \$15.00

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Survival Arts of the Primitive Paiutes

by Margaret M. Wheat



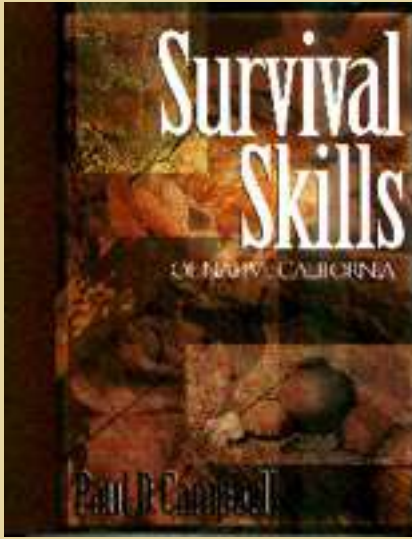
Those of us who desire to learn primitive skills are often stuck in the situation of "reinventing the wheel". Skills that were developed by native peoples over thousands of years were often reduced to cryptic notes in ethnographic works, such as "The pine nuts were harvested, roasted and hulled." We are left to trial and error to rediscover what was once well known.

Originally published in 1967, *Survival Arts of the Primitive Paiutes* is a unique ethnographic work, because author Margaret M. Wheat provided step-by-step photo-documentation of key skills used by the Paiute Indians in the Great Basin Desert. These are real skills demonstrated by the people who once depended on them. Some of the skills covered include: harvesting and processing pine nuts, tule boats, duck decoys, cordage, harpoons, fishing and drying fish, deadfalls, rabbitskin blankets, clothes woven from sagebrush bark, tule baskets, split-willow work, cradleboards, tule and grass hut construction. Coverage of braintanning and arrow-making is more sketchy.

Margaret M. Wheat spent twenty years gaining the acceptance of the elder Paiutes to record their skills and stories before they were lost forever. *Survival Arts of the Primitive Paiutes* is a classic and elegant work with stunning black and white photography. 117 pages. Cost: \$20.00.

Survival Arts of the Primitive Paiutes \$20.00

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Survival Skills of Native California

by Paul D. Campbell

As an author I know what it is like to undertake a large-scale research and writing project. But even I am awed by the scale and scope of Paul Campbell's incredible book *Survival Skills of Native California*. Through ethnographic studies, interviews of elder Indians and extensive replicative studies, Campbell has compiled the vast majority of the physical skills of survival used by California Indians, including fire-making, shelters, water collection & storage, travel, cordage, traps, digging sticks,

acorns and other nuts, mortar and pestle, the soaproot brush, numerous basket types, pottery, key edible and useful plants, use of sugar and salt, seeds and seed beaters, netting, sanitation, wooden containers, clothing, rabbitskin blankets and elderberry bark shirts, yucca and rawhide sandals, moccasins, flutes, bow & arrow, atlatl and dart, knapping, glue, stalking, split-wood figures, rabbitsticks, slings, snowshoes, braintanning, insect harvesting and use, twined bags, war clubs, tule boats, fish traps and nets, harpoons and sea hunting, fish catching and preparation. Most of the skills covered include all the necessary how-to information to do it yourself. The book includes nearly 1,000 instructional illustrations.

Paul Campbell is uniquely qualified to write this book from a lifelong passion for learning, practicing and writing about primitive survival skills. The breadth and depth of his experience shows through every page of the book. 448 pages. 1999. Cost: \$40.00.

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Bowdrill Sets for Primitive Fire Making

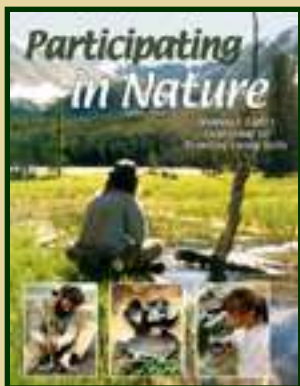
Ever wanted to learn how to start a fire by rubbing two sticks together? It's easier than you might expect, especially if you have a well-made set to begin with. Ultimately we hope you will learn how to make your own bowdrill sets, but you can start by practicing with ours until you get a feel for the proper materials and design.

A fire is created by rapidly spinning the dowel-like "spindle" back and forth in a hole in a fireboard below it. Downward pressure and speed grinds wood powder from the two wood surfaces while generating intense heat. A notch in the fireboard allows the wood powder to collect at one point, where it gets hot, then smoulders and glows red. Then the glowing coal is transferred to a "tinder bundle", basically a wad of soft, dry, fibrous material shaped like a bird's nest, and blown into flame.



Here briefly, is the proper technique, for right handed people (opposite for left):

1. Be sure to place a piece of bark or other material under the notch to catch the coal before you start drilling.
2. Place your left foot halfway across the fireboard and about one inch to the left of the hole in the fireboard.
3. Kneel with your right knee almost directly behind your left foot.
4. Wrap the spindle one time into the bow string and place the spindle in the hole in the fireboard. The bow should be positioned so that you can pull it back and forth beside you and not across in front of you.
5. Place the socket on top of the spindle and hold it with your left hand.



6. Since your left foot is half way across the fireboard the spindle will stand up right alongside your shin. Your hand with the socket should be held firmly against your shin, with the spindle straight up and down. The movement of the bow being pulled back and forth puts a lot of sideways force against the spindle. You need to anchor it against your shin to be able to control it. I literally "pinch" my hand in between my shin and the socket so it cannot move.

7. With your right hand pull the bow back and forth, turning the spindle. Keep the bow level and take full strokes. Speed is not as

important as good steady technique and downward pressure on the socket.

8. If the bowstring slips around the spindle use the fingers of your right hand to pull the cord taut against the bow to cinch the cord around the spindle.

9. When you have a definite and steady wisp of smoke the first thing to do is calm down. People get excited about their first coal, and they yank the bowdrill set away, scattering a hard earned coal several feet in every direction. You have time. A coal will smolder for several minutes before consuming the punk. Carefully pull the spindle out of the hole and set it aside. Place your set in a safe, dry spot. Carefully take your foot off the fireboard and fan the hot coal in the notch by gently waving your hand. Tap the fireboard and pull it away from the glowing ember.

The wood punk welds itself together as it glows, forming a durable ember. Pick up the bark and drop the coal into the center of your **tinder bundle**. Hold the sides of the bundle and blow long, steady breaths into it. Allow the smoke to pass out the back. Cradle the tinder closely around the coal. Blanket it to keep it warm, but not so tight that you smother it. Blow long steady breaths and it will grow and spread, smoke, and then flame.

Each bowdrill set is handmade from carefully selected woods by Chris Morasky. Currently we are selling sets like the one pictured here, with a spindle and fireboard made from western red cedar. The socket and bow are hardwoods, usually oak, plum, hawthorn, apple or maple. Each set is "burned in" --properly notched and ready to create fire! Additional instructions on how to use the bowdrill properly can be found in the books [Participating in Nature](#) and [Outdoor Survival Skills](#) and the video [Friction Fire with Jim Riggs](#) . Note: **Oakum tinder** is sold separately. **Cost of Bowdrill Set: \$25.**

Bowdrill Fire Set \$25.00

Quantity:

Participating in Nature: Thomas J. Elpel's Field Guide to
Primitive Living Skills \$25.00

Quantity:

-Please scroll down the page for the "Add to Order" button.-



Handdrill Sets for Primitive Fire Making

A handdrill set is similar to a bowdrill set (see above), but there is no top socket to apply downward pressure, and no bow to rapidly turn the spindle. Instead you have to twirl the spindle between your hands, while also pushing downward. This is truly rubbing two sticks together! In a matter of minutes you will discover new muscles you never knew you had (and probably don't have yet)!

Some people get fire the first time they try the handdrill, but you may need to practice for a few days or a couple weeks to develop the specialized muscles that are used in the task. Sometimes I like to practice the handdrill while watching television. I get a good workout, even while sitting on my butt.

Place your hands together at the top and start twirling the spindle. Use as much of the length of your hands as you can to get the most revolutions each way. Apply downward pressure as you work and your hands will move down the spindle. Take your time to learn the technique before working for speed. At the bottom, hold the spindle with one hand then move the other hand to the top and hold the top. Move the other hand up and start spinning. Make the move quickly because the spindle cools off fast. Warm up the set gradually and save your strength. Some people spit on their hands to get a better grip on the spindle; I usually find that it is unnecessary. As the set warms then increase the speed and downward pressure and start it smoking. When it is smoking heavily then apply your best burst of speed, pressure, and most importantly, your will power!

Like the bowdrill, a fire is created by rapidly spinning the spindle back and forth in a hole in a fireboard below it. Downward pressure and speed grinds wood powder from the two wood surfaces while generating intense heat. A notch in the fireboard allows the wood powder to collect at one point, where it gets hot, then smoulders and glows red. Then the glowing coal is transferred to a "tinder bundle", basically a wad of soft, dry, fibrous material shaped like a bird's nest, and blown into flame.

The drill pictured here is from a bigleaf maple, while the fireboard is made from the dead flower stalk of the sotol plant. Currently we are selling handdrill sets made with a seep willow drill (*Aster Family: Bacharris salicifolia*) on a sotol stalk fireboard (*Lily/Agave Family: Dasylyrion wheeleri*). Each handdrill set is handmade with care by Vince Pinto. Each set is "burned in" --properly notched and ready to create fire! Instructions on how to use the handdrill properly can be found in the books [Participating in Nature](#) and [Outdoor Survival Skills](#) and the video [Friction Fire with Jim Riggs](#). Note: **Oakum tinder** is sold separately. **Cost of Handdrill Set: \$15.**

Handdrill Fire Set \$15.00

Quantity:

-Please scroll down the page for the "Add to Order" button.-

Oakum Tinder



Once you have created a hot coal, you will need to place the glowing ember into a nest of light, dry, fibrous materials, called a tinder bundle. Good tinder bundles can be made from dead grass, sagebrush bark, or the inner bark of a dead cottonwood tree, and many other materials. Just look around for dry, fluffy materials and shape them into a nest-like form. In the mountains you can use "pine fluff", the dried flower parts of the pines which often accumulate in small piles around logs and boulders. As a curiosity,

very fine steel wool can also be used. The steel fibers are so fine that they catch fire and burn, one of those things you almost have to see to believe.

We hope that you the reader will learn to make your own primitive fire sets and collect your own tinder, but to get started you may want to use our quality "oakum" tinder. Oakum is made of fibers from the jute plant. Historically, oakum has been manufactured for plumbers, heavily greased and used for packing around steel pipe fittings. The oakum we have is ungreased, plain dry fibers. A small amount of "oakum" tinder is included with our [flint & steel kits](#). Tinder is sold separately for bowdrill, handdrill, and fire plow sets.

Make your tinder bundle into the form of a nest with a hole in the center to place the coal. Cradle the bundle in your hands, gently closing the front to wrap the coal inside. Be careful to not smother it, but only to blanket it to keep it warm. Blow with steady, even breaths between your hands and let the smoke spill out the backside until you have a flaming bundle, a ball of fire. Then place it in the fire pit and start adding small twigs and then bigger sticks.

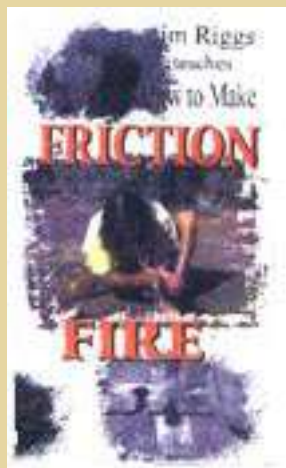
Our oakum tinder is also helpful for group events, when a large amount of tinder is needed. We sell oakum by the pound. One pound makes about twelve average-size tinder bundles. We ship the oakum in recycled plastic bags (bread bags, etc.).

1 lb. Oakum Tinder \$6.50

Quantity:

-Please scroll down the page for the "Add to Order" button.-

Friction Fire Instructional Video

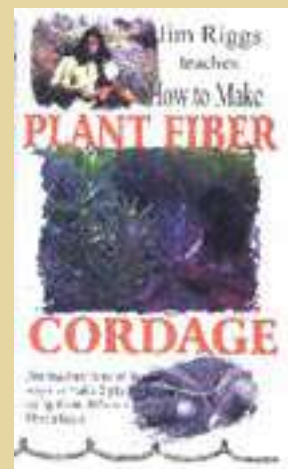


I have watched many, many primitive skills instructional videos, and *Friction Fire* by Jim Riggs is clearly the best one available on starting fire-by-friction with the bowdrill and handdrill. It is extremely educational and also enjoyable to watch. (The video covers how to make and use bowdrill and handdrill fire sets, so you will find it useful alone, or with our high-quality sets.)

Jim Riggs has been a leader in experimental archeology since the 1970's, actively using primitive skills to learn and teach about our past. He taught ethnobotany and aboriginal life skills at Oregon's Pacific University's Malheur Field Station. Jim Riggs was also a primitive skills advisor for the movie *Clan*

of the Cave Bear.

Friction Fire was originally produced by Northwestern Video Productions, now part of HOPS Press, LLC. The video degraded some over time, but we digitally remastered it, combining the better quality sound from the production master with the better quality video from the edit master. (That took some work to properly lip-sync the video!)



In addition, we are combining *Friction Fire* with Jim Rigg's other excellent video *Plant Fiber Cordage*, so you get two great videos for the price of one! *Friction Fire* and *Plant Fiber Cordage* are currently on two separate tapes. We will ship them as two separate tapes until we run out of stock. Then we will combine both videos onto a single tape and release it with a new cover. **Recorded on certified quality recycled VHS tapes for an environmentally friendly product!**

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. Sorry, this video is not available in PAL format.

Friction Fire & Plant Fiber Cordage (2 videos) \$30.00

Quantity:

-Please scroll down the page for the "Add to Order" button.-

Complete Primitive Fire-Starter Package!

Cost: \$95.00 (Save \$20.50)

-This package counts as 6 items for calculating postage.-

Package includes:

- **1 Flint & Steel Kit.**
- **1 Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills.**
- **1 Bowdrill Fire Set.**
- **1 Handdrill Fire Set.**
- **1 lb. Oakum Tinder.**
- **1 Video: Friction Fire with Jim Riggs (Plus a Free copy of Plant Fiber Cordage!)**

Complete Primitive Fire-Starter Package (6 items) \$95.00

Quantity:

Also see these related pages:

[Flint & Steel Sets for Primitive Fire Making](#)

[Fire Plow Sets for Primitive Fire Making](#)

[Fire Pistons for Primitive Fire Making](#)

Hello Friends at Hollowtop!

I got my order today. Thank you. I tried the bow drill with the kids after supper. It was all very comical. I'm sure you can appreciate the image: my 8 year old daughter and I were trying to get it going, but we were laughing so much that we couldn't keep it even. Everyone wanted to be involved in it, my 2 year old daughter was hitting her on the head with a piece of wood from our woodbox (a small piece, a small child) while my 85 lb dog

kept sticking his cold nose in my ear because he was getting excited with all the commotion and loud noise. We finally retired to a nice cup of dandelion root coffee. That's delicious.

I am also enjoying your book "Participating in Nature" that I received as a gift recently. I really like your way of weaving the teachings with your thoughts and ponderings, and then again to the activity at hand. It's all very nice. One thing I suddenly feel moved to tell you is that I appreciate your perspective on how we must continue to move forward--how that will not change. Of course I don't want to hear this, I want everything to go back to normal. but you're right about something in there, and that something keeps me thinking on it... "something" being a nice vague word that my denial can accept at the moment.

--Traci (used with permission).

Dear Tom,

Success !!!!

I ordered your Complete Primitive Fire-Starters Package 4 days ago and received the kit this afternoon. I am pleased to say that I managed to start two fires with the bow drill in a matter of around 10 minutes after reading your materials and watching the included video. What a rush !!!

My father who is 80 told me how he tried many times as a boy scout in the 1930's to start a fire with a bow drill. He said he could get lots of smoke but didn't understand that you have to have a notch in the fire board and that the coal that is developed must then be transferred to the tinder bundle. The main incentive for purchasing the kit from you was to help him overcome that disappointment that has lingered in the back of his mind all these years. Interesting, he was present when I managed to start the first two fires and it was wonderful to see how excited he became. I am not sure that he has the strength to operate the bow drill by himself but just being present when I managed to start my two fires meant a lot to him.

I am an elementary librarian and plan on sharing this experience with "my" 435 K-5 kids.

I'll keep in touch.

*Alan Corson
Dauphin, Pennsylvania
(used with permission)*

Tom,

*I received my **hand drill fire set** and **oakum tinder** (which was very easy to use I might add...I mean like four or five passes down and there was a coal...for me faster than cattail on cottonwood). My new order consists of the following videos:*

[Mountain Lakes](#)

[Getting Started in Flint Knapping](#)

I always look forward to what you have done in the videos. I can't go out in the woods (here in South Korea) with the freedom I had in the states and so have to live through your videos and products. I have also turned some of the other guys here into aspiring Abo's and you should be seeing at least a few new orders from my locale. I really appreciate the heart and concern you put into your writing and your videos. The messages and ideas would make for a better world if only people would listen. Keep up the good work...fight the good fight.

Sincerely,

Tim Hilton

Stationed in South Korea

(used with permission)

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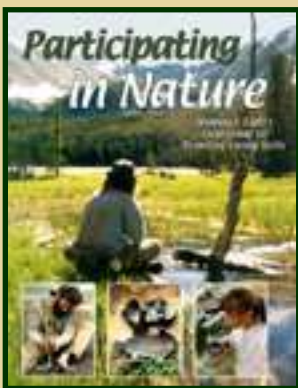
Fire Iron Flint & Steel Kits for Primitive Fire Making

Although I often use a [bowdrill](#) or [handdrill](#) to start fires on primitive camping trips, I virtually always bring along a good flint & steel kit too. Flint & steel kits are reasonably compact, lightweight and very reliable.

A spark is created by striking the steel down across the sharp edge of a flint or quartz rock. The rock shears off tiny flakes of metal. The shearing, ripping action heats up the flecks of metal so much that they catch fire. The sparks are literally globs of flying, molten metal.



The magnesium and steel kits sold at many camping stores work on a similar principle, except that the magnesium is struck against a piece of steel, and the sparks are burning pieces of magnesium.



To nurture a tiny flint and steel spark into a fire, the spark is first caught on a material called char cloth. Char cloth is usually made from 100% cotton material that has been previously charred in the fire and smothered. This partially burned material is easily re-ignited by the tiny spark. The cloth is then transferred to a tinder bundle and blown into flame.

To make a flint and steel fire, first practice making sparks. These instructions are for right-handers. The opposite works for lefties: Hold the spark rock in your left hand so that a sharp edge is laying horizontally and facing your right hand. Hold the striker vertically in your right hand and practice taking one good deliberate stroke at a time. Bring the striker nearly straight down so that the sharp edge of the stone shaves off microscopic bits of metal. Following through with long strokes seems to help. When you get good sparks then you are ready for the char cloth. To catch the sparks, hold a piece of char cloth the size of a postage-stamp on top of the rock with your thumb. Hold it as close as possible to the edge without interfering with the striker.

When a spark catches on the cloth and glows cherry red, blow gently to help it spread. Next, place it in the tinder bundle and blow it into flame. Be sure and put your flint and

steel kit in a safe place as soon as you have your spark.

Each flint & steel kit includes a **steel, a flint rock, char cloth, raw cotton, tinder and instructions**. The steel strikers are made entirely of high carbon steel and hardened all the way through, this way they last until there is no more striker left. The kits come in a **round metal container**. Manufactured by enterprising Eagle Scouts Kristopher Goodrich and Rob Hogg. (They are in college now.) Please see the book [Participating in Nature](#) for additional instructions. **Cost \$14.00.**

One Fire Iron Flint & Steel Kit	\$14.00	Quantity:
Package of 5 Fire Iron Flint & Steel Kits (Save \$12.00)	\$58.00	Quantity:
Set of 4 Extra Flint Rocks	\$3.00	Quantity:
Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills	\$25.00	Quantity:

-Please scroll down the page for the "Add to Order" button.-

Oakum Tinder



Once you have a hot coal from your flint & steel kit, fire piston, bowdrill or handdrill set, you will need to place the glowing ember into a nest of light, dry, fibrous materials, called a tinder bundle. Good tinder bundles can be made from dead grass, sagebrush bark, or the inner bark of a dead cottonwood tree, and many other materials. Just look around for dry, fluffy materials and shape them into a nest-like form. In the mountains you can use "pine fluff", the dried flower parts of the pines which often accumulate in small

piles around logs and boulders. As a curiosity, very fine steel wool can also be used. The steel fibers are so fine that they catch fire and burn, one of those things you almost have to see to believe.

We hope that you the reader will learn to make your own primitive fire sets and collect your own tinder, but to get started you may want to use our quality "oakum" tinder. Oakum is made of fibers from the jute plant. Historically, oakum has been manufactured for plumbers, heavily greased and used for packing around steel pipe fittings. The oakum we have is ungreased, plain dry fibers. A small amount of oakum tinder is included with the flint & steel kits.

Make your tinder bundle into the form of a nest with a hole in the center to place the coal. Cradle the bundle in your hands, gently closing the front to wrap the coal inside. Be careful to not smother it, but only to blanket it to keep it warm. Blow with steady, even breaths between your hands and let the smoke spill out the backside until you have a flaming bundle, a ball of fire. Then place it in the fire pit and start adding small twigs and then bigger sticks.

Our oakum tinder is also helpful for group events, when a large amount of tinder is needed. We sell oakum by the pound. One pound makes about twelve average-size tinder bundles. We ship the oakum in recycled plastic bags (bread bags, etc.).

1 lb. Oakum Tinder \$6.50

Quantity:

-Please scroll down the page for the "Add to Order" button.-

Complete Primitive Fire-Starter Package!

Cost: \$95.00 (Save \$20.50)

-This package counts as 6 items for calculating postage.-

Package includes:

- **1 Flint & Steel Kit.**
- **1 Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills.**
- **1 Bowdrill Fire Set.**
- **1 Handdrill Fire Set.**
- **1 lb. Oakum Tinder.**
- **1 Video: Friction Fire with Jim Riggs (Plus a Free copy of Plant Fiber Cordage!)**

Complete Primitive Fire-Starter Package (6 items) \$95.00

Quantity:

Received your package (flint & steel + oakum tinder) two days ago. It is a very nice set up. The tinder is grand. I was able to start a fire with very little effort. Thanks for the quality you put in your products. You have a lifetime customer. Keep up the great work.

Bill Thompson
(used with permission)

I'm a freelance photographer living in northern Thailand near the Burmese border. I shoot with a professional digital camera, process my images using three different large, very powerful computers designed just for image handling, and am surrounded by hi-tech supplies constantly when I'm in my home studio.

However, I do spend a good deal of time with the various indigenous hill tribes in the Golden Triangle, almost stone age in their customs and tools, and it's a delight to see the reaction on the faces of my villager friends when I make my cooking fire using your flint and steel fire kit! They use Bic lighters! Thanks for bringing balance and harmony back into my life!

Steve Kramer
Chiang Mai, Thailand
Photoenvisions

Also see these related pages:
[Bowdrill and Handdrill Sets for Primitive Fire Making](#)
[Fire Pistons for Primitive Fire Making](#)

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Fire Pistons

The primitive Fire Piston operates on the same principle as a diesel engine. When air molecules are rapidly compressed within the cylinder, the temperature of the air becomes hot enough to cause combustion. A single push of the piston ignites tinder placed in the end of the shaft. Since fire pistons create fire through compression, they function even after complete submersion and make an excellent addition to survival gear. The fire-piston is capable of creating a live ember in a fraction of a second and open flames in less than 30 seconds....even in windy conditions.

While fire pistons are difficult to construct, they are durable and reliable. A properly maintained fire piston will provide many hundreds of lights. When they eventually do become worn, original performance can be restored in minutes by replacing the gasket. Complete instructions for care and use are included.

You won't find any plastics or man-made materials used in the construction of these pistons. Manufactured in the USA by Jeff Wagner, these are the highest quality, traditionally styled fire pistons of wood or water buffalo horn (from India) available anywhere in the world. Why are they priced so low? Simple - No one should have to pay \$100 or more for an ordinary fire piston. Refinements in fabrication methods enable Jeff to offer his fire pistons at the lowest available prices.

Each piston comes with a small amount of tinder fungus (*Inonotus obliquus*) and a roll of charcloth. A piece of the tinder fungus or the charcloth is placed on the end of the shaft that is inserted into the cylinder and ignited. **A supply of shredded cedar bark or oakum tinder for tinder bundles is also included.** The ember is placed into a tinder bundle and blown into flame.

Fire Pistons are shipped direct from the manufacturer. All pistons are thoroughly tested to assure performance. Customer satisfaction is guaranteed. If you don't like it for any reason, simply return in original condition within 5 days for a full refund. **PLEASE ALLOW 4-5 WEEKS FOR DELIVERY.**



MODEL 1 - This model features a tapered end that is comfortable in the hand and pocket. Available in either hardwood or water buffalo horn.



MODEL 2 -Features a carved piercing for attachment to a possible bag, lanyard, neck cord, etc. The cylinder can remain suspended around the neck, leaving a free hand to manipulate fire-making materials. Available in either hardwood or water buffalo horn.



MODEL #3 - Features an attached buckskin tinder bag. Great for carrying your fire-making kit. Available in either hardwood or water buffalo horn.

Fire Piston, Model 1. Wood \$55.00

Quantity:

Fire Piston, Model 1. Horn \$80.00

Quantity:

Fire Piston, Model 2. Wood \$65.00

Quantity:

Fire Piston, Model 2. Horn \$90.00

Quantity:

Fire Piston, Model 3. Wood \$72.00

Quantity:

Fire Piston, Model 3. Horn \$97.00

Quantity:

**Fire Pistons are shipped direct from the manufacturer.
Please allow 4-5 weeks for delivery.**

-Please scroll down the page for the "Add to Order" button.-

Oakum Tinder



Once you have a hot coal from your fire piston, bowdrill, handdrill, or flint & steel kit, you will need to place the glowing ember into a nest of light, dry, fibrous materials, called a tinder bundle. Good tinder bundles can be made from dead grass, sagebrush bark, or the inner bark of a dead cottonwood tree, and many other materials. Just look around for dry, fluffy materials and shape them into a nest-like form. In the mountains you can use "pine fluff", the dried flower parts of the pines which often accumulate in small piles around logs and boulders. As a curiosity, very fine steel wool can also be used. The steel fibers are so fine that they catch fire and burn, one of those things you almost have to see to believe.

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Make your tinder bundle into the form of a nest with a hole in the center to place the coal. Cradle the bundle in your hands, gently closing the front to wrap the coal inside. Be careful to not smother it, but only to blanket it to keep it warm. Blow with steady, even breaths between your hands and let the smoke spill out the backside until you have a flaming bundle, a ball of fire. Then place it in the fire pit and start adding small twigs and then bigger sticks.

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1 lb. Oakum Tinder \$6.50

Quantity:

Also see these related pages:

[Flint & Steel Sets for Primitive Fire Making](#)

[Bowdrill and Handdrill Sets for Primitive Fire Making](#)

[Fire Plow Sets for Primitive Fire Making](#)

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Fire Pistons: The primitive fire-starter that works like a diesel engine.

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Art of the Ancients 2004 Flintknapping Calendar

Millions of years ago on some forgotten plain a unique sound was being produced. The prehistoric animal creating this noise: man. The sound: a nondescript "clinking"; that of stone striking stone; the birth of flintknapping.

Thanks to the efforts of modern knapping pioneers such as Don Crabtree, J.B. Solberger and many others, this once nearly extinct craft is experiencing a dramatic rebirth. No longer do the pressures of a strictly utilitarian use and survival mandate the tools' existence. Instead, a focus on aesthetics can be pursued.

Utilizing precise percussion, indirect percussion and pressure, modern day flintknappers are able to fashion from stone some of the finest originals and reproductions of knives, spear and arrow points ever to have graced this planet. Silica-based stone such as flint, chert, agate, and obsidian are their canvas. In some cases, the stones have undergone unique heat treatments to maximize their coloration and knapability--avenues not readily available to our ancestors. The artisans' brushes: creek cobbles, bone, antler, and copper billets and pressure flakers. As you enjoy the flintworks showcased within, the diversity of material, technique, skill and passion, be reminded this art is the summation of countless hours of practice and dedication to pursuing the Art of the Ancients.

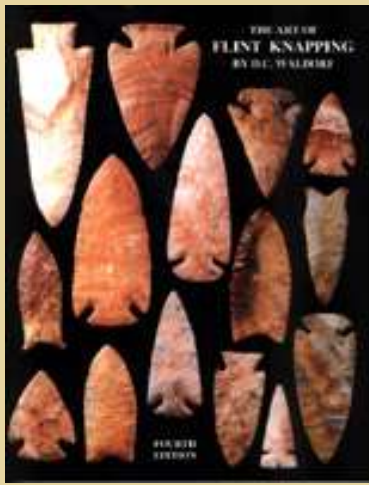
Whether you are into flintknapping or simply love the primitive arts, this is *the* calendar for 2003! Dramatically photographed, this 12"x18" calendar is perfect for any office, den or workshop. Each month showcases the talents of some of today's top flintknappers: Jim Regan, Carl Smith, Mark Condron, Joe Miller, Derek McLean, Jerry Bridwell, Jim Miller, Doug Leeth, Doug Kreis, Scott Silsby, John Siderio and James Howell! This calendar also includes most of the knap-in dates for 2003 as well as material descriptions of these incredible works of art!

2004 Flintknapping Calendar: Art of the Ancients. Cost: \$15.00.

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The Art of Flint Knapping

4th Edition

by D.C. Waldorf, illustrated by Valerie Waldorf

I cannot imagine any primitive skill more difficult to learn or teach through a book than flint knapping. Nevertheless, D.C. Waldorf took on the challenge and produced a truly remarkable and user-friendly guide in *The Art of Flint Knapping*. Waldorf originally wrote the book as a class hand-out to answer the questions that every student asks. Over the years it was refined and expanded to cover the emerging field of experimental archaeology. The result is a well-honed book that is useable to the amateur or the professional. *The Art of Flint Knapping* is used world-wide as a text for lithic technology classes. The illustrations by Valerie Waldorf are simply exquisite.

The Art of Flint Knapping, 4th Edition. 76 pages. Cost: \$15.00.

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Flint Knapping Videos

by D.C. Waldorf

D.C. Waldorf has also produced several very good videos on flintknapping. The videos are both informational and interesting to watch. It is the next best thing to being right there with Waldorf. Please note that the *Art of Flint Knapping Video Companion* is intended to be used with the *Art of Flint Knapping* book (sold separately).

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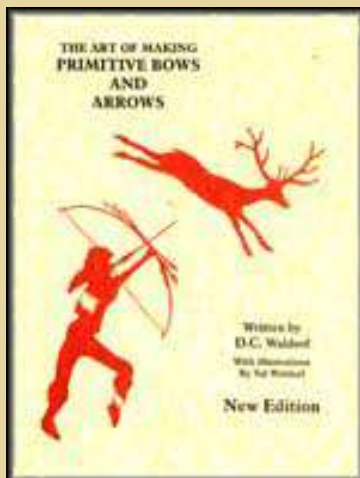
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The Art of Making Primitive Bows and Arrows

by D.C. Waldorf, illustrated by Valerie Waldorf

D.C. Waldorf was one of a handful of people who revived the art of making primitive bows and arrows. This excellent book was one of the first how-to guides available on the subject. It was revised and updated in 1999.

The Art of Making Primitive Bows and Arrows covers several types of woods and many different bow styles, providing all the necessary information for the beginner or advancing bow maker. The book includes instructions for working with modern or stone-age tools. Also included is coverage of sinew-backing, snakeskin wraps, handle covers, quivers, trouble-shooting, and of course primitive arrows. **The Art of Making Primitive Bows and Arrows.** 64 pages. Cost: \$15.00.

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The Best from the Story in Stone

Flintknapping Poster
illustrated by Valerie Waldorf

The *Best from the Story in Stone* features more than 100 arrow points, spear points, and stone knives exquisitely drawn by Valerie Waldorf. Each point is illustrated to life-size and in great detail, and each is labeled with a name for the type of point, plus the geographic location it was found, and the approximate date it was created. This 24 x 36 inch wall poster is printed in a rich blue-black ink on heavy, ivory colored stock. Every poster is signed by the artist.



With this poster you can easily compare a Clovis point to a Folsom point or a Hardin point to a Dalton point, to see what the similarities and differences are. It is like having an illustrated encyclopedia of North America's lithic technology all on a single page.

The Best from the Story in Stone Poster \$12.50

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the tape time after time for inspiration and to learn and hone their skills. Topics covered include: history, safety, percussion flaking, pressure flaking, platforming, notching, serrating, fluting, tools, sawn slabs, problem solving, sources, material, and ethics.

Welcome Back to the Stone Age. VHS/NTSC Video. 2 hours. **Cost: \$25.00.**

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Harrison School 8th Grade Camping Trip -Return to the River-

Thursday May 15th - Friday May 16th, 2003

By Thomas J. Elpel and the 8th Grade Class

The boys' shelter was a bit too small to fit the whole group, and I ended up sleeping in the dripping doorway. The poncho blocked the worst of the rain, but a puddle seeped in below me. In the dark I assumed everyone else was just as soaked as me. Sam had the stomach flu and stepped over me several times in the night to puke outside the door.

Our kids are enrolled in the local public school, and each year I try to take their classes out on a field trip to learn outdoors skills. This was Felicia's class, my oldest daughter. I brought these kids out on several day trips in the past, but this was our first overnight trip. Laying there in the dark and dampness all night, I assumed that our first campout would also be our last. I was sure that the school would never let me take another group of students out camping again. More than an inch of rain fell while we were there.

Fortunately, everyone else woke up damp around the edges, but adequately comfortable. The rain subsided and we dried out by the fire. Except for Sam, everyone was having a good time, treating the experience as a great adventure. I think that was partly a reflection off of the teacher and I. I always have a good time, regardless of how uncomfortable I am, and the teacher seemed to be responding the same way. I realized later that if I had been partnered with a teacher with a bad attitude, then everyone probably would have had a miserable time.



A year rolled by and Felicia's class was eager to go again--to return to the wickiups for another springtime campout. This time the weather was perfect. We scored a couple of warm, dry days between storms. The group paid their dues the last time, and this was their reward--a chance to go back and try new skills that they didn't get to do in the rain. The 8th grade campout consisted of six boys and five girls, plus the science teacher Mr. Jones, and Sam's mother Linda, who is also a member of the school board. This is the story of the 8th grade campout, as told in journal excerpts from the students.

Whitney: The moment that I stepped out of the bus I endured the fresh scent of nature and the beautiful scenery. It was very green with dandelions spread throughout the fields.

In the distance it was filled with uniquely formed trees, and lovely water features. Within five minutes of being outside the bus, our class picked up our luggage and walked down a dirt road about a mile.

Tanner: Today we walked to the Jefferson River to where we were going to spend the next two days camping with our classmates. The walk in was so warm and beautiful and right then I knew that it was going to be a nice camping trip, unlike the last time.

Saxton: The walk in was cool because it was a time to talk to my friends. At first we walked on a road by an open field. We entered the cottonwoods a quarter mile after we started. We came across a little stream running through the road. Sam, Bryce, Brent, and I crossed it. They kept on walking, but I stayed back and waited for the rest of the group. When they got there I carried Ashley and her stuff across. I also helped with Linda's stuff. After the group was across I ran an eighth of a mile to catch up to the boys.

Felicia: Ash, Shayla, Whit, Myself, Mr. Jones, Linda, the Twins (Connor and Tanner) and Saxton all walked together.

On the way we saw lots of birds, ponds, irrigation ditches and tons of cattle. We all made it to camp, set our things down and toured the camp. First we went to the outhouse, then the boys' shelter, and last we went to our girls' shelter.

Ashley: Today was the perfect day for camping, since for the last week or so we have had nothing but rain. Last year we almost got rained out. Since we still had our shelters intact we did not have to focus our first few hours on building them. Last year the process of building our shelters took most of our day.

Tom Elpel: The shelters are called wickiups, basically tipi-like structures made with sticks and bark. Before our first trip I went out and selected two good shelter sites on dry ground with an abundance of building materials to work with. I chose sites that were nicely camouflaged and clear of any cottonwood trees that might fall or drop branches in a windstorm. Then I selected three tall forked branches for each shelter and hooked them together to make tripods. When the class arrived, it was a simple matter to gather sticks from the ground and lean them against the tripods from all sides to make the tipi-shapes. We left a small space for a door and covered the shelters with slabs of dead cottonwood bark for shingles.



Bryce: Coming back to the wickiups brings back many memories. This year we improved the structures by putting dry grass in the cracks and using it for bedding. Last year we did not have the weather in our favor, we stayed through more than an inch of rain.

Felicia: We immediately set to work on the shelters gathering grass for stuffing the holes so we would be warm that night. We had very few holes because we had done such a good job last time we were out there. With what we had leftover we made a mattress and we set up our sleeping stuff for the night. Then we started giving ourselves a few homier touches; we dressed up the shelter with things like juniper branches and Whitney's umbrella.

Tom Elpel: I don't care if these kids ever learn any real survival skills. I am just thrilled to see them become more comfortable and confident in the outdoors. Kids in the past always played outside in the woods and streams, because there was nothing else to do. But now there are all sorts of indoor entertainment activities, plus easy transportation to shopping malls and movie theaters. Many rural kids don't know how to play outside any more, and some from this class had never been camping before. A few were unsure last year about sleeping in primitive shelters or eating

off slabs of bark. But this year was more like a homecoming. They knew the place, and they were eager for new adventures.

Felicia: We met up at the boys' camp and we were extremely hot so Dad said, "Why don't we go and do some swimming, and while we are out there we can gather some cottonwood root for making coal-burned cups." The boys' got very excited and kicked us out for good reason, to change. The girls went to our camp and changed into our suits. We were almost changed when the boys' ambled up. We freaked out on them and they changed course to the river. When we got there, Bryce, Brent, and Saxton were already partly in the water. They started splashing us and I jumped in right then. They confirmed that I was crazy. We swam for a while and the boys were called over to start their cups and bowls with cottonwood root. When they were done the girls went. We had a bit harder of a time with the saw than the boys had.



Sam: I liked making the bowls with a stone and a large stick. We broke a fine-grained rock and used a large stick to wedge open the root into a bowl shape. We used cottonwood roots as the chosen materials. Later we would use hot coals to burn and hollow out the roots for use as cups and bowls.



Brent: After that we had our lunch that we brought for ourselves and ate. When we were done with lunch we wrote in our journals. Then we had a bowdrill competition. In this competition we had a race to see who could get a fire started faster than the other group. The groups were boys against girls. We had to find our own drill and fireboard and once we got that we had to start the fire.

Shayla: All of us learned how to start fires without matches, lighters, and paper. It was kind of hard at first because we didn't have the right type of wood for our bow.

Bryce: The bowdrill is a fairly difficult method of fire starting. To get started you need to collect all of the supplies: cottonwood root, a 6-inch straight piece of branch, a small, sturdy piece of bark, some cord or a shoelace, and a slightly bowed stick with a fork on one end. Once you have collected everything you need, you have to cut the piece of cottonwood root in half lengthwise. Next cut a notch in the bowed stick on the opposite end of from the fork. Tie the cord or shoelace to the fork and in the notch.

Bryce: Next, carve the 6-inch stick into points at both ends (not too sharp) and twist it into the cord on the bow. Carve a divot into one of the two pieces of cottonwood root. Then carve another divot into the piece of bark. Finally, put one end of the spindle in the divot in the piece of cottonwood root and the other in the divot in the piece of bark. Now, stroke the bow in slow steady strokes and slowly get faster. Once the cottonwood root starts smoking remove the spindle and cut a notch to the center of the divot. Then place a piece of bark under the cottonwood root to catch the coal. Now continue to stroke the bow faster and faster until you have a coal.

Bryce: To make a tinder bundle, gather the stringy part from the dead cottonwood bark and make it into a nest. Then grind some more bark into a powder and put it in the center of the nest. Once you get a coal, put it into the powdery center of the bundle. Then, pick up the bundle and turn it towards your face and hold it so that when you blow in it the air will go right through it. Once it starts smoking put it were you want the fire and continue blowing until you have flames. Then slowly add small twigs and slowly put on larger pieces on until you have a fire the size you want.



Brent: When we started everybody did separate things. Bryce stood on the fireboard and I ran the bow. Tanner got the tinder bundle together so that when we got a hot coal we could dump it into the bundle. Sam and Connor went and got wood so that when we got the fire going it wouldn't go out. The problems we had were that we couldn't find a good bow and if you don't have a good bow it is hard to start the fire. And then our string broke so we had to get another one. When we did have a hot coal we started blowing on it to get a flame and we blew too hard and put it out. So we had to start again. On the second time we got the flame going.

Tom Elpel: The bowdrill can be a frustrating skill for kids to learn individually, but it becomes a fun game when it is a contest between two groups. This class has worked with the bowdrill before, so this time I simply demonstrated making an entire set right in

front of them, and I started a fire with it. Then it was their turn. I handed each team some cottonwood root, from which they had to make their own fireboard and drill. They also had to find and make their own socket from cottonwood bark, and they collected their own tinder bundles. They cut their own bows and twisted some plastic baling twine into cordage. This was a race, so it was a kick to watch these two groups of kids work as hard and as fast as they could to build their sets and start a fire. The winning team got a package of black licorice to share.



Shannon: The girls ended up losing the fire starting competition. That really stunk, but we deserved it after all the bragging we did last year. We went swimming again, and it was pretty fun because I couldn't feel the water, I was so numb.

Saxton: We went for a botany walk to learn the edible plants of the area. We learned about mustard plants and how you can classify them. Mr. Elpel showed

us the parts of the dandelion that you can eat. So we picked a whole bunch of edible plants for dinner that night. Then we found some morel and oyster mushrooms for dinner too.

Ashley: During our nature walk, we ate mustards, dandelions, mints, and many other edible plants. After sampling each plant, we gathered what we would need for a wild green salad, which, after enough was gathered, would be in our dinner. This year's dinner was so much better than last year.

Tom Elpel: Last year we tried to cook chicken and vegetables in a steam pit in the rain. The food was warm but completely raw when we dug it out of the pit, so everyone had to cook their own shish kebabs on willow sticks. This year I thought we should try something new.



Shannon: I helped with the salad. It had in it store-bought lettuce and wild greens that we collected from all over the place. In the salad we also had chopped carrots and tomatoes. Then we made ashcakes out of flour and water mixed together and cooked in the ashes.

Tanner: One of the things I would have liked to have found would have been onions. Much to my surprise the salad, despite its looks, actually tasted really good.

Whitney: Tanner was eating an ashcake with honey over my shoulder and dropped some honey in my hair. I squealed and then got up and knocked him down to the ground!



Connor: We learned how to cook stir-fry with a slab of bark and hot rocks. The first thing you do is find a good-sized slab of bark, then start a fire to heat some rocks. As the rocks are heating prepare what you are going to eat. When the rocks are heated to a significant amount you put them in with the food you have prepared. Keep adding rocks until you have enough to cook the food.

Shannon: Making dinner was an adventure. We chopped up meat, onions, green beans, peppers, carrots and the wild mushrooms. Then we took the hot rocks that we had put in the fire that morning and put them in the bark pan. We then fried our food with that. It took a while for the food to cook but when it was done it was really good. I was the only person stirring that didn't get burned, believe it or not.

Tom Elpel: It was great fun cooking a gourmet primitive stir-fry. We all worked together to cut up the food, and then we poured on the teriyaki and soy sauces while it cooked. As far as primitive cooking goes, this method is almost grit-free, but Felicia did bite down hard on one little rock, agitating her incoming wisdom teeth. I've since added one more step to the process to help keep grit out of the food. We still use bark tongs to transfer the rocks from the fire into the bark frying pan. Only now, we drop them into another bark pan to knock the grit loose. Then we pick them up again to move them into the food.



Sam: The gathering of our forks and spoons and plates was my highlight of the evening. For our plates we used bark, just like the large slabs of bark we used to cook the food in. While supper was being cooked Brent, Bryce, and I went down to the river fishing, but it got a little chilly so we went back to eat supper empty-handed.



Saxton: Dinner was awesome! I personally think that it cooked faster than it would on a stove. We also threw some Ramen noodles into the stir-fry.

Sam: After supper we had Mr. Elpel show us stalking techniques and how our ancestors used to walk. He encouraged us to do the activity in bare feet so it was kind of painful. At the end of the lesson we had a race across the field and I somehow managed to win the race.

Ashley: Stalking proves to be very difficult, because you are supposed to walk on your toes. You are also supposed to be quiet, and for those who know me I'm not a very quiet person. After losing the mad dash across the field, we started our stalking game. It was a version of capture the flag.

Whitney: I will admit one of the most fun things about this field trip was playing capture-the-flag at midnight under the shimmering eclipsing moon. It was girls against boys and we were after a candy bar... NOT a flag.

Ashley: The point of the game was to get the boys candy bar (it was boys vs. girls) before they could get ours. Now instead of getting captured, getting tagged, you had to be identified. They had to call out your name for you to go to jail. Then after you were identified you go to jail. So the girls wore all black attire, and switched clothes to make identifying us harder.



Shannon: It was fun creeping around in the dark, and I snuck around through the woods trying not to make a noise but I did. I'm not the sneakiest person there was. But the second time I got the candy bar, which was so much fun not being caught. Then we sat by the fire telling a really weird story about Hitler, Michael Jordan, Napoleon and Attila, although I think I fell asleep a couple of times. Then we went off to bed which was a relief because I was really, really tired.

Shannon: We woke up by Tom telling us we were dead beats or something like that. I was the first girl out of our wickiup. I went down to camp and all the boys were down there. Tom showed me how to make a cup.

Shayla: When I woke up to a loud voice of Tom's I went down to the fire to get warm. Everyone was working on their cups and bowls, besides Whitney, because she was still sleeping.

Tanner: We burned holes into cottonwood roots so we could use them to drink tea. Our tea consisted of the mint leaves we picked the day before. For breakfast we had mushroom "omelets" that Mr. Jones cooked for us. They tasted just like the ones you get at the diner.

Shannon: Burning out the cups was an all around good experience but I ended up having a hole in my cup so it didn't work. I burned two holes in my pants, one hole in my sweatshirt and two holes in my shoe. It was a good experience that I'm glad I did and hope to do it again. Maybe next time it won't break. The breakfast was really good.

Tom Elpel: I try to avoid cooking eggs over the fire, since they usually stick and burn to the bottom of the pan. But one trick I've learned is to crack the eggs into a tortilla shell. Fold the tortilla closed over the egg and cook it on both sides until the egg is done inside. It works best in a rounded pan, so the egg doesn't run out. This time we did it in a flat pan and we had to make a dam of fried wild mushrooms to keep the eggs in the burritos. We fed anyone who wanted egg and mushroom burritos first. Then, to speed up the process, Mr. Jones scrambled a large batch of eggs in the pan to feed the rest of the group.



Bryce: After breakfast we tried different methods of starting a fire. The different techniques were the handdrill, the bowdrill, flint and steel, a magnifying glass, and the fire plow. I was in the fire plow group. The way you started a fire with the fire plow was you took a piece of cottonwood root and cut a shallow groove in the wood. Next, we took a sharp piece of root and rubbed it in the groove to cause friction. Eventually, the friction would cause heat and a coal would form at the end of the groove. This procedure is a lot harder than it sounds; it takes a lot of work to get the coal started.

Sam: Bryce and I tried the fire plow but learned quickly that it is not as easy as it sounds or looks, we dropped the fire plow and worked on the handdrill trying to beat the bowdrill.

Bryce: The handdrill uses about the same equipment as the bowdrill, but you don't use the bow or the piece of bark to hold the spindle down. You have to use about a two-foot spindle. Another thing you need is several people (the more the better), to help you with the drill. Dampen your hands to prevent scrapes then rub your hands back and forth on

the drill and push down at the same time. Before you reach the bottom of the drill, tell the next person to start. Like the bowdrill you need to cut a notch to catch the coal once the hole starts to smoke.



Bryce: Flint and steel is probably one of the easiest ways of starting a fire. The supplies you need include a piece of carbon steel, a sharp edged rock, and some dry, soft charred cotton cloth to catch the sparks in. To start hold the steel and the rock in opposite hands. Strike them together and try to get a spark to land in the char cloth.

Saxton: If you do it right you will make sparks. But the steel was not good for the project. So I tried to make a magnifying glass out of a sheet of plastic with water on it. That didn't work either.

Tanner: The handdrill team won by five seconds.

Brent: We ate lunch and talked a little bit and then went and learned how to use the atlatl. The atlatl is a device used for hunting before bows and arrows were even thought of.



Saxton: The last event that we did, which I thought was the coolest, was the atlatl contest. An atlatl is an arrow-like spear with another stick with a notch at the end. It is used to throw the spear farther than you would throw it with your hands. At first it was hard but after a while it got easy.



Brent: It has a handle that has an antler on the tip that you put in a hole in the arrow to hold on to it. Then you hold onto the arrow and move your arm forward and let the arrow come out. The arrow is a long fiberglass or aluminum arrow and it is flexible so that it can adjust in the air.

Saxton: The way the contest went was the closest person to the box got two mints, and the second closest got one mint. If anybody hit the box they got three mints. Shannon was the closest

one to the box out of all rounds put together. I got the closest in two rounds and the second closest in one round. Tom explained how the atlatl had greater knock down power than some guns. The reason I thought this was the coolest contest is because it is a neat weapon for hunting.



Ashley: After learning to throw an atlatl, I proved that I am not any good at throwing. Many people were able to throw clear out to the box, while I could only get it to go a few feet in front of me. Needless to say I didn't receive any mints, unless someone felt bad and gave me one. After we were done with the atlatls we packed up everything and cleaned out the wickiups.

Whitney: I was sitting by the wickiup with Shayla, and a spider dangled down from my armpit. She said "Oh my gosh! There is a spider hanging down from your armpit!" and I screamed bloody murder!! They heard me down at the fire. Then Shayla and I walked down there and everyone looked at me. I explained to them about the spider, and they all started teasing me. It was great to have such a laugh.

Whitney: One of the things that was excellent was how well the class got along in nature: telling jokes, laughing, and full of positive energy and willing to do things. Everything was just so amazing... the weather, the swimming, the games, and the education of course. We learned so much and had a blast at the same time!

Saxton: The walk out was short. Instead of walking with the guys on the way out I walked with Shay, Ashley, Felicia, and Whitney. I carried all four of them back across the creek. When we got to where the bus was supposed to be we worked on our journals for a while. We waited for about two hours until we realized that the school bus had forgotten about us.

Tom Elpel: It was a Friday evening and there were so many school busses out on sports trips that the school forgot about us out there on the ranch. We borrowed a phone, but there was nobody left at the school to call. We dialed the home numbers for all the administrators, teachers, and bus drivers we knew, but they were all away to the games. Finally we tried Connor and Tanner's dad Scott. He and another parent came to the rescue. A half hour later the entire class of very tired kids was finally on their way home. The class is already looking forward to their next adventure of fun and learning.



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We've Gone Solar!

Installing our 2528 Watt Tracking Photovoltaic Array

By Thomas J. Elpel

We have been asked more times than I can count if our owner-built, energy-efficient, stone & log home is off the grid and solar powered. Well no, we've always been on the grid, using electricity from coal-fired power plants and local hydroelectric projects. But we finally made the leap into solar power, and as of January 1st, 2003 we have been producing our own power. We installed a 2528-watt photovoltaic (pv) array on two Zomeworks Passive Trackers to produce almost all of the electricity we use.

In a nutshell, the **Zomeworks Passive Trackers** are built with two large Freon-filled tubes welded from heavy square stock. There is one tube on each side of the tracker, with a small, flexible tube connecting them.

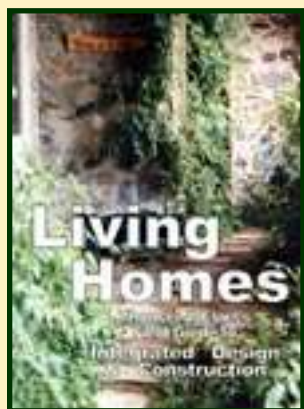


Reflectors on the trackers help to focus solar energy on one of the square tubes while shading the other one. The Freon warms and expands, causing it to flow through the flexible tube to the other side of the tracker. That makes the other side of the tracker heavier, causing the panel to move and align itself with the sunshine. This way the panels track the sun all day long without using any electricity and without using any motorized systems that might break down.

Our pv system is grid-tied, consisting of sixteen 158 watt Kyocera solar panels, such that in the daytime we run the meter backwards, powering other people's homes with our solar electricity, and at night we draw off the grid, using coal-fired power. On average we generate about as much electricity as we use. In this article I'll lay out all the details about the costs and benefits of going solar.

The first thing that everyone wants to know about solar power is how economical it is, because they are tired of paying high utility bills every month. They want to install solar panels, generate their own electricity and save money. Unfortunately, it doesn't work that way, at least not yet. Although the cost of solar power continues to fall almost as fast as the price of computer hardware, the reality is that solar remains significantly more expensive than grid-supplied power under most circumstances.

Going for Efficiency



The single biggest factor in making solar power feasible is still tackling the problem from the demand side, instead of the supply side. Basically, it is impractical to supply the full power needs of a conventional American home with photovoltaics. However, by finding creative ways to reduce demand as much as possible--especially through energy efficiency and alternate fuel sources--you can reduce your electrical needs down to a point where the cost of a photovoltaic system is at least bearable. The idea is to look for ways to eliminate the need for electricity without sacrificing comfort, as detailed in my book **Living Homes: Integrated Design & Construction**. Then you

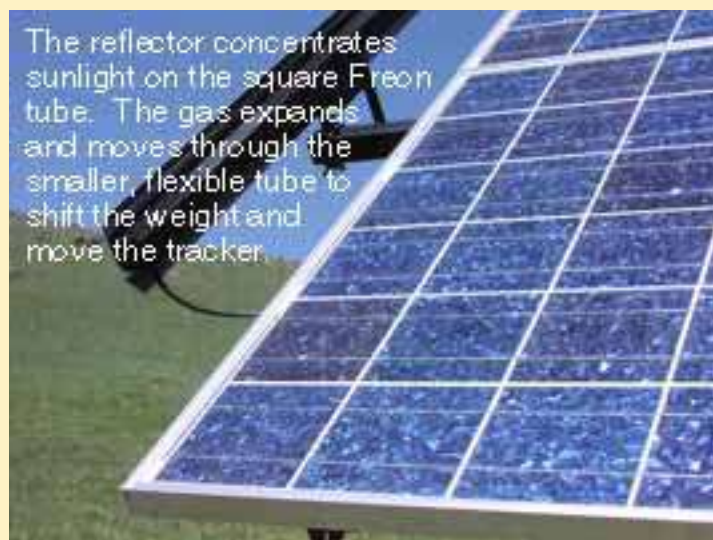
may be able to afford solar power for whatever is left that will not run without electricity.

Turning a house into an energy efficient home is a lot easier when building from scratch, than trying to retrofit an energy-wasting beast later on, but either way is definitely worth doing. We did a little of both in our house, building it as energy efficient as we could with our limited funds, living on a total income of about \$12,000 a year (early 1990's). Read my article **Building a House on Limited Means** for more details.

Household heating and cooling is usually the single biggest energy expense in a home, so we made sure our place was well-insulated, and we built it facing mostly south with lots of windows for passive solar heating. The winter sun shines in through the glass and helps warm the house, and that is hard to beat. We also built an efficient fireplace for backup heating with wood, so we do not use any electricity for heating. Summer cooling isn't an issue here in the mountains of Montana where the temperature rarely exceeds 90°F.

Heating water is typically the next biggest energy expense. We built a solar water heater to provide free hot water whenever the sun is shining. This point may require some clarification, since many people imagine using solar electricity to heat water.

A solar water heater is much like passive solar heating in a house. Sunshine comes through a window and heats your house or heats water in a tank or in pipes, and it is really simple and cheap. Using expensive solar electric panels to heat water would be really foolish. To use an analogy, you could say it would be like passing the basketball all the way down the court and back when you were already standing under the basket



The reflector concentrates sunlight on the square Freon tube. The gas expands and moves through the smaller, flexible tube to shift the weight and move the tracker.

ready to shoot. Just take the straight shot and allow the warmth of the sunshine work directly without trying to convert it to electricity and back to heat again.

The rest of our hot water comes from our wood cookstove. My grandmother cooked on a wood cookstove and I grew up around it. It isn't the most energy efficient way to cook a meal, since it really goes through the firewood, but we've always appreciated the pure quality of cooking on a wood stove. It has water pipes through the firebox to heat water, so we always have scalding hot water when the fire is going. The solar water heater provides most of our hot water in summer, while the wood stove provides the majority of the hot water in winter. We simply take showers when we happen to have hot water. It may be a bit arcane in this day and age, but we like it that way. With this arrangement we do not need electricity for either water heating or cooking on the stove, although we make extensive use of our electric microwave, crock pot, toaster, and hot plate.

The next biggest energy use in a typical home is usually for refrigeration. Many people with solar electric homes have installed propane powered refrigerators, as well as propane for their water heating and household heating, to avoid the need to generate electricity for those tasks. However, as the cost of solar panels comes down, it is becoming more and more reasonable to purchase the extra solar capacity to run an electric refrigerator.

We started out with a small, antique refrigerator we rebuilt ourselves. It added about \$5 a month to our power bill, but didn't do much to keep the food cold. When we were feeling richer we bought a new, modern refrigerator with a lot more space that also uses about \$5 worth of electricity a month, but does a really nice job of keeping the food cold.

At one time there was a big difference in energy use between high-efficiency refrigerators from specialty markets compared to the conventional refrigerators sold at appliance stores. But thanks to energy guidelines from the government, mainstream refrigerators have improved to nearly match the most efficient models on the market. Ours is a no-frills model without an ice-maker or anything like that, so it is reasonably efficient.

We still have a large, older chest freezer, which also gobbles up electricity, but we plan to move it out to the unheated workshop in the near future, where it won't have to work so hard for seven or eight months of the year to keep the food cold.

For lighting we use compact fluorescent lightbulbs through most of our house, which use 25-30% as much electricity as an incandescent bulb to produce the same amount of light. We look forward to switching over to the super-efficient LED lights whenever they become available for standard light fixtures.

In the laundry room we replaced our old, inefficient top-loading washing machine with a super-efficient front-loading model. The efficiency of a washing machine is measured primarily on two factors: 1) how much hot water is needed to wash a load, and 2) how much water is left in the clothes afterwards to be removed in a dryer. Neither factor makes much difference in our electric use, since we heat our water with solar and wood, and we prefer to hang the laundry outside to dry. However, conserving hot water with the front-loading washing machine improves our comfort level by leaving more hot water in the tank for other uses. And the high-speed spin cycle really wrings the moisture out of the clothes so that they don't take nearly as long to dry, or don't consume as much electricity in the dryer when we are forced to use it in wet weather.



We also have a gravity-fed spring, so we do not need electricity for a well pump. But there are two adults and four children in our home, with lots of lights, computers, radios, and the VCR and television usually turned on-- even when not in use. At present our average electric consumption is about 400 Kwh/month, which is much less than a conventional household, but quite a bit more than most alternative, solar-powered homes. That translates to an electric bill averaging \$30 a month for grid-supplied power.

Regardless of the cost of power, we try to do at least one energy-related project in the house every year to conserve either electricity or wood, or at least to improve our quality of life without consuming more and more power. The newer, better washing machine and refrigerator were two such projects. Insulating or weatherproofing some part of the house a little better is a common project too. Installing our own solar panels to generate electricity was by far the biggest, most expensive energy project we've done yet.

Making the Leap

There were several factors that drove our decision to make the leap to solar power, including: 1) peer pressure from people asking if we generated our own electricity in our "alternative" home, 2) personal interest to learn about solar power in a hands-on way, 3) the desire to wean ourselves off of fossil fuels to do our part to curb global climate change, 4) we qualified for a grant to pay back part of the cost of our system, and 5) our business grew to the point that we actually had enough money sitting in the bank to pay for our share of the cost. In a nutshell, we finally made it into the middle class income level, but we had nothing else to spend our money on, since we had no mortgage on our home, we drive older cars, and we had few other monthly bills.

Funding for the grant came from the Universal Systems Benefits Charge (USBC) on our Northwestern Energy power bill (formerly Montana Power Company). Applicants had to be electric customers of the utility. (See www.montanagreenpower.com for more information.) The program was originally administered directly by the company, and we applied for a grant that would have covered the entire cost of our photovoltaic system. We would have "paid" for our share of the cost through labor, by teaching school kids about solar electricity. We might have been awarded the grant, but the residential program was canned just about the time our application went in.

Instead, the utility developed a partnership with the [National Center for Appropriate Technology \(NCAT\)](#) in Butte, Montana to administer a residential cost-share grant program for alternative energy systems. The new program gave a rebate of \$4.50 per watt of installed capacity. The homeowner had to pay the rest. We didn't have enough experience to design our own photovoltaic system, nor the time to learn to do it ourselves, so we asked Oasis Montana, Inc. to put together a package and order it for us. We described approximately what we wanted--two Zomeworks Passive Trackers with as many solar panels as we could fit on them, and a grid intertie system. The helpful staff at Oasis Montana customized a package to maximize the solar capacity on the trackers, with an appropriate-sized inverter for the project. We did our own installation. Our expenses were as follows, not including 30-40 hours of my own labor:

**2528-Watt Grid-Tied Photovoltaic Package
Designed by [Oasis Montana](#)**

Parts Description	Cost
16 Kyocera 158W Solar Modules @ \$736 each	\$11,776.00
6-30' Single Ended Plug-n-Power Cable Sets @ \$30 each	\$180.00
1 Robroy Fiberglass Enclosure	\$105.00
1 Aluminum Back Panel (for above)	\$16.00
1 6 Position Terminal Strip (for above)	\$9.00
150 feet #10GA-USE/Red Wire @ \$0.50/foot	\$75.00
150 feet #10GA-USE/Black Wire @ \$0.50/foot	\$75.00

2 UTR-F120 Zomeworks Trackers @ \$1,518 each	\$3,036.00
2 Zomeworks Tracker High Wind Kits	\$339.00
1 OPS-PSSB Segmenting Breaker Assembly	\$230.00
1 SMA-SB2500W Sunnyboy Utility-Tie Inverter	\$2,253.00
1 30Amp Outdoor Fusible Disconnect, 2 pole	\$70.00
4 20Amp Class R Fuse	\$20.00
Shipping & Handling:	\$746.00
TOTAL OF ABOVE:	\$18,930.00
-Additional Installation Expenses-	
1/2 hour backhoe excavation for poles	\$120.00
2-24" X 2' Sonotubes @ \$21.40 each	\$42.80
2-15' Schedule 40 steel pipe @ \$155 each	\$310.00
3 Cubic Yards of Concrete @ \$73/yard	\$219.00
Misc. Wiring & Conduit	\$50.00
13 Hours Hired Labor @ \$15/hour	\$195.00
TOTAL OF ABOVE:	\$936.80
GRAND TOTAL EXPENSES:	\$19,866.80
USBC Rebate at \$4.50/watt x 2528 watts:	(\$11,376.00)
Montana Renewable Energy Tax Credit:	(\$500.00)

OUR SHARE OF THE COST AFTER REBATE & TAX CREDIT:	\$7,990.80
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Choosing and Installing the Zomeworks Trackers

A significant part of the cost (\$4066.80) went towards the Zomeworks Trackers, and the associated high wind brackets, steel pipe supports, excavation, sonotubes and concrete. The tracking systems increase the performance of the solar panels by directing them towards the sun all day long. However, the added cost of the tracking systems does not justify the added efficiency of the system. In most cases it would be more cost effective to put that money towards additional solar panels and mount everything in a fixed position. This point is especially true in a grant program like this one where the rebate is calculated per watt of installed capacity. At retail cost we paid about \$4.66 per watt of capacity and got a refund of \$4.50 per watt, so the solar panel part of the project was practically free.

The reason we chose the Zomeworks Trackers for our solar array was because we did not have a good place to mount the solar panels on the house. This is a good example of the concept of integrated design. We could have saved the expense of the tracking systems if we had built our house with a section of roof at the ideal orientation and slope for maximum solar exposure. Given that we didn't build our house that way, we had to choose an alternate mounting system. We could have mounted the solar panels in a fixed position at an angle to the roof, but that would have looked really bad. Optionally, we could have done a fixed installation on the ground, but that also would have looked tacky. Instead we chose to mount the panels on the expensive Zomeworks Trackers, which are pretty cool, but also dominate the view of our place. From any place in town where our house is visible, the eyes are drawn directly to the solar array.

We had one other chance to build the solar panels seamlessly into our place. In 2001 we built a small workshop and planned ahead to mount solar panels on it at some future time. We designed it with a barn-style roof, where part of the roof would be at the ideal slope facing due south. The solar panels would have fit the angle and become part of the structure. But midway through the construction we questioned whether we wanted such a tall roof on our little workshop-plus we just got lazy--so we changed the roof to a shallow gable and decided to deal with the solar panels some other way. That decision cost us more than \$4,000 by making it necessary to buy the tracking systems. That expense increased our cost to the point that we don't imagine the system ever realistically paying for itself in reduced utility bills. Nevertheless, we just couldn't stand the idea of having the solar panels mounted at an odd angle to the roof, so the tracking systems seemed like the most aesthetic choice. At least we were foresighted enough to include an extra circuit and wiring in the breaker box for the eventual solar array.

Mostly we have been pleased with the Zomeworks Trackers, although there have been a

few surprises. The first surprise was that the support poles were not included in the kits. It makes sense to do it that way to avoid shipping the heavy steel poles, which can be bought anywhere, but it was an extra expense that was not initially expected.

A bigger surprise was that there was only one pair of shock absorbers included in the kit, so we had to pay extra for an additional pair of shocks to help stabilize the panels in the wind. I do not usually think of our place as being in a "high wind area" because we are largely sheltered by the nearby mountains, so it is often calm here, even when the wind is blowing hard just a few miles down the road. On the other hand, a "high wind area" is relative, and in the greater scheme of things, all of Montana can be considered a "high wind area". When the wind does blow here, it will keep a person awake at night wondering if the roof is going to come right off the house!



The fall of 2002 was the least windy fall I can remember in many years, which was really nice while installing the track racks and solar panels. However, the wind started blowing hard just a few days after we finished the installation--before we ordered the extra sets of shock absorbers. The track racks rocked back and forth and slammed against the rubber bumpers. I lay awake at night wondering if the whole thing was going to fly apart, littering our place with thousands of dollars of useless solar junk. At one point one of the shocks even unscrewed itself somehow, so that there was only one shock left on the rack. The problem wasn't readily noticeable, except that the rack was slamming against the bumper really hard. It mildly tweaked the steel framing before I noticed it and screwed the shock back in place. Installing the extra pair of shocks on each rack cured the wind problem, and it hasn't kept me awake since.

I thought the installation directions could have been more detailed, and I think the project would have been difficult for someone without much building experience. There were also a couple of really funky aspects to the design.



Near the very beginning of the installation process the instructions called for three heavy steel washers to adjust the spacing of the rack. In retrospect, we really needed an additional five washers there for proper spacing, but there was no way to know that in advance, and no way to add more washers afterwards, without taking the entire rack apart. The spacing problem arose when installing the counterweights to help slow the track racks down when they are swinging in the wind. There is a rubber bumper that keeps the track rack from moving too far to

either side, and the counterweight is supposed to swing right past the bumper, but it didn't. The directions called for bending the arm of the counterweight if it hit the bumper. Mangling the arm this way seemed like a poor solution to the problem, and it wasn't nearly enough to let the arm swing by the bumper anyway. Since the rubber bumper is just a heavy steel bolt covered with rubber radiator hose, the simplest solution was to cut the bumper bolts a little bit shorter. That cured the problem.

Since working the bugs out of the track racks, we have really grown to like them. I think of them as "sun mills" as they turn in the sun and generate electricity. On windy days the panels rock gently back and forth, but still track the sun. However, the track racks are definitely less efficient on cloudy days.

The panels always end the day facing west, and on cloudy days there is not enough sunshine to "wake" the panels and return them to an easterly orientation. The result is that the panels remain facing west through part or all of the day, tilted away from the available solar energy. A motorized track rack would be able to stay on target in these conditions to extract any solar energy that is available. Even a fixed installation, with the panels facing due south, would perform better on these cloudy days. Fortunately, we don't have too many days without at least some sunshine in this part of the world.

Panels, Inverter, and Wiring

Installing the Zomeworks Passive Trackers included bolting the solar panels in place. It was a bit tricky working with the heavy panels up in the air, but the job was not too bad, since we could at least stand in the back of the truck to do it. It would have been much more difficult to lift the panels into place from a ladder.

Installing the inverter, combiner boxes, main disconnect and wiring was considerably easier, although additional directions could have helped with the process here too.

Basically, the wires from the eight solar panels on the first track rack are fed into a fiberglass box mounted on the pole, then through conduit underground to a box on the pole of the other track rack. All the wires from both track racks are combined in this box and sent out in a positive and negative wire through underground conduit to the inverter, which is mounted in our workshop.

The 2500-Watt Sunny Boy inverter converts the Direct Current (DC) to Alternating Current (AC) to match the household current. An LCD panel on the inverter shows how many watts are being produced at any given moment, with cumulative totals in kilowatt hours for each day and for the life of the inverter.



The AC is routed back outside the workshop to a main disconnect that is provided for the power company. That way the utility can disconnect our solar panels to work on their power lines, even if we are not home. From the main disconnect the wiring is routed back into the shop where it feeds 220-volt power backwards into the breaker box and from there to the house or back onto the utility grid.

We signed a "net-metering" agreement with the power company so that we are credited for the power we produce. If we produce more power in a month than we use, then the surplus remains on the account for any future month when we draw more power than we produce. That way we can use surplus power produced in summer to make up for those short winter days when we are not generating as much.

There are no batteries in our system, and unfortunately it will not operate unless the grid is working. However, I think that battery technology is still in the dark ages, and I am glad

that we don't have to deal with them. At some point we may want to research the feasibility of modifying our system so that we can use it even when the grid is down, but we have never been overly concerned about that issue.

Real World Performance

With 2528 watts of solar panel capacity we can generate 2528 watts of power under the most favorable conditions. The rest of the time the system generates less power than that. Several factors affect the performance, including atmospheric conditions, temperature, and snow cover--or the lack of it. A system like ours placed in sunny southern California might never reach peak output, since solar gain would be reduced by the thickness of the atmosphere, plus the amount of water and pollution in the air. The panels also work better under cooler temperatures, so a system in a southern location may never exceed 75% of capacity.

Here in Montana we lose efficiency due to our short winter days, but make up for it with the cooler temperatures, thinner air and crystal clear atmosphere, plus we get the benefit of additional watts reflecting off the snow cover. On one bright, but cloudy day there wasn't enough sunshine to wake up the passive trackers to turn east, but from their westward position they were producing more than 100 watts of power solely from sunlight bouncing off the clouds and snow cover. Otherwise, on a typical sunny winter day with snow cover we produce 2200 to 2400 watts with frequent short spikes up to peak capacity. Once while I was looking at the LCD screen on the inverter, the output even jumped a few watts above peak capacity for about half a second. As we move towards summer we have the benefit of longer days, but slightly lower output, usually between 2000 and 2200 watts on clear days, probably due to warmer temperatures and additional haze.

Based on our historic power use, we need to produce an average of 13 kilowatt hours per day to cover our consumption. That is about the amount of power we generate on fully sunny winter days. On cloudy days we produce less. With the longer days of spring we can often produce 21 kilowatt hours per day. The question is, can we produce enough of a surplus on sunny days throughout the year to make up for our power consumption on all the cloudy days?

Flipping the Switch



The utility installed a Net Meter that runs forwards or backwards.

It was quite the thrill the first time we flipped the switch to watch the wheel on the electric meter start spinning backwards. We were still waiting for some paperwork to go through before we could get our electrical inspection. Then we could sign the Net Metering Agreement with the utility and they would replace our meter with a special Net Meter to credit us for the power we produced. In the meantime--even if we were not being credited for the power we fed into the grid--at least we would be consuming less and thereby lowering our power bill. So I was shocked to find that our next utility bill was even higher than before!

As it turns out, the utilities had some trouble with customers in the past taking their meter out and turning it upside-down to make it run backwards. So modern meters are made to run forwards regardless of which

way the power comes into the meter. The dial was turning backwards, but we were being charged for the power we produced. Fortunately, the meter had an internal counter that registered all the power we put onto the grid. When the Net Meter was installed the utility gave us a credit for all the power we fed into the old meter.

At this writing, we are still trying to determine how much of our power is being offset by the photovoltaic system. With the power we produced, plus the credit on our account, we were billed for nothing but the \$4.60 service charge for the first couple months of the year. Then we got a power bill for \$8.76 (\$4.60 service charge + \$4.16 for 62 kilowatt hours of electricity) for the month of April and \$9.78 for May, both of which were very cloudy months. We were also running the dryer a lot at that time. In June we again zeroed out and started accumulating a new credit. It may take awhile to determine how close we are on average to producing all of our own power.

It is possible that we were generating as much power as we *were using*, but we've since added another appliance that draws quite a bit of electricity. We remodeled our kitchen and added a high-tech Fisher & Paykel Dish Drawer for washing dishes. It is a nicely efficient dishwasher, but like most dishwashers it uses an electric current to boost the water temperature. Previously we only washed the dishes when we had hot water available from the solar panel or from the wood stove. Now we turn it on whenever we want, so we are sometimes boosting the



temperature of the water from frigid to scalding, and that uses a lot of power.

Moving our chest freezer out of the house into the unheated workshop where it will draw less power may be enough to offset the additional power used by the dishwasher. I'm not sure, but time will tell, and we will continue to invest in energy conservation projects at least until we are producing as much electricity as we are using. It is not really about money. It is more a matter of doing our part to reduce global warming, plus it is just a good sport to seek new ways to trim the power bill every year!

The Big Picture

If you do the number crunching, our solar electric installation doesn't seem to make much economic sense. Given the total cost of the project, it is unlikely that the system would ever recover it's costs. Even with more than half the cost subsidized by the USBC Rebate and the Renewable Energy Tax Credit, our share of the cost could easily take 20-30 years to recover. It may seem like a poor investment on our part, as well as a waste of other people's money to subsidize this technology that doesn't pay for itself. But I see it differently.

It is generally agreed that all the necessary technological hurdles have been adequately addressed to make PV systems affordable. The only remaining obstacle is the scale of production. There is an effort in California to guarantee a market for a large number of PV systems (at a lower price), provided that the manufacturers are located in California. The thinking is that if you create a large enough market, then PV manufacturers will be able to scale up production enough to bring the unit cost down to greatly expand the market.

Government meddling in the markets is often viewed suspiciously, as subsidizing products that cannot make it on their own. But there is precedent here. The U.S. Department of Defense was about the only purchaser of the first silicon chips in 1961. The chips from Texas Instruments cost \$100 each and didn't do much. They replaced only a couple dollars worth of conventional electronics. Many people considered it a foolish waste of money. But the government orders created enough demand to bring the market price down so that private companies also started buying the chips. The cost per chip fell to \$2.33 by 1968 and sales to the private sector quickly dwarfed those to the government. Today we have low-cost silicon chips for personal computers that have far greater processing capacity than the sum of all chips put together at the time of the first trip to the moon. If the government didn't take part, then the computer revolution may not have happened yet, and you wouldn't be seeing this web page now.

Similarly, you could say that the only reason we could afford our PV system is because someone before us was foolish enough to pay a whole lot more for their system than we did for ours. In this respect, you could say that PV systems are generational. Ours is the result, the offspring, of an earlier, more expensive system, and ours will be the grand-

daddy of other PV systems to come. In other words, the payback period might not be great for us on our system, but by installing 2500 watts today, we've done our part to bring costs down so that other people will inevitably install 250,000 watts of new systems at a lower cost a few years down the road. Suddenly it looks like we got a really good deal for our money!

Markets do not readily recognize the value of benefits to "the commons", but I do. Our PV system helped to make many other PV systems more affordable at a future date, which cumulatively goes a long ways towards preventing the planet from boiling over from fossil fuel emissions. That is very much in my own self-interest, even though I live in Montana where even the warmest years are still on the cold side!



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

Also see our selection of [Books On Independent Power Systems.](#)

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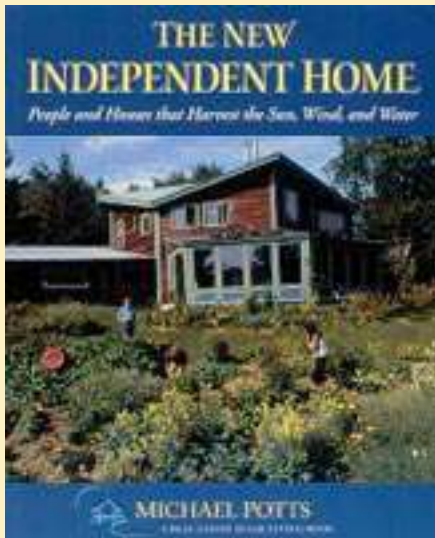
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The New Independent Home

People and Houses that Harvest the Sun, Wind, and Water

by Michael Potts



Because of its impact in bringing the almost unknown promise of solar energy to thousands of readers, one longtime observer of energy trends described the publication of the *Independent Home* as "the most important event in the solar industry in more than a decade." The book's initial publication in 1993 coincided with a National Tour of Independent Homes. When more than ten thousand people attended this one-day event, it suddenly became clear that the promise of living in homes powered by sunlight, wind, and falling water had caught the imagination of far more Americans than expected.

In this newly revised and expanded edition, Potts again profiles the solar homesteaders whose experiments and innovations have opened the possibility of solar living for the rest of us. Potts provides clear and highly entertaining explanations of how various renewable energy systems work, and shows why they now make more sense than ever. He is a brilliant guide to the stages of planning and design faced by everyone who seeks to create a home that reconciles the personal and global dimensions of ecology.

Over the past five years, the concept of an "independent" home has evolved beyond the energy system to encompass the whole process of design and construction involved in planning a renovation or a new home. Independent homes are homes with integrity and personality. Beautiful abodes are now being built with age-old materials, such as straw bales and rammed earth, and combined with state-of-the-art electronic technologies for harvesting free energy from the surrounding environment. Potts writes with lucidity about a group of homeowners some would consider to be the lunatic fringe and others would regard as among the only sane people on the planet. This move toward self-reliance is an important trend that will continue to surprise and delight us as we approach the inevitable dawn of the Solar Age.

The New Independent Home \$30.00

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Also be sure to read our on-line article [We've Gone Solar!](#)

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Iodine & Iodine Crystals for Water Purification

Text adapted from

Participating in Nature:

Thomas J. Elpel's Field Guide to Primitive Living Skills

Iodine can be used in several different forms for water purification: as tablets, liquid, or crystals. **Iodine tablets** are available at most camping supply stores, and they are very effective at killing anything in the water, but they have a short shelf life even when new, and rapidly lose potency after opening. The tablets also give the water a nauseous taste and can be harmful if used over an extended time period. Renee and I only used tablets once. We brought some iodine tablets on our 500 mile walk across Montana. The one time we used them was to flavor the water at Two Dot, Montana because the alkaline town water tasted worse than the iodine tablets!

A 2% tincture of liquid iodine from the drug store, like that used in a first aid kit, can be used as a less expensive alternative to tablets. Just add 8 drops to one quart of water and let it sit for about fifteen minutes before drinking. But make sure it is fresh iodine, since it too has a short shelf life.

The best form of iodine for water purification seems to be **USP-grade resublimed iodine crystals**. The crystals "sublime" from a solid to a gaseous state without passing through a liquid phase in between. A small pinch of iodine crystals (4-8 grams) can be re-used almost indefinitely for water purification. Just put the crystals in a one-ounce bottle with water and hold it in your hand to warm it up to body temperature for a few minutes until the water is saturated with iodine from the crystals. Then add 10 millimeters of this saturated water (but not the crystals) to your canteen for every quart or liter of volume. The temperature of the water in the canteen doesn't matter; it can be very warm or ice cold. But wait a good fifteen minutes for the iodine to kill everything before you have a drink



Iodine crystals sound almost like alchemy or a great placebo at first, since the crystals can be re-used indefinitely. But I finally tried it myself, and the treated water certainly had the smell and flavor of water treated with tablets, although it was not nearly as strong. Apparently there is enough iodine in the water to do the job. The difference in taste may be simply that the iodine sublimates into a gaseous state, rather than dissolving into a liquid form. I've also noticed that the iodine flavor becomes less and less noticeable the longer the water sits, suggesting that the iodine slowly escapes from the water



Iodine crystals are nearly inert, but they will evaporate (sublime) into the air if the cap is left off the bottle. They will also completely sublime into water if placed in a large enough volume.

The purpose for warming the water in the one ounce bottle is because the warmer water holds more iodine before reaching a state of saturation or "dynamic equilibrium" at which point the crystals stop dissolving. After pouring the saturated solution into your water bottle, then you can replace the water in the one ounce bottle so that you will have saturated iodine water ready when you need it to treat the next

batch of drinking water

So, you may be wondering, if iodine crystals are so good for water purification, then how come you cannot buy them at the camping supply store downtown? The reason is simply that the crystals are toxic if accidentally ingested, so there is a potential liability issue there. Fortunately, you need only 4 to 8 grams of crystals for water purification, while the lethal dose is considered to be above 15 grams. Still, you want to be careful to avoid accidentally ingesting any of them.

Our kits include a one-ounce bottle with 4-8 grams of iodine crystals, plus instructions. Only YOU are responsible for the safe use of this product. **Sorry, we cannot ship this product outside the USA.**

Water Purification: Iodine Crystals --USA Only-- \$12.00 Quantity:

Participating in Nature, 5th Edition. \$25.00 Quantity:

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Hand-Crafted Braintan Buckskin

There is nothing in the world quite like the look and especially *the feel* of genuine hand-crafted braintan buckskin clothing. When you wear braintan buckskin clothing you connect with the ancients who wore the buckskins every day of their lives for thousands of generations. Genuine braintan simply feels *real* in a way that nothing else can compare.

For those who want to tan their own hides we have plenty of books, videos and tools for either the **Wet-Scrape** methods or the **Dry-Scrape** methods. And for those of you who lack either the time or the will to tan your own, we now stock quality braintan buckskin hand-tanned by artisans around the West. We take a picture of each hide we sell, so you can see exactly what you are getting. (Please excuse the wrinkles, but we have to keep the hides folded up, since we do not presently have a place to hang them.)

Braintan is great for clothes for primitive living, mountain man rendezvous and Native American dress and beadwork. All our deer and elk buckskins are lightly smoked and very soft.



BTD1--Deer Hide / 12 Sq. Feet: \$240.

Buy This Skin! Enter "1" in box.



BTD2--Deer Hide / 10 Sq. Feet: \$200.

Buy This Skin! Enter "1" in box.

-Please scroll down the page for the "Add to Order" button.-



BTE1--Elk Hide / 20 Sq. Feet: \$500.

Buy This Skin! Enter "1" in box.



BTE2--Elk Hide 20 Sq. Feet: \$520.

Buy This Skin! Enter "1" in box.

-Please scroll down the page for the "Add to Order" button.-



BTE3--Elk Hide 22.25 Sq. Feet: \$555.

Buy This Skin! Enter "1" in box.



BTE4--Elk Hide 15.75 Sq. Feet: \$425.

Buy This Skin! Enter "1" in box.

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Make Your Own Braintan Buckskin!



Now you can learn the magic of transforming raw skins into velvet-soft braintanned buckskin! Braintan is soft and light in comparison to the dense, slick commercial leathers. Lecithin is an oil in the brains that is used to lubricate the fibers of the hides so they can be stretched (kind of like taffy) until soft and dry.



Some braintanners utilize a **wet-scrape** process where the wet hide is draped over a round log and dehaired with a dull tool. Other tanners utilize a **dry-scrape** process where the fresh hide is stretched and dried in a frame, then dehaired with a razor-sharp tool. Wet-scraping is an easier way to remove the

hair, but dry-scraping usually allows better penetration of the brains. We have books, videos and tools for either method.

**Wet-Scrape
Books, Videos & Tools**

**Dry-Scrape
Books, Videos & Tools**

Additional Resources

Wet-Scrape Resources

Tanning Spirit

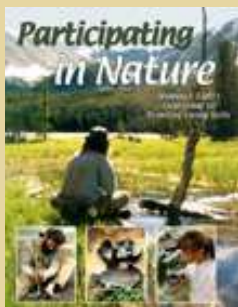
by Melvin Beattie

A Step-by-Step Instructional Video of the Brain-Tanning Process

In 1978 Melvin Beattie brought his brain-tanned buckskin to sell at a black-powder rendezvous with some 300 people. He was the only one there with genuine brain-tan. At the same rendezvous ten years later there were 3,000 people in attendance, and it seemed that everyone had brain-tan to sell.

Melvin is my cousin, and one of a few people around the country who helped recover the nearly lost art of braintanning. Today there are individuals all over the West who learned wet-scrape tanning directly from Melvin, or from others he has taught.





Discover for yourself this amazing process of making velvet-soft buckskin from raw animal skins! This 52 minute video features Melvin and his tanning method. It is an easy, informative step-by-step look at the magical tanning process. Use Melvin's *Tanning Spirit* for an overview of the process, and my book **Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills** for details and trouble-shooting, and you have a combination that will easily guide you through the tanning process. 1990. 52 minutes. Cost: \$30.00. Please scroll down the page for ordering information.

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. For our European customers we may be able to special order PAL format. Please send an e-mail to us through our [E-mail Contact Page](#) to inquire.

"I finally managed to take advantage of the information I obtained from you on brain tanning hides. I found that Melvin Beattie's video "the Tanning Spirit" most beneficial. I have done three hides so far and have been able to pick out the mistakes I have made--all of them are correctable. When I was reading the books---they are all very good---tanning seemed to be a very complicated process and I couldn't help wondering if I really wanted to get into it. Watching Mel's video helped me to realize just how easy hide tanning really is. I would definitely recommend Mel's video to any one interested in tanning hides!" (--Tim B.)

Tanning Spirit VHS Video \$30.00

Quantity:

Participating in Nature, 5th Edition. \$25.00

Quantity:

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Wet-Scrape Tools

From High-Quality Planer Blades



The best wet-scrape tools we have ever found are the planer blades from saw mills. The blades are resharpened at the mill again and again until they are too narrow to fit in their planer equipment. We buy the blades secondhand and fit them with simple and comfortable rubber hose handles, so this is a mostly-recycled product. We dull the blades slightly for wet-scrape use. If the blades still cut into the hide at all, then you should dull the blade some more with sandpaper or sandstone. Cost: \$18.00

Wet-Scrape Tool \$18.00

Quantity:

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Deerskins into Buckskins

How to Tan with Natural Materials
by Matt Richards



Matt Richards learned tanning from Melvin Beattie and Jim Riggs, and favors the wet-scrape process for most tanning projects today. Matt discovered that ashes (lye) can clean the mucus out of a hide to facilitate penetration of the brain material, a significant improvement to the wet-scrape process. Matt also faced the challenge of tanning hides without modern implements, and proved that quality braintan could be produced in the field with truly primitive tools. In this straight-forward manual, Matt leads you through the tanning process using either modern or primitive implements. 1997. 158 pages. Cost: \$15.00

Deerskins into Buckskins \$15.00

Quantity:

-Please scroll down the page for the "Add to Order" button.-

Buckskin

The Ancient Art of Braintanning
by Steven Edholm & Tamara Wilder



Buckskin: The Ancient Art of Braintanning (originally titled *Wet-Scrape Braintanned Buckskin*) is a veritable encyclopedia of the braintanning process. Steven and Tamara first learned the art of tanning from Jim Riggs and Melvin Beattie. They added their own innovations to the process and compiled the most definitive work available on brain-tanning today, with lots of tips for trouble-shooting problem hides. *Buckskin: The Ancient Art of Braintanning* also includes comprehensive sections on making and using buckskin clothes, dyeing buckskin, tanning deer hides with the hair on, and many other uses of the deer. Steven and Tamara have a casual, fun-to-read writing style. 1997. 2001. 300 pages. Cost: \$20.00

Buckskin: The Ancient Art of Braintanning \$20.00

Quantity:

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Complete Wet-Scrape Tanning Package!

Cost: \$98.00 (Save \$10.00)

-This package counts as 5 items for calculating postage.-

Package includes:

- [Tanning Spirit Video](#)
- [Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills.](#)
- [Wet-Scrape Tool](#)
- [Deerskins into Buckskins](#)

- **Buckskin: The Ancient Art of Braintanning**

Complete Wet-Scrape Tanning Package (Save \$10) \$98.00

Quantity:

For more information and supplies for tanning, also check out Matt & Michelle's excellent website
<http://www.braintan.com>



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hair, but dry-scraping usually allows better penetration of the brains. We have books, videos and tools for either method.

**Wet-Scrape
Books, Videos & Tools**

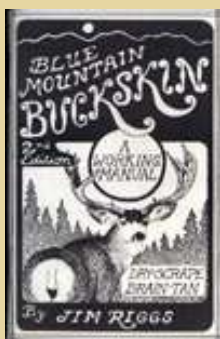
**Dry-Scrape
Books, Videos & Tools**

Additional Resources

Dry-Scrape Resources

Blue Mountain Buckskin

by Jim Riggs

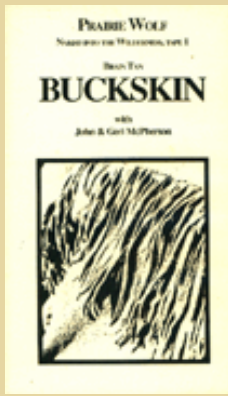


Like [Melvin Beattie](#), Jim Riggs was one of a small handful of people practicing primitive skills in this country twenty-five years ago. Jim learned the art of braintanning from old-timers Slim Schaefer and Sonny Sherman, and went on to produce *Blue Mountain Buckskin* as the classic book on dry-scrape tanning. First printed in 1979, *Blue Mountain Buckskin* remains the most comprehensive text available today on dry-scrape braintan. Jim's book includes an in-depth section on manufacturing buckskin clothing, plus good braintan humor and fun illustrations. (2nd Edition, 1982, 2003.) 134 pages. Cost: \$15.00

Blue Mountain Buckskin \$15.00

Quantity:

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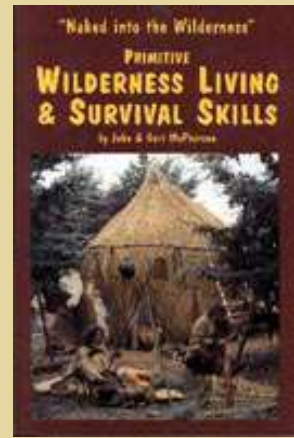


Dry-Scrape Brain Tan Buckskin

by John and Geri McPherson

Video companion to the book *Primitive Wilderness Living and Survival Skills*

This is the video companion to Chapter One of John & Geri McPherson's book **Primitive Wilderness Living and Survival Skills**. In this video the McPherson's detail the tanning process from raw skin to finished Buckskins. They explored many methods of tanning and adopted the most simple, time efficient processes they ever encountered. As with every skill they do, they look for function before art. If stuck in a real primitive situation, they want the easiest, most efficient (both for time and energy) method. 80 minutes. Cost: \$25.00



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Prairie Wolf Video: Dry-Scrape Braintan \$25.00

Quantity:

Primitive Wilderness Living & Survival Skills \$25.00

Quantity:

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Dry-Scrape Tools

Quality Hand-Crafted Tools

People have been asking us for years to sell dry-scrape tools, and we finally have them available. Each scraper is professionally hand-crafted and very high-quality. The tool is shaped at an angle which is ideal for working without hitting the handle against the hide. Be careful handling this tool, since the blade is razor sharp, unlike a wet-scrape tool. Cost: \$75.00

Dry-Scrape Tool \$75.00

Quantity:

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Complete Dry-Scrape Tanning Package!

Cost: \$122.00 (Save \$18.00)

-This package counts as 4 items for calculating postage.-

Package includes:

- [Blue Mountain Buckskin](#)
- [Dry-Scrape Brain Tan Buckskin Video](#)
- [Primitive Wilderness Living & Survival Skills](#)
- [Dry-Scrape Tool](#)

Complete Dry-Scrape Tanning Package (Save \$18) \$122.00

Quantity:

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Additional Resources

Tanning Nature's Way The Art of Making Leather and Furs

Video by Brent Ladd



Brent Ladd uses and demonstrates both **wet-scrape** and **dry-scrape** methods in his video, *Tanning Nature's Way* (formerly *The Complete Braintanner*). He is one of an increasing number of tanners to use the "pre-smoke" process, where the hide is smoked before it goes into the brains. In this video Ladd demonstrates the use of both modern and primitive implements for the tanning process. In addition to tanning buckskin, the video includes an overview of the process for tanning furs, deerskins with the hair on, and even buffalo hides! 89 min. Cost \$30.00.

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. For our European customers we may be able to special order PAL format. Please send an e-mail to us through our [E-mail Contact Page](#) to inquire.

Tanning Nature's Way video \$30.00

Quantity:

For more information and supplies for tanning, also check out Matt & Michelle's excellent website <http://www.braintan.com>

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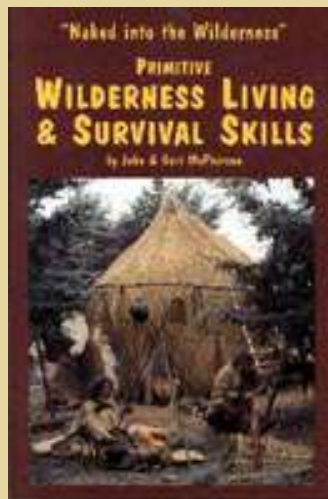
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Primitive Wilderness Living & Survival Skills

by John & Geri McPherson



John & Geri McPherson are true pioneers in rediscovering ancient skills. They do not settle for anything less than the truly primitive. They start with their bare hands and work their way up from there. In fact, they coined the term "primitive, primitive" to stand for primitive tools *made with* primitive tools. *Primitive Wilderness Living & Survival Skills* was originally published as ten separate booklets, the "*Naked into the Wilderness*" series. Each booklet became a chapter within the book, covering these topics:

1. Brain Tan Buckskin: McPherson's dry-scrape process.
2. Primitive Fire & Cordage: bowdrill, handdrill, cordage.
3. Makin' Meat - 1: the bow & arrow.
4. Makin' Meat - 2: traps, gathering, atlatl, insects, meat preservation.
5. Primitive Wilderness Cooking Methods: in the coals, broiling, baking,

boiling.

6. Deer from Field to Freezer: field dressing, skinning, sinew removal, meat cutting, etc.
7. Containers - 1: baskets, coiled baskets, bark container, stone, animal parts, wood.
8. Containers - 2, Primitive Pottery: clay, temper, construction, firing.
9. Primitive Tools, Making & Using Them: digging stick, awl, celt, hafting, adze, vice, etc.
10. Primitive Semi-Permanent Shelters: wickiup, lean-to, thatched wickiup, etc.

Primitive Wilderness Living & Survival Skills is illustrated with an incredible 700 photos to take you step-by-step through every process. 1993. 408 pages. Cost: \$25.

Primitive Wilderness Living & Survival Skills \$25.00

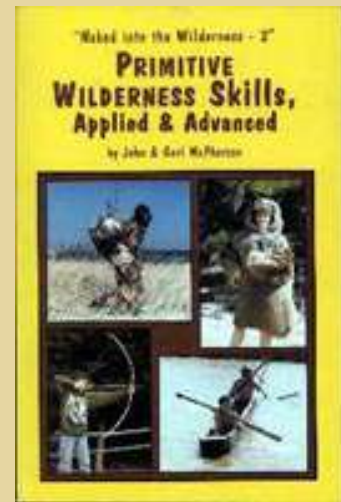
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Primitive Wilderness Skills, Applied & Advanced

by John & Geri McPherson

John & Geri McPherson continue on the cutting edge of primitive innovation with *Primitive Wilderness Skills, Applied & Advanced*. In this book, John and Geri flesh out many of the ideas started in their first book and explore new frontiers. They also share their experiences in working with local kids on primitive skills projects.



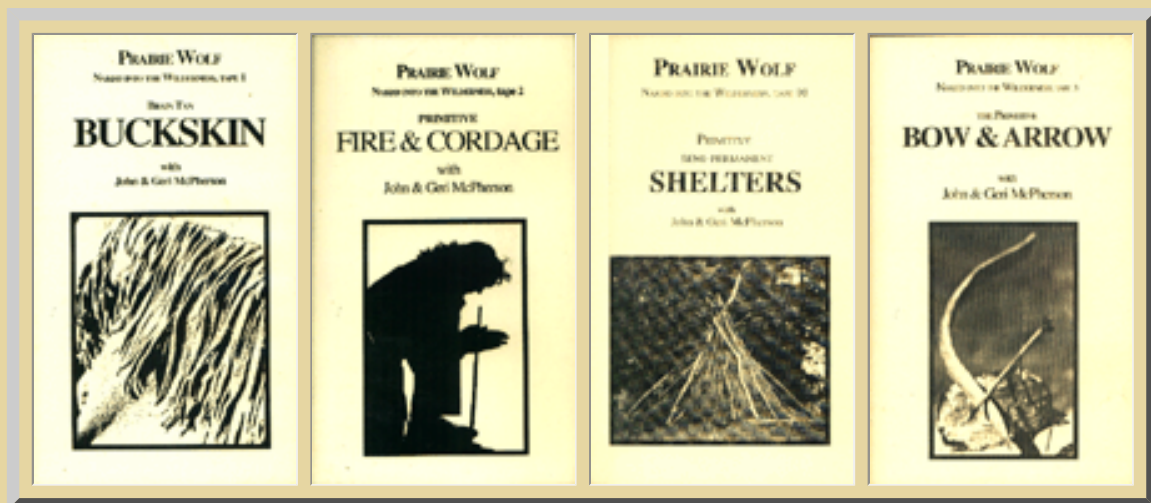
1. Hantavirus: What you need to know.
2. Nutrition: Why hunting/trapping skills are essential.
3. Brain Tan Robes & Furs: How to tan deerskins with the hair on, plus furs.
4. Dugout Canoe: Local kids helped make a canoe with stone-age tools
5. Odds'n Ends: Notes on flintknapping, fat lamps, bone needles, quickie bow, etc.
6. Primitive, Primitive: Theory and philosophy.
7. Naked into the Wilderness Day 1: Shelter, fire, traps, basketry.
8. Naked into the Wilderness Day 2: Stone axe, bow & arrow, woven clothes.
9. Naked into the Wilderness Day 3: Squirrel moccasins and more.
10. Storms: A short story by Geri.

Primitive Wilderness Skills, Applied & Advanced is illustrated with lots of photos to take you step-by-step through every process. 1996. 290 pages. Cost: \$25.00

Primitive Wilderness Skills, Applied & Advanced \$25.00 Quantity:

-Please scroll down the page for the "Add to Order" button.-

Prairie Wolf Videos by John & Geri McPherson



The quality of primitive skills instructional videos varies widely. Some

videos have really good information, but they would almost kill you with boredom. Other videos are fun to watch, but not terribly informative. There are relatively few videos that are both educational and stimulating to watch. We have scored each of the videos we carry for information content and the presentation quality. Five *'s in each category is the highest score.

The McPherson videos rate very high in information content, but sometimes low in the quality of the presentation. We scored the videos conservatively to leave room at the top for the newer and better videos that we expect to become available in the coming years.

Brain Tan Buckskin

This is the video companion to Chapter One of John & Geri McPherson's book *Primitive Wilderness Living and Survival Skills*. In this video the McPherson's detail the tanning process from raw skin to finished Buckskins. They explored many methods of tanning and adopted the most simple, time efficient processes they ever encountered. As with every skill they do, they look for function before art. If stuck in a real primitive situation, they want the easiest, most efficient (both for time and energy) method. 80 minutes.

Primitive Fire and Cordage

This is the video companion to Chapter Two of John & Geri McPherson's book *Primitive Wilderness Living and Survival Skills*. The video covers the hand drill and bow drill, plus cordage, and the bamboo fire saw.

The McPherson's prefer the handdrill technique. It was the most common method of fire making by aboriginal peoples throughout the world because it is so simple. There are only two components--the drill and the hearth, sometimes from the same wood source.

Under the harshest conditions, when you need fire the most, then the bowdrill is easier--assuming all the necessary materials are available. That's why cordage making is included in this video, to show you how to make functional bowdrill strings from natural materials. 100 minutes.

The Primitive Bow and Arrow

This is the video companion to Chapter Three of John & Geri McPherson's book *Primitive Wilderness Living and Survival Skills*. In this video John McPherson details every step of the process to make a primitive bow and arrow. The critical part of the process is understanding the basic physics of bow-making, so McPherson spends much of the video in front of the chalkboard, making diagrams that illustrate how to shape a piece of wood so that it will bend efficiently to make a bow. Once you understand these rules then you can make a bow from just about any piece of wood. Then you need an arrow. McPherson outlines the essential rules of making good arrows, and shows you how to make your own from start to finish. 115 minutes.

Deer from Field to Freezer

This is the video companion to Chapter Six of John & Geri McPherson's book Primitive Wilderness Living and Survival Skills. Using only common knives found in most kitchens, John McPherson demonstrates how to butcher a deer-sized animal from the moment of the kill all the way until the meat is wrapped and ready to put in the freezer. (Since a deer was not available at the time of filming, they used a goat instead, but the process is the same.) They show you how to skin, how to remove the sinews, and how to "debone" the animal, taking the meat off with a knife, rather than cutting through the bones with a meat saw. With this video you will see how easy it is to transform a fresh carcass into many months worth of good eating. 65 minutes.

Primitive Semi-Permanent Shelters

This is the video companion to Chapter Ten of John & Geri McPherson's book Primitive Wilderness Living and Survival Skills. Along with fire, shelter is one of the most important survival that you will need in any primitive living and/or survival situation.

In this video, John spends plenty of time explaining the rules, concepts and materials of good shelter building. Then he and Geri (+ one friend) head out and make four different styles of semi-permanent homes from a variety of natural materials. Note that these are not quick, survival-type shelters you could build in a hurry, but rather these are long-term shelters, the kind that take a little more effort to construct up front to establish a quality primitive dwelling for an extended wilderness living situation. 90 minutes.

How-to Construct the Asiatic Composite Bow

By Jeff Schmidt and John McPherson. Centuries ago the Asiatic Composite Bow was used to kick butt. These were short and powerful bows that could be used with a long, heavy arrow. The bows were made with horn and sinew glued to a wooden core to make a bow capable of casting an arrow over half a mile. Jeff Schmidt has built more than two dozen of these bows. In this video he demonstrates his favorite construction techniques. The concept is so simple it will surprise you. 90 minutes.

Breaking Rock

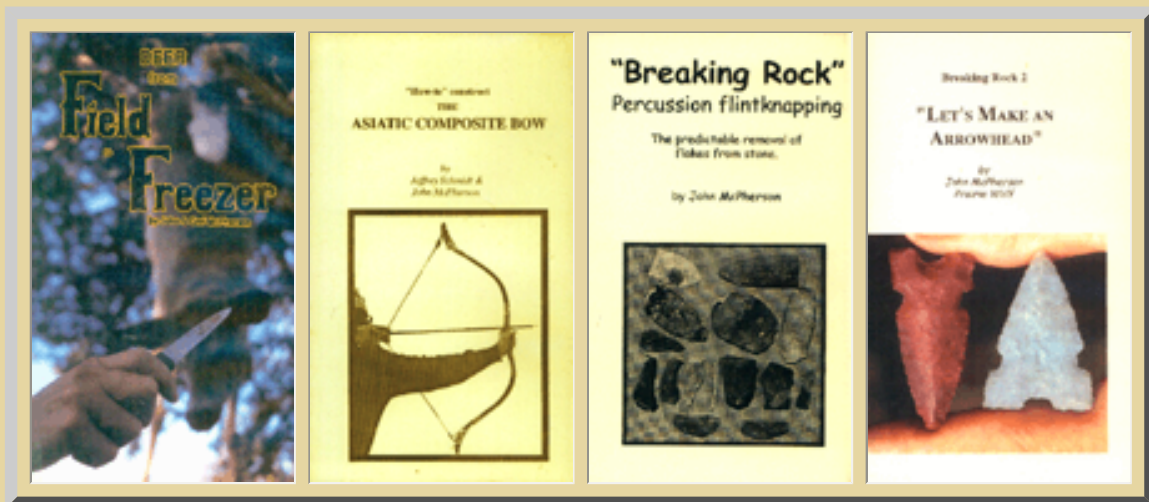
Many flintknappers can make excellent stone tools, but few can clearly explain the process. In this two hour video, the first hour is spent "in the classroom", covering the physics behind flake removal. McPherson has gone to great time and effort to demonstrate with models that explain the process of flake removal. From a visual perspective picture is worth a thousand words. He clearly illustrates how all the rules (the very basic core of flintknapping) are derived from only one basic principle of physics. Once the viewer sees how all this is tied together, he/she will advance their flintknapping techniques by light years.

The second hour is spent removing flaks from a core and making a bifacial preform. Flake-by-flake you will see John McPherson unravel the secrets of flintknapping. He included in the video everything he wish he knew many years ago, when he first started flintknapping. 118 minutes.

Breaking Rock II: Let's Make an Arrowhead

In the first Breaking Rock video, John McPherson demonstrates how to make a bifacial preform.

In this sequel video he takes flintknapping to the next step, teaching you how to make an arrowhead from a bifacial preform. Step-by-step and flake-by-flake, McPherson takes away the mystery of flintknapping as he makes two arrowheads and shows how to overcome various obstacles. McPherson works with abo hammerstones and antlers for most of his work, plus he explains the use of copper tools for the difficult parts. The emphasis is on being able to produce functional arrowheads, not artistic points that are for show only. 60 minutes.



Title	Information	Presentation	Cost	Quantity
Prairie Wolf: Dry-Scrape Braintan	****	***	\$25.00	
Prairie Wolf: Primitive Fire & Cordage	****	**	\$25.00	
Prairie Wolf: Deer From Field to Freezer	****	**	\$25.00	
Prairie Wolf: Primitive Bow & Arrow	****	*	\$25.00	
Prairie Wolf: Semi-Permanent Shelters	****	*	\$25.00	
Prairie Wolf: Asiatic Composite Bow	****	**	\$35.00	
Prairie Wolf: Breaking Rock	****	***	\$25.00	
Prairie Wolf: Let's Make an Arrowhead	****	***	\$25.00	
All Eight Prairie Wolf Videos		(Save \$30.00)	\$180.00	

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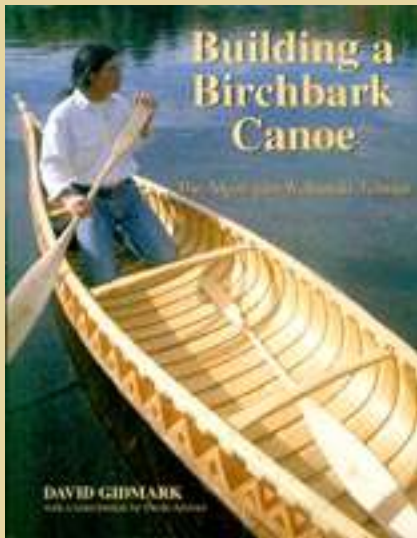
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Building a Birchbark Canoe

The Algonquin Wabanaki Teiman
by David Gidmark

The birchbark canoe is the true native watercraft of the northeast, and ideally suited to any region where birch trees grow large. Author David Gidmark is one of few non-natives to learn this ancient craft of making a birchbark canoe. He has meticulously detailed the step-by-step construction methods of the traditional Algonquin canoe builders, demonstrating everything you need to build your own birchbark canoe. Along the way he invites you to appreciate the cultural significance of

this elegant and practical craft that might otherwise be lost to history. 2002. 147 Pages. \$20.00

Building a Birchbark Canoe \$20.00

Quantity:

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Canoecraft

An illustrated guide to fine woodstrip construction
by Ted Moores



Cedarstrip and woodstrip canoes are not primitive watercraft. Their history originates in the mid-1800's from craftsmen in Ontario searching for a way to combine the rugged durability of the wooden dugout canoe with the light agility of the birchbark canoe. The builders used a dugout canoe as a mold, then steambent three wooden planks around each side to form a wood-plank canoe. The process was refined over the next century, gradually evolving into the incredibly elegant woodstrip canoes we see today. The

unparalleled elegance of the modern woodstrip canoe makes it seem like the perfect marriage between wood and water.

Ted Moores book *Canoecraft* provides detailed step-by-step instructions so that anyone

with moderate carpentry skills, a good work space and quite a bit of free time, can build their own woodstrip canoe. I think that it would be an incredibly satisfying experience to build a canoe this way. I guess this is the kind of project people look forward to in retirement--when the kids are all out of the nest, and there is no great rush to do anything. You could immerse yourself in this one project, build a watercraft of great beauty, and sail off into the sunset. ISBN: 1-55209-342-5. 2000, 2002. 207 Pages. \$20.00

Canoeecraft: Woodstrip Construction \$20.00

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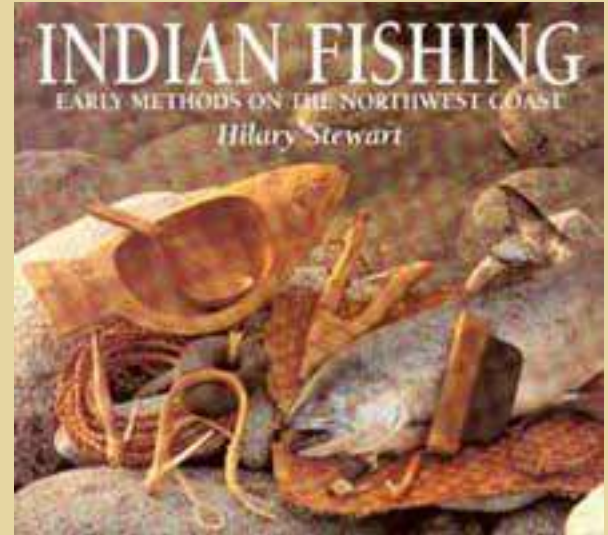
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Indian Fishing

Early Methods on the Northwest Coast
by Hilary Stewart

Of the many resources available to the First Nations of the Northwest Coast, the most vital was fish. The people devised ingenious ways of catching the different species of fish, creating a technology vastly different from that of today's industrial world. With attention to clarity and detail, Hilary Stewart illustrates their hooks, lines, sinkers, lures, floats, clubs, spears, harpoons, nets, traps, rakes, and gaffs, showing how these were made and used--in over 450 drawings and 75 photographs.



She has gathered material from major museums and from the old people in coastal villages and fish camps. But Hilary Stewart didn't just catalog the technologies of the past--in her research she has also made and used much of the gear featured in this text.

The book also includes a section demonstrating how the catch was butchered, cooked, rendered, and preserved. The spiritual aspects of fishing are described as well-- prayers and ceremonies in gratitude and honor to the fish, customs and taboos indicating the people's respect for this life-giving resource. The fish designs on household and ceremonial objects are depicted-- images that tell of fishing's importance to the whole culture.

Indian Fishing \$25.00

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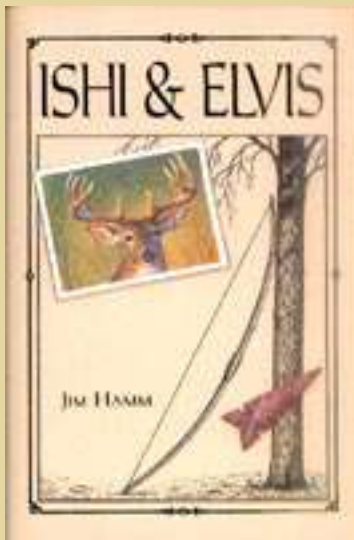
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Ishi & Elvis

by Jim Hamm



Upon acquiring seven hundred acres of rocky, overgrazed rangeland, Jim Hamm dubbed a tremendous whitetailed buck he encountered as Elvis, "because he created such excitement whenever he was spotted".

On the surface this is a book about hunting for a trophy buck, but there is much more to it than that. *Ishi & Elvis* is a deeply personal story about the author's place in the natural world and how he connects with it.

With a keen eye for the natural world and a sweeping sense of the history which shaped it, Hamm tells the story of Elvis and the gradual recovery of his ranch. He brings to life the waters tumbling down a spring-fed creek, dark cedar and liveoak thickets, blistering summers and snow-swept winters, migrating sandhill cranes, rattlesnakes, coyotes, and assorted human characters who experience the Hideout, as his ranch is called. Ancient hunters, Comanches, and longbow-armed Medieval warriors leap from the book, as does Ishi, the "last wild Indian" who stands now as the grandfather of archery in this country.

All of this history and ecology, plus Jim Hamm's friends and stories and his deep reverence for nature are woven artfully together with this quest for the great and crafty whitetail monarch. Few will ever know a wild animal the way Hamm comes to know Elvis, and few will ever forget their final meeting. Hardcover. 153 pages.

Ishi & Elvis \$20.00

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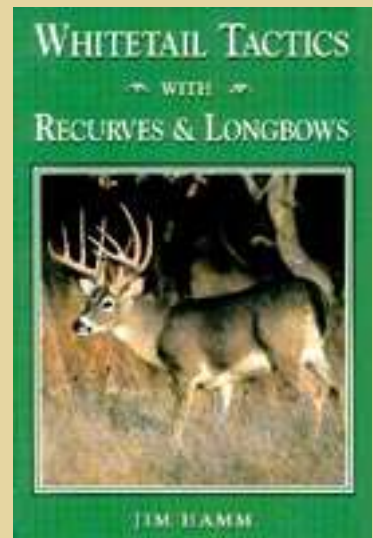
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Whitetail Tactics with Recurves & Longbows

by Jim Hamm

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3. Stand Placement
4. The Plan
5. Calls
6. Stalking
7. Drives
8. Hunting the Big Guys
9. Making the Shot
10. Following the Shot
11. Professor Whitetail



Whitetail Tactics with Recurves &
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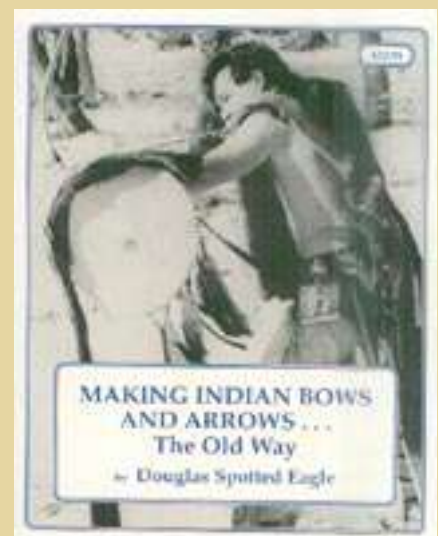
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Making Indian Bows and Arrows...The Old Way

by Douglas Spotted Eagle

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2. Woods and Tools
3. Bow Styles
4. Cutting the Wood
5. Reflex and Recurves
6. Backing the Bow
7. Finish Work
8. Bowstrings



- 9. Making the Shot
- 10. Arrows
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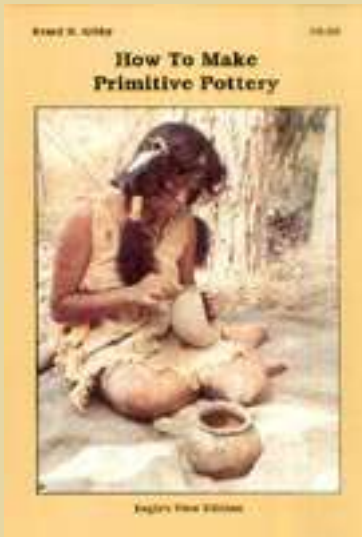
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How to Make Primitive Pottery

by Evard H. Gibby



A challenge: Find some naturally occurring clay, make a pot from this clay, fire it successfully, and use it to cook in a primitive setting. Author and primitive skills enthusiast Evard Gibby accepted the challenge and succeeded. Now you can learn from his experiences. This book covers all the basics you need to know to make attractive, functional earthenware, with more than 60 photographs showing each step in the pottery-making process. Sections include finding clay, clay preparation, tempering clay, making pottery, finish and decoration, drying pottery, primitive firing, how to cook in a clay pot, plus other objects made from clay. 57 pages. 1994.
Cost: \$9.00 (The \$1.00 per item shipping charge does NOT apply to this title.)

How to Make Primitive Pottery \$9.00

Quantity:

Note: Primitive pottery work is also included in
Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills

as well as these books:

Primitive Technology: Practical Guidelines

Earth Knack: Stone Age Skills for the 21st Century

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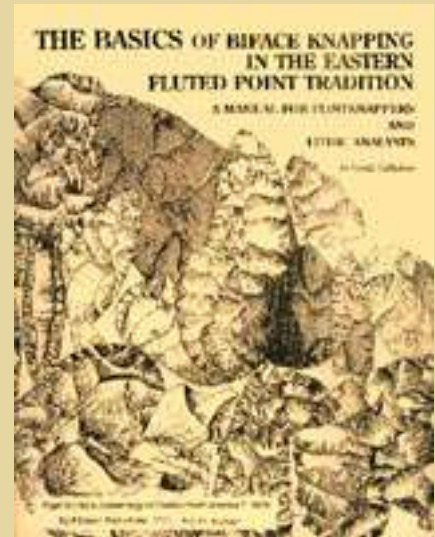
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The Basics Of Biface Knapping In The Eastern Fluted Point Tradition

A Manual For Flintknappers And Lithic Analysts
4th Edition

written and illustrated by Errett Callahan, PhD, MFA



Errett Callahan is a traditionalist flintknapper, preferring the authentic tools, materials, and techniques that native peoples used. Callahan wrote this manuscript under a different title in 1977 as his Master's thesis in Anthropology at Catholic University of America. Two years later it was edited again and published with the new title *The Basics Of Biface Knapping In The Eastern Fluted Point Tradition* as an article in *Archaeology of Eastern North America*. That issue was sold out and reprinted and sold out again, before Callahan self-published the manuscript under his own publishing company, Piltdown Productions. As a thesis paper, it is somewhat dry and technical to read, but very thorough and well illustrated. Callahan has continued to edit and refine the text with subsequent reprints. The third and fourth editions are virtually identical, except for the cover art and a few minor corrections. 4th Edition. 2000. 180 pages. **Cost: \$18.00**

The Basics Of Biface Knapping \$18.00

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Flintknapping Flash Cards

Pressure Flaking of Flakes

written and illustrated by Errett Callahan, PhD, MFA

Errett Callahan's *Flintknapping Flash Cards* illustrate and describe the pressure-flaking process in a few simple steps. These cards are helpful to quickly

understand the process of working a stone flake into a serviceable arrowhead. Percussion work (reducing bigger pieces) is not covered in the cards. Each card has pictures on one side and a description on the other. 1985. 20 cards. **Cost: \$6.50**

Flintknapping Flash Cards \$6.50

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Primitive Technology

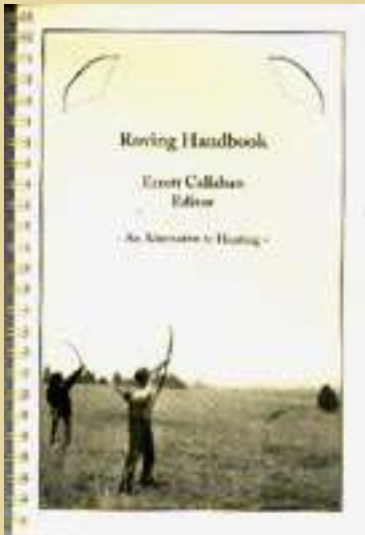
Practical Guidelines For Making Stone Tools, Pottery, Basketry,
Etc. The Aboriginal Way

written and illustrated by Errett Callahan, PhD, MFA



Primitive Technology: Practical Guidelines For Making Stone Tools, Pottery, Basketry, Etc. The Aboriginal Way includes eighteen fully illustrated "wall charts" about how to make stone tools, aboriginal pottery and basketry, plus axes, celts halfting, projectiles, bowmaking, firemaking and shelters. Callahan produced the wall charts for teaching projects in "living archaeology" over the years, then reproduced them in booklet form on copy paper with a plastic comb binding. There is a lot of information packed into this little booklet! Third Edition. 1994. 25 Pages. **Cost: \$7.00**

Primitive Technology: Practical Guidelines \$7.00 Quantity:



Roving Handbook

An Alternative to Hunting

Edited by Errett Callahan, PhD, MFA

Roving is "the practice of wandering over hill and dale and shooting with bow and arrow at whatever impromptu target catches your eye" writes Errett Callahan in his *Roving Handbook*. Roving is a means of practicing and refining archery techniques, but it is also an end in itself--kind of a Zen form of hunting. The *Roving Handbook* includes articles by Errett Callahan, most of which were previously published in *Instinctive Archer* and/or *Primitive Archer* magazines. Other sections were contributed by Jack Jeffers and Normal Bean. Wire-bound. 1999. 128 pages. **Cost: \$18.00**

Roving Handbook \$18.00

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-Round'n-Up & Recycling-
Wire Wrangler Products

Hand-Crafted Barbwire Baskets & Wall Hangings



The west is littered with thousands of miles of rusty barbwire fences slowly sinking into the ground. Loose wires laying around from decomposing fences can be an unseen hazard to humans and animals alike. Turning old barbed wire into decorative baskets and curios is one way to help clean up the countryside and put the materials to good use.

Barbwire Valentines

Barbwire valentine hearts are a wonderful and lasting way to say, "I love you." Try your poetic talents for writing a poem to accompany a barbwire heart gift for your loved one for Valentine's Day.

The barbwire shaped hearts with cupid arrows can remain as beautiful wall displays year around as not only a show of love but also a show of your support for products made of recycled materials. These creative hearts are tasteful and artistic gifts for any time of the year.

Each heart is individually handmade and unique. The hearts are made from recycled barbwire that was previously a dividing fence line but now a symbol of togetherness. The barbwire is not treated. Silk flowers of various colors and shapes garnish one side. The average size of the heart is about 10 inches wide and 10 inches tall, and the cupid's arrow adds about 3 inches to each side for a total of about 16 inches in width. Cost: \$7.50

Please specify in the comments box (on the check-out form) any flower type or flower color preference. We will pick the closest match from our stock on hand.

Barbwire Valentine \$7.50

Quantity:

Barbwire Baskets

I first saw barbwire baskets at the Winter Fair in Bozeman, Montana many years ago. I had some experience with willow basketry already, so it was easy to switch over to the new materials. As soon as I had the chance, I made several baskets for Christmas presents. Barbwire baskets are really nice garden baskets when lined with moss and filled with potting soil for flowers. The planted baskets can be placed on the ground or hung from a sturdy support.

If you have done any basketry before, then I highly recommend you try making your own barbwire baskets. In many ways barbwire is easier to work with than natural materials, because the wires are uniform in diameter, without tapering, and as long as you like. Also, the barbed wire can be bent into any shape and it will stay that way without snapping back. You can even get out the hammer and beat on the basket if you want to reshape a section! However, you do have to wear gloves, and a pair of fencing pliers or bolt cutters is a must for this kind of work.



I have a slowly growing collection of barbwire baskets, and I would like to offer them for sale, except that I need them as props for a future video to teach how you can make your own barbwire baskets.

In the meantime, I am looking for someone who would like to make barbwire baskets that we could sell here. Please write to me if you are interested. See below for contact information.



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The Mongolian Ger

(Popularly known by the Russian word "yurt".)

The BioRegions Program at Montana State University-Bozeman is marketing the traditional felt tent, called a ger (yurt in Russian), imported from Mongolia. More than 50 percent of present Mongolians, including the nomadic herders, live in these simple dwellings. The nomads pack the gers and move 4-12 times a year as they follow their herds of horses, yaks, cattle, sheep, goats and camels to new pastures.

These gers are hand made with local materials of sheep wool, horse and yak hair and local wood that is usually Siberian Larch. Proceeds from the sale of these gers are used for Mongolian projects through the BioRegions Program.

About the BioRegions Program

The aim of the BioRegions Program is to develop the concept of community citizenship and link similar mountainous bioregions around the world while exchanging local knowledge and expanding global perception.

Currently, faculty and students at Montana State University and private citizens are partnering with communities and institutions in similar mountainous bioregions of Greater Yellowstone, Japan, Mongolia, and Nepal.

The BioRegions Program works within mountainous bioregions to help communities train students and community members to: assess their natural, social, and economic wealth, to provide an interchange of resources and ideas within the global community, to create a platform for proactive, holistic decision-making, and to build a balanced community resource base. For more information, please go to the [BioRegions Program](#) home page.

Advantages of a Mongolian Ger

- Authentic and hand-made in Mongolia
- Live in genuine nomadic dwelling
- Used, tested and improved for over a 1000 years.
- Easy to maintain, assemble and disassemble
- Light weight and portable on pack animals (total 500 lbs in pieces)
- Sheep-wool felt insulation
- Wooden lattice wall assembled with raw-hide instead of metal
- Rafter poles are hand-painted with traditional Mongolian design
- Center-ring also decorated with traditional Mongolian design
- Wooden door and frame decorated with traditional Mongolian design
- Roof opening with traditional felt cover, cloth and horse-hair rope ties
- All outside straps are hand made out of horse-hair
- No sewn seams are used in the felt and canvas covers.
- Opportunity to buy authentic Mongolian ger stove, furniture and locks.
- Proceeds are used in Mongolia through the BioRegions Program.



Size: At present we have only the non-decorated gers left in stock. They are 20 feet across and 5 feet high at the sides and 9 feet at the top. A complete ger, including the supporting framework, weighs almost 1,000 pounds.



Climate and maintenance concerns: Mongolia is very dry and the gers are placed directly on the ground. Some people here in the USA place them on a raised platform. In the ger shown here there is a tarp and carpets covering the earth inside.

Wool moths are not a problem in Mongolia due to the dry climate, the sheer thickness of the walls (1 inch of wool felt!) and the fact that these are nomadic people, so they do not stay in one place long enough for insects to be

a concern.

It is unlikely that you would have significant problems with pests here in the USA, provided that you maintain your ger, especially keeping in dry, open and airy.

PRICE LIST

Undecorated Ger: (The poles are red, orange and blue, door and center ring are orange.) Includes 2 stools & a katag (blessing scarf) for the center. \$3500.

Hand Painted Ger: (Poles, door and center ring are individually hand painted in colors with traditional Mongolian designs.) Includes 2 stools & a katag (blessing scarf) for the center. **OUT OF STOCK.**

OPTIONAL EXTRAS

Mongolian Stove with pipes and tongs, and Tibetan style **Mongolian Lock** \$ 60.
EXTRA.

We can arrange for truck shipping within the USA for an extra \$100.00 **handling charge**. (Expect to pay about \$1,000 for shipping.)

Two sample gers are set up at the home of Cliff & Joan Montagne in Bozeman, Montana. Please arrange for a visit by contacting them at:

Cliff & Joan Montagne
17 Hodgman Canyon
Bozeman, MT 59715
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Sinews & Hide Glue

Supplies for Primitive Archery and Native Crafts



Sinews: We sell backstrap sinews and leg tendons from deer and elk. The thick, round leg tendons are found on the lower part of the legs. The backstrap sinews are found along both sides of the backbone. The sinews we sell are cleaned and dried by our supplier, Michael Foltmer. You will need to process the sinews down to individual fibers for use.

Processing backstrap sinews is easy. Simply use the thumb and index finger of each hand to hold the sinews at two points close together then twist the fibers around to separate them.

Work the entire length of the backstraps this way.

Leg sinews require a bit more work. Start by pounding the tendons with either a wood mallet or a very smooth stone on a wood surface such as a log or stump. Do not use a rough stone, because it will cut the fibers. Pound the tendons thoroughly, from one end to the other to loosen the fibers. Then pull them apart into individual fibers with your fingers. The fibers can be split down again and again, to finer and finer threads.

Hide Glue: Animal skins consist of a network of gluey collagen protein fibers. When a skin dries to rawhide the gluey fibers set up and the hide becomes stiff like a board. You can extract this glue by slowly simmering scraps of rawhide in water. It is one of the strongest glues known to humankind. The heat should be kept low to avoid burning and weakening the glue. The hide glue we sell is carefully prepared, dried and ground into chunks and powder by our supplier. All you have to do is add water and warm it up.

For indepth details on processing and using sinews and hide glue, be sure to check out the latest edition of [Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills](#)

--Note--

We do not ship animal parts internationally.

The products on this page are for our USA customers only.

(Note: The \$1.00 per item shipping charge does NOT apply to sinews.)

One Elk Backstrap Sinew (18" - 22" long)- \$5.50 Quantity:
USA Only-

One Deer Backstrap Sinew (12" - 17" long) -USA Only-	\$3.25	Quantity:
One Whole Elk Leg Sinew -USA Only-	\$1.75	Quantity:
1/2 lb. Hide glue (dried and crushed) - USA Only-	\$10.00	Quantity:

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Order on-line with your Visa, Mastercard, or Discover. Simply click on the links to learn more about each product and enter the quantity you want in the little white boxes, then click the "Add to Order" button. We also accept checks and money orders. For orders by mail, e-mail, or telephone, you can still use the on-line shopping basket to tally the order and postage. Then print or copy the information and send it in to:

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Ingwe

by M. Norman Powell

M. Norman Powell was born in South Africa in 1914, the fourth generation of a British family which immigrated there in the 1820's. Lured by tales of indescribable beauty, his family moved to Kenya when he was still a child. The young Powell found life-time friends in the African tribesmen, and they mentored him in the skills of wilderness survival, tracking and hunting. Powell mastered the ways of the African wilderness and connected with the African people. The Zulu tribal scouts gave him the name "Ingwe" meaning "the Leopard", and the Akamba people initiated him as a member and warrior of their tribe.

As an adult supporting a family, politics forced Ingwe to leave his ranch and the wilderness he loved. He came to America where he eventually met Jon Young and co-founded Wilderness Awareness School in the 1980's. The book *Ingwe* is Powell's story of his experiences with the African wilderness and the African people.

For those who seek a path closer to nature, *Ingwe* is an inspirational story, revealing the depth of connection that is possible with the natural world. I enjoyed the book for my personal interest, as further inspiration to keep developing my own wilderness skills. My kids enjoyed the book too, as I read it to them a little bit each morning before school. *Ingwe*. ISBN: 1-57994-013-7. 1995, 2001. 80 pages. Cost \$15.00.

Ingwe \$15.00

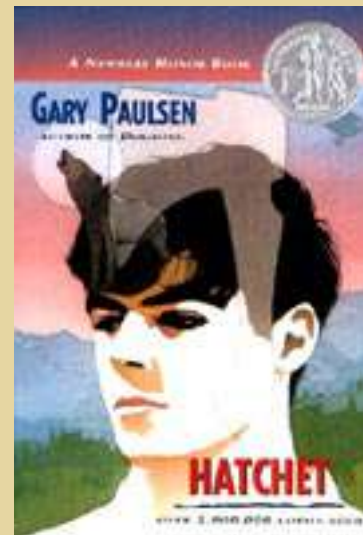
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Hatchet

by Gary Paulsen

"Thirteen year-old Brian Robeson is on his way to visit his father when the single engine plane in which he is flying crashes. Suddenly, Brian finds himself alone in the Canadian wilderness with nothing but his clothing, a tattered windbreaker, and the hatchet his mother has given him as a present--and the dreadful secret that has been tearing him apart ever since his parents' divorce. But now Brian has no time for anger, self-pity, or despair--it will take all his know-how and determination, and more courage than he knew he possessed, to survive." (From the back cover).



It is always helpful to read stories about wilderness survival to fire the imagination. You learn how someone else has dealt with a challenging situation, and it makes you wonder what you would do under similar circumstances. Although *Hatchet* is a fictional story, it is very well written, and it is clear that author Gary Paulsen has spent more than a little time in the outdoors.

The book does not go into a lot of primitive skills, but rather into the *experience* of just being out there--being hungry, sunburned, bug-bitten and alone. The most unrealistic part of the book is simply that Brian Robeson is a lot more resourceful than your average thirteen year old. (Most people would die of self-pity before they figured out how to care for themselves.) But back home he went on many pretend wilderness survival adventures with a friend, developing some of the necessary thought patterns he would ultimately depend on to figure out what to do in a difficult situation. That is the usefulness of this book--besides simple entertainment--it helps develop the thought patterns in your own mind, so that you can be more resourceful in a wilderness survival experience. I would have read the book to my kids, but they had already read it in school. *Hatchet*. Fiction. ISBN: 0-689-80882-8. 1987. 195 pages. Cost \$6.00.

Hatchet by Gary Paulson \$6.00

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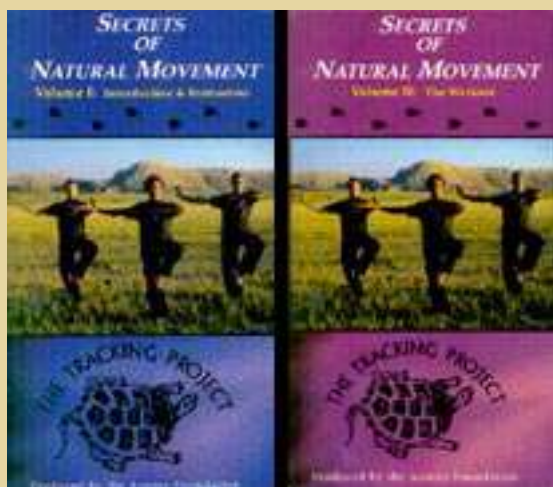
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The Secrets of Natural Movement
by John Stokes & Friends
Produced by the Aurora Foundation

The Tracking Project has led thousands of people in workshops set in nature, teaching tracking, survival, and living in the natural world. The Secrets of Natural movement is their workout designed to give you a natural physique--one that emphasizes tendon and connective tissue strength over bulk--aiming for the body of a mountain lion, both graceful and powerful.

The Secrets of Natural Movement draws on the health traditions and martial arts that have taken their inspiration from the animals--Yoga, Taiji, Bagua, and Chi Kung, to name a few. Volume I: Introduction and Instruction takes you step-by-step through each of the moves. Volume II: The Workout connects all the moves into a cohesive workout that you can follow along with. The videos were filmed in the outdoors and are accompanied by soothing didgeridoo and drum music. If you seek to increase your flexibility, balance and endurance for stalking and getting closer to nature, then these tapes can certainly help you reach your goals. Cost: \$35.00.

Secrets of Natural Movement Videos I &
II \$35.00 Quantity:

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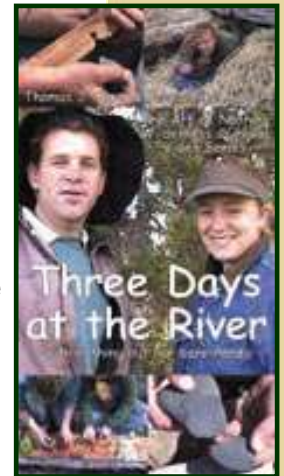
Our Class Schedule

Updated June 11, 2003

Expeditions with Thomas J. Elpel

Primitive skills allow a person to get closer to nature by experiencing nature directly. Instead of merely hiking through or camping in nature, these skills allow one to move in and become part of the process. You learn about nature as you use it to meet your daily needs for shelter, clothing, fire, water, and food. You discover nature in an intimate way as you learn about the plants and trees and rocks and animals, and all their uses. You meet the elements of the world as neighbors and as personalities. To borrow the Zen terminology, it is "direct pointing to reality". You set aside the trappings of modern culture and step directly into nature with little or nothing. . . how can you have an experience any more real than that?

These experiences in touch with nature have always been a source of immense strength and inspiration in my own life. Whenever I felt lost or uncertain in the modern world I turned to nature for clarity and renewal. I was able to step outside of difficult problems to gain a new and more resourceful perspective. Above all, I just loved to explore and discover the world around me.



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3Rivers Park

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But there is a big difference between learning primitive skills in a laboratory-like class setting versus applying those skills in the real world. You can attend as many workshops as you want to learn specific skills, but it never adds up to the whole experience of actually using those skills. In short, the whole is greater than the sum of its parts.

I have participated in many great primitive skills classes and field courses over the years, but ironically, most of the fascinating things I learned had little use in applied primitive living. Many of the critical skills, like good shelter-building and wild food harvesting, I have had to learn on my own. That is the basis of our **Art of Nothing Wilderness Survival Video Series**--to show how all of these skills come together in the field.

On my expeditions I like to bring participants directly into an applied primitive living situation, pushing the experience to limits of what is practical. On some trips that translates to nearly full survival living, gathering most of our food and resources from the environment. On other trips, especially in new and unfamiliar environments, that translates to packing in a lot of gear, or sometimes going without gear and simply being cold and hungry.

One thing I've learned though is that some of the most difficult skills to master are more cultural than physical. For example, people often get into primitive skills with the romantic notion that you can go out and live in harmony and bliss with nature. They don't realize that on the path to harmony it helps to morph into a half-wild creature that loves heat and cold and wet and strange foods and weird sleep. Yes, primitive living is loads of fun, but you have to learn to appreciate a certain amount of discomfort to really thrive in it! If you are not prepared to enjoy some discomfort, then don't bother coming.

Let me also say that I am no master of primitive survival. If you come with your expectations too high, then you may be disappointed. Come with open mind and I am confident you will have a great time.

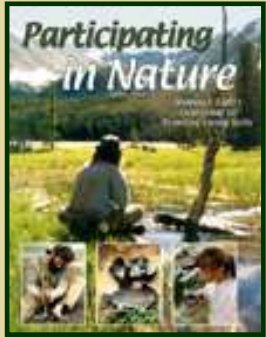
When we go out on an expedition then we work together as a team to meet our needs. For example, instead of sitting down to a formal class where everyone makes a bowdrill fire set and everyone starts a fire, we simply work to create a fire as a group. Of course, you are encouraged to develop your skills as an individual, and we will assist you towards that end, just not in formal class sessions.

We want participants who are especially earnest in their desire to learn and experience the natural world. You will get the most out of these classes if you have at least a conceptual basis of what primitive living is all about. In other words, you do not need prior experience with the physical skills, but it helps if you are well read. At the very least, I ask that you read my book **Participating in Nature** so that you have a clear sense of my philosophy and background in primitive skills. Also be sure to read my **on-line camping**

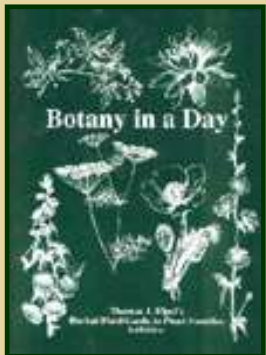




This Website Created on a lovable
Macintosh computer!



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journals for a greater sense of the flow of these trips.

For additional trip details please read our **Adult Expeditions Equipment List** and the **Liability Waiver and Release Form** you will be required to sign.

To be notified of upcoming additions and changes to our class schedule, you are invited to join our HOPS Classes Call List by subscribing below.

HOPS Classes Call List

Enter your e-mail address for updates on HOPS classes.
This list is not used for any other purpose.
It will not be shared with any other source.
Expect to receive class updates 2-4 times a year.

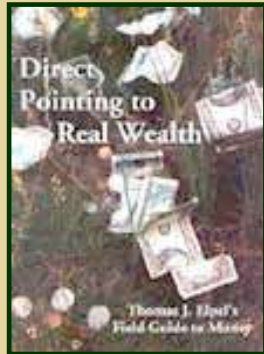
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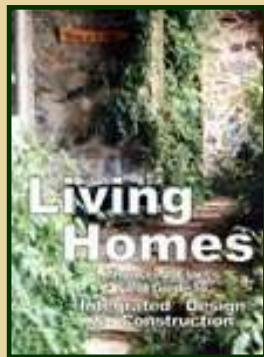
-Lewis & Clark Living History Canoe Trips-

Available All Summer

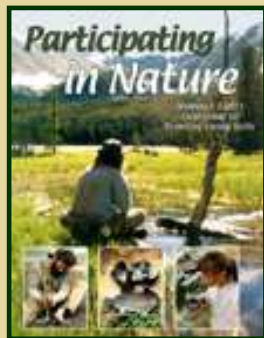
Starting in 2004



Direct Pointing to Real Wealth



Living Homes



Participating in Nature



Starting in the Summer of 2004 we will be offering guided Lewis & Clark Living History Canoe Trips on the historic Jefferson River here in southwestern Montana. This will be the first time in many years we have offered a full schedule of classes, since we have otherwise been reserving our summers to spend quality time with our growing children. But several things have changed to allow us to offer classes again.

First, our bookstore and publishing business have taken over our house room by room, and we have become desperate to move it out of here. After a couple years of looking, we have finally found a place to move it to. We purchased a small store

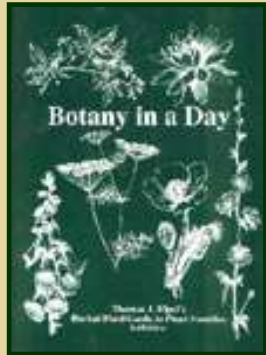
in the town of Silver Star, Montana. It has a front door on "main street" (Main street is about four blocks long.) and the back door is right on the Jefferson River and the Silver Star Fishing Access Site. In a nutshell, we moved our business over there at the beginning of September 2003. We will run the store ourselves while we get it set up, then we will hire an employee later in the fall to run the store and to help out with our internet bookstore. The Silver Star store includes the community Post Office and the contract job of Post Master. A residence is also built into the store. We are home-schooling this next year, so we can be anywhere with our kids.

In addition, the property includes a trailer that will become a residence for interns in the spring of 2004. Interns will be trained in primitive skills. They will then hone their skills through the process of giving Living History demonstrations to passing tourists. The Jefferson River was an important part of the Lewis & Clark route, and one of their campsites was very near Silver Star. The little town is also on the tourist strip for people driving through to historic Virginia City and Nevada City.

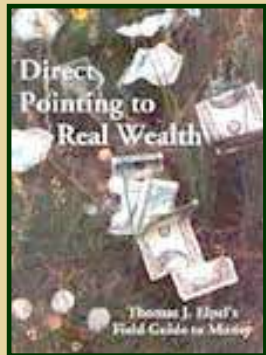
Basically, we hope to reach out to a more mainstream audience this way, to draw new people back to nature. Canoe rentals and guided Lewis & Clark Living History canoe trips will be available throughout the summer. Guided canoe trips will be customized, from as short as half a day up to 5 days or more. Our interns will be trained for these trips in the spring. We will assist them on longer trips.

This new enterprise will give us a full-time schedule of primitive skills classes and primitive canoe trips throughout the summer season (Memorial Day to Labor Day). In the off-season, especially May and September, we would like to expand our work

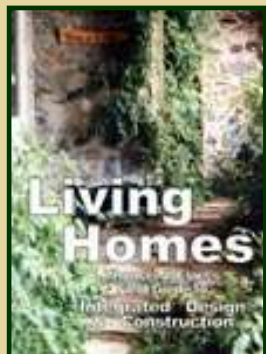




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with local school kids.



This May I took the 7th grade class from Harrison School (Cassie's class) out for an overnight camping trip on a ranch on the Jefferson River, the same place where we shot the video "3 Days at the River" last year. The week before I had the 8th grade class (Felicia's class) out there for an overnight trip as well. Everyone had a great time and learned a lot. Working with school kids this way has become my favorite kind of teaching. It is really interesting to work with the same group of kids for one or two days each year over many years. They really become comfortable in the woods in a way that you do not see with people that are coming for the first time. The 8th graders wrote journals of their experience, which were compiled into an [on-line journal](#).

We want to work towards building a graduating outdoor skills curriculum for all the local schools, where even kindergarten kids would come out for a field trip, learn a few skills, and build on those skills through subsequent field trips each year until they were quite proficient in the outdoors (and knowledgeable about ecology issues) by the time they graduated from

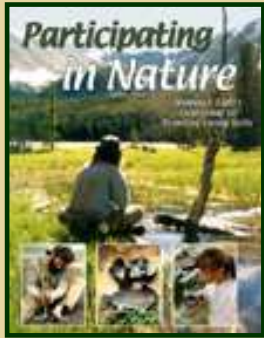
school.

So, in a nutshell, that is where we are going with the business. We probably won't have any home-building classes until at least 2005. We would like to replace the trailer house on the property with a much more resource-efficient dwelling. We will probably build with stone or a combination of stone and straw or stone and log. We'll post class information as it becomes available.

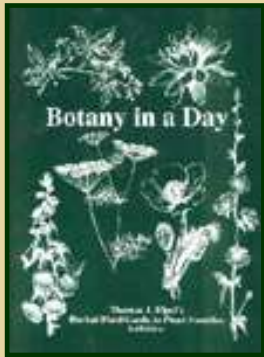
3Rivers Park Canoe Trip Coming in 2004

This trip is in the initial stages of planning. The purpose is to promote our organization [3Rivers Park](#) and to raise awareness of the need to plan for the future of the Jefferson, Madison and Gallatin Rivers here in southwestern Montana.

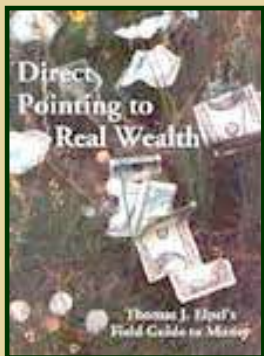
The plan is to launch a flotilla of canoes down the Jefferson River to explore this natural wonder. This will Not be a "primitive" trip, as we will be tent-camping at public fishing access sites along the way.



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Nevertheless, we will cover some primitive skills like fire-starting and plant identification and uses.

There is no cost for the trip, although we would gladly welcome contributions to 3Rivers Park to help buy habitat for people and wildlife along the rivers.

Additional information on this trip, plus an equipment list and canoe rental information will be posted as it comes together. Be sure to subscribe to our HOPS Classes Call List below if you want to receive updates on this and other upcoming expeditions.

On-Line Discussion of Botany in a Day

Facilitated by Frank Cook

Starting June 2003

Hi There Friend of the Plants,

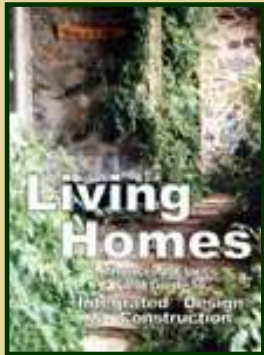
Over the past year I facilitated a collective read through of a book called "Botany in a Day" by Thomas Elpel. Though this medium of sharing is new to me, I felt the journey through went well and want to offer another opportunity to go through the book together. This is a wonderful book to serve as a resource for a discussion of plants.

You are invited to join a circle of us reading through "Botany in a Day"-a section a week (or two). I believe it will take about 5 months exchanging an email a few times a month discussing the section read. (4 communications doing an overview of Botany and 8 communications reviewing plant families in North America).

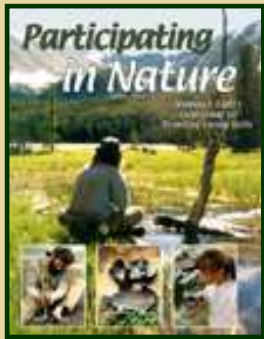
Each week you will receive an email with comments from me of the section read as well as comments from others. You are encouraged to ask questions and contribute comments but are not required to.

If this sounds interesting to you, this is what you need to do: 1) Respond to me at planttalk2003@yahoo.com so I can add you to the circle. 2) Order yourself a copy of **[Botany in a Day](#)** Let them know it's for the Online Botany Circle facilitated by Frank Cook. They can get it to you in just a few days (unless they are out camping). 3) When you get the book, look it over and read up to page 3 and the inside covers. I'll be sending you the first email in June.

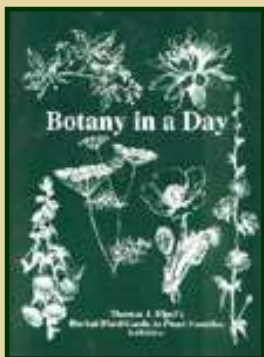
I look forward to hearing from you and hope you are able to participate in early spring opportunities.



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Peace,

Frank Cook.

Dear Thomas,

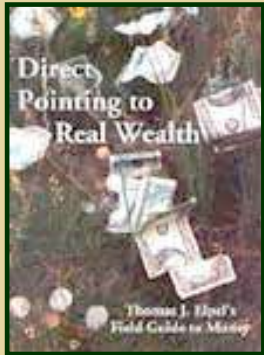
My wife gave me [Botany in a Day](#) and [Participating in Nature](#) for my birthday in September.

[Botany in a Day](#) is a revolutionary approach in the way that way that you introduce the family concept for "non-botanists". I teach botany courses (identification, ecology, conservation, edible and medicinal uses, etc.) at the Rocky Mountain Biological Laboratory near Crested Butte, Colorado. I've taught college students, biologists, land managers, and vacationers. I always try to take the family approach. I think it is a great way to organize the taxonomy of things in one's head instead of just learning about a bunch of plants. This is obviously an old system in the technical resources, but your use of it in a field guide is great.

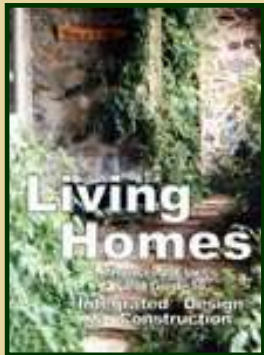
In [Participating in Nature](#), I particularly like the way you combine your philosophy in a journal style with discussion of specific skills. I also like very much how you emphasize those skills or variations on skills that you have adapted on your own. It is clear that you have spent much creative time in the woods. I have been very much an observer and student of the land in the past 10 years, but it has really only been in the past few years that I am becoming a participant. For example, I have a masters in botany with an emphasis in plant taxonomy. So it is now that I am going back and saying, "Oh, I didn't know that was edible!" or "Dang, I can make rope out of this?". I thought I knew the plants of the Colorado Rockies pretty well, and then I started eating them and realizing that my learning had just begun. I am getting pretty decent with a bow-drill and I've tanned a few dozen hides. But I realize I have the knowledge of about an 8 year-old Cheyenne boy. I am getting better at accepting that tomorrow is another day.

--Kevin T.
Broomfield, Colorado
(used with permission)

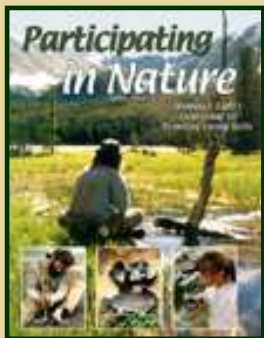
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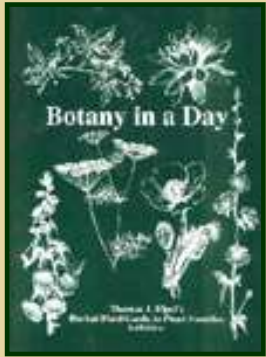


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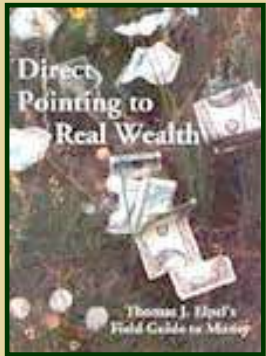
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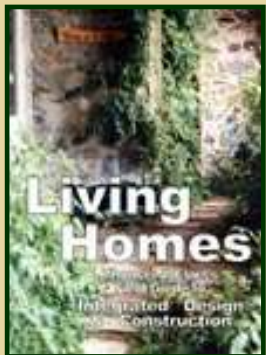
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Botany in a Day



Direct Pointing
to Real Wealth



Living Homes

Hollowtop Outdoor Primitive School, LLC

Adult Expeditions Equipment List

On foot or in a canoe, our expeditions are pretty informal, and you can bring pretty much anything you want, as long as you pack it along! Nevertheless, we will help you to sort through your gear before the trip to make sensible decisions.

Please note that there is no need to spend money on fancy equipment. It will just get destroyed anyway. Handkerchiefs can be cut from old T-shirts. A scrap of plastic or old shower curtain works for a poncho, and a juice bottle works for water, etc. Use your imagination. On hiking expeditions we make simple pack frames to carry our gear. You are encouraged to bring any primitive equipment you have previously made that would be useful on an expedition.

Clothing: In Montana we can experience temperatures anywhere from freezing to nearly 100°F. We usually get at least one summer snowstorm each year during June, July or August. Each person will be climatized in a different way. Participants from southern climates often think our summer temperatures are downright frigid, especially at night. We will guide you in building warm and comfortable shelters to sleep through the cold nights. However, you may want to dress on the warm side in case our definition of “warm and comfortable” turns out to be substantially cooler than your definition.

Layering is your best bet so you can regulate your temperature easily. Please bring warm and quiet clothing. **Natural or plaid colors** will help you blend into and become part of the landscape. Bring additional clothing if you have any doubts. We will help you sort it out before the trip begins. *Please note that we often trim a few items off this list when we meet prior to a trip for a group assessment and goals discussion.* Otherwise, here is our suggested list:

Footwear

Lower Body

Upper Body

Head

- 3 pair warm socks -sturdy pants w/ belt
- T-shirt
- sun hat
- tennis shoes or light-weight hiking boots
- 2 pair underwear (dark colors)
- wool sweater or heavy sweat shirt
- wool hat
- moccasins or sandals (optional)
- shorts
- flannel shirt

Personal Hygiene

-3 handkerchiefs

-dental care

-comb or small hairbrush

-other necessary personal items

-personal medications

Other Necessary Gear

-wool blanket

-water bottle

-pocketknife or sheath knife

-camp cookware

-rain poncho

Other Possible Gear

-small musical instruments

-small camera

-art supplies

-favorite field guide(s)

-notebook, pencils, pens
-small pouches to hold things

•Please let us know in advance of any **personal medications** you need to bring.

•Please bring a **sleeping bag** for use before and/or after the expedition.

•We have **extra blankets, water bottles** and **camp cookware** if you don't have any.

•We'll send you some of our best photos at no additional cost after the trip, so a **camera** is not necessary for most people.

Food: We provide some **basic foods** for our expeditions, such as flour, rice, beans, and oatmeal. We **forage** for additional plant and animal foods along the trail, harvesting as many wild foods as we reasonably can, such as berries, starchy roots, greens, mushrooms and occasionally non-game meat such as ground squirrels or "trash fish" such as suckers or carp. (A Montana fishing liscence is required for any fishing, and you are on your own to bring

in the catch.)

You can expect a diet of mostly grains and beans on our outings. Please let us know well in advance (i.e.: immediately) if you have any specific dietary requirements. Some people experience discomfort adjusting to a wild and/or varied and unpredictable diet.

If a diet of oatmeal for breakfast, trail mix for lunch, and rice and beans for dinner sounds new and different, then you should definitely try it out at home for a week before coming on this course. *You are welcome to bring limited additional foods if you would become dysfunctional without them.* Please try to minimize the plastic and aluminum packaging so we will not have so much waste to deal with on the trail.

Waiver and Release Agreement

Hollowtop Outdoor Primitive School, LLC

PO Box 697 • Pony, MT 59747-0697 • 406-685-3222

***Please read carefully before signing.
This is a release of liability and waiver of certain rights.***

In consideration for my being permitted to participate in a primitive skills, survival camping, and wilderness living class or expedition with Hollowtop Outdoor Primitive School, LLC, I agree to the following Waiver and Release:

I acknowledge that there are inherent risks, hazards and dangers to any person practicing primitive skills, survival camping, and wilderness living techniques, particularly in a wilderness environment. I UNDERSTAND THAT THESE RISKS, HAZARDS AND DANGERS INCLUDE WITHOUT LIMITATION:

1. Hiking hazards in walking cross-country through rugged terrain, with or without trails, and with or without hiking boots, during variable weather conditions, and in either daylight or darkness, including traveling at night without flashlights.
2. Water hazards in canoeing, floating, swimming, or traversing streams, rivers, ponds and lakes, including ice-covered bodies of water.
3. Temperature extremes and inclement weather conditions, especially when traveling with only a minimum of gear, and when shelter may not be readily available.
4. Fire hazards from building, using and sleeping by campfires or in primitive shelters heated by fire, or from wildfires from natural or manmade sources.
5. Health hazards from exposure to the sun and other elements, as well as from lack of water, food and sleep, which may impair judgment and increase the risk of other hazards.
6. Injuries to yourself or from others from the manufacture or use of tools and equipment, including, but not limited to: knives, bows and arrows, spears, traps, and tools made from sticks, stones, bones, ropes, hides and other materials.

7. Encounters with wildlife, including but not limited to: venomous spiders and insects like bees, wasps, ticks and scorpions, as well as rattlesnakes and other reptiles, as well as bears, mountain lions and other potentially dangerous mammals and birds.
8. Exposure to harmful viruses, bacteria and disease-carry organisms, including, but not limited to: hantavirus, chronic wasting disease, bubonic plague, rabies, tularemia, trichinosis, giardia, salmonella, hepatitis, Lyme disease, Rocky Mountain spotted fever and Colorado tick fever.
9. Complications from handling or ingesting, intentionally or accidentally, wild edible, medicinal, poisonous, or allergenic plants and mushrooms.
10. Absence of immediate medical attention in the wilderness or any communication devices in range of receivers to seek medical attention in case of injury.
11. Transport in any vehicle before, during or after an event to or from any location.

I understand these risks, hazards and dangers inherent in practicing primitive skills, survival camping, and wilderness living techniques, and I have had the opportunity to discuss them with Hollowtop Outdoor Primitive School, LLC staff and instructors. I understand that these activities may require good physical conditioning and a degree of skill and knowledge. I believe I have that good physical conditioning and the degree of skill and knowledge necessary for me to engage in these activities safely. I understand that I have these responsibilities. My participation in this experience is purely voluntary. No one is forcing me to participate and I elect to participate in spite of the risks. I AM VOLUNTARILY USING THE SERVICES OF HOLLOWTOP OUTDOOR PRIMITIVE SCHOOL, LLC WITH FULL KNOWLEDGE OF THE INHERENT RISKS, HAZARDS, AND DANGERS INVOLVED AND HEREBY ASSUME AND ACCEPT ANY AND ALL RISKS OF INJURY, DISABILITY, PARALYSIS, OR DEATH.

I, for myself, my heirs, successors, executors, and subrogees, hereby KNOWINGLY AND INTENTIONALLY WAIVE AND RELEASE, INDEMNIFY AND HOLD HARMLESS Hollowtop Outdoor Primitive School, LLC, their directors, officers, agents, employees and volunteers from and against any

and all claims, actions, causes of action, liabilities, suits and expenses which are related to, arise out of, or are any way connected with my participating in this activity including but not limited to, NEGLIGENCE of any kind or nature, whether foreseen or unforeseen, arising directly or indirectly out of any damage, loss, injury, disability, paralysis or death to me or my property as a result of my engaging in these activities or the use of these services or equipment, weather such damage, loss, injury, disability, paralysis, or death results from negligence of Hollowtop Outdoor Primitive School, LLC or from some other cause. I, for myself, my heirs, my successors, executors and subrogees, further agree not to sue Hollowtop Outdoor Primitive School, LLC as a result of any injury, disability, paralysis, or death suffered in connection with my participation in this primitive skills, survival camping and wilderness living class or expedition.

Lastly, I authorize Hollowtop Outdoor Primitive School LLC to use my name and likeness, pictures, narratives and video recordings of me from my experience with Hollowtop Outdoor Primitive School, LLC in future publications and advertisements, including, but not limited to, books, videos and other products produced for sale, from which I waive the right to any and all disbursements or royalties. Furthermore, Hollowtop Outdoor Primitive School, LLC shall have the unrestricted right to assign the use and subsidiary rights of any such material to any third party for similar purposes, and I waive the right to any and all disbursements or royalties from any such use and assignments.

I HAVE CAREFULLY READ, CLEARLY UNDERSTAND, AND VOLUNTARILY SIGN THIS WAIVER AND RELEASE AGREEMENT.

Title of the Class or Expedition I am attending:

Signature: _____

Date: _____

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Reviews from the Press

Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills

Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills provides a strong, quiet, thoughtful view of contemporary living and man's place in his ecosystem. The text's voice shifts easily between the author experiencing the wilderness in sight, sound, smell; musings about his past; his perceptions of what he has learned; and directions for meeting daily needs while in the wilderness. The author covers creating shelter, starting a fire, edible and medicinal plants, and tanning buckskin, among other skills.

This is a different sort of book than what might be gleaned from the title. Elpel accepts the contemporary world and its technology. He himself has chose to have a house, wife and family. But primitive living is an important part of his psyche. He runs a school that allows others to experience it for themselves. He believes that experiencing the wilderness helps people get in touch with the reality that all resources come from the earth, not from a store, and what impact they have on the earth and other beings just by meeting their daily needs. It helps them understand that life in any form requires the use of energy and resources. This is a fine book, one that should be appreciated not only by those who want to spend time in the earth's wild places but by anyone looking for a different perception of contemporary life.

--Ecology Action Newsletter. Willits, California. November 2002.

Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills

Ever wonder how to start a fire with a bowdrill, weave a basket, build a stone oven, blow a coal-burned cup, or make reliable and comfortable shoes? Which plants are edible or medicinal, and what material makes the best bows and arrows? I've thought about these things and others, never really dwelling on them for long. None of these were on my list of things to learn to do for 2001. But they should have been. I moved to the country to be closer to nature and to be more a part of it, and it's about time. So where do we start?

Take a beautiful quiet morning, before sunrise. Sit on a peaceful overlook with a view that you know will be breathtaking once the morning light touches it. Watch the stars shine until they fade into the half-light. Feel the dew on the grass and in the air. Listen to the day birds begin their chorus. Notice the smells that waft by on a soft breeze.

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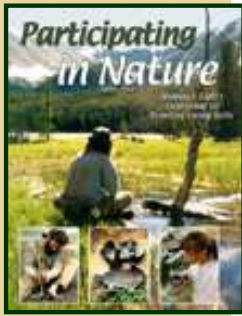
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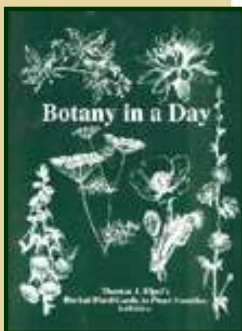
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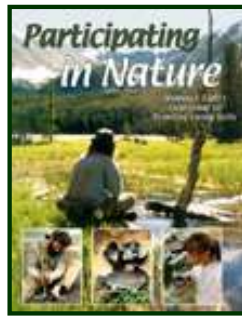
This Website Created on a lovable
[Macintosh](#) computer!



[Participating in Nature](#)



[Botany in a Day](#)



Watch the animals begin or end their regular rituals as the morning breaks. Write a book. This is how Pony, Montana resident Thomas J. Elpel wrote *Participating in Nature*. It begins before daybreak, and is written so that as you grow in understanding of many things natural, a day unfolds and runs its course. By evening, near the end of the book, you have learned how to do several things, and why.

This is not a survival book written for guerrillas, though they might find it very useful. It is a book written for the average worker who wants to get away from it all or the family that wants to do something special together. It's those who want to learn something new, a new way of doing something old, or enrich their relationship with nature. It's a must-read for anyone who is interested in doing something on a personal level to help maintain and restore Earth.

Even if you don't consider yourself an environmentalist, you probably don't mind saving money, stimulating your brain, or learning a new stress-relieving habit. Learning skills such as those found in *Participating in Nature* could also help answer questions like "what do you want to do this summer?" or even the ever-annoying "are we there yet?"

Throughout the pages of this *"Field Guide to Primitive Living Skills,"* you'll find pictures of the author's work with other medium also. Some of the photography is his, and most of the artwork, making it a book that is not only useful but attractive as well. Now that you understand the utilitarian and aesthetic qualities of the book, I'll move on to the style. In this, I've saved the best for last. He may describe it as a field guide, but don't let the name fool you. This is no dry instruction manual filled with only technical descriptions and directions for use. Oh, the step-by-step is there so you'll know you're getting it right, but there is so much more than that within these pages.

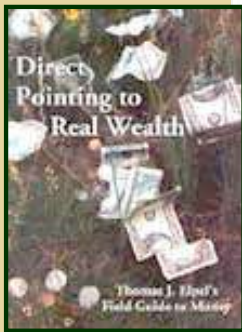
As I mentioned before, he wrote this as a day that progresses, and his details take you to the very spot where he sits wrapped in a blanket, leaning against a fir tree as the morning gradually pushes the night westward. By sunset, he has explored and explained Mind, Shelter, Fire, Water, Cooking, Plants, Animals, and Clothing. These are the chapters of the day that is the book. Of course, he adds a bibliography and a fairly comprehensive index.

"My tea is hot. I put away my journal and my pen... Then I sit back and think about what it is that I am seeking...."

"I have always been drawn towards the idea of being able to move lightly, freely, almost invisibly through the ecosystem, to be like the breeze, being present, but invisible.... and I am referring to the Indian scouts from another era, is symbolic of that desire. "...it is something I seek distinctly for myself. It is my dream to be able to move and live as the scout, to travel unhindered, hopping, skipping, and gliding through the wilderness."

Of course there are "trade-offs" that the author recognizes: *"For me taking less gear means I can travel farther and faster, but it also means I have to spend more of my time providing for my sustenance...."*

"Thus I seek to balance what I take and what I bring so that I can have both the lightest load and the most free time."



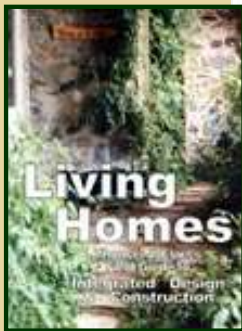
[Direct Pointing to Real Wealth](#)

Thomas Elpel writes from his experience with nature. *"Primitive living is a metaphor we participate in. We journey into the Stone-Age and quest to meet our basic needs. We learn to observe, to think, to reach inside ourselves for new resources to deal with challenging and unfamiliar situations."*

Aren't those the skills we need for everyday living even in the Space-Age?

-- Deb Anne Flynt, [Island Park News](#). Island Park, Idaho. January 11, 2002.

[Go to Participating in Nature](#)



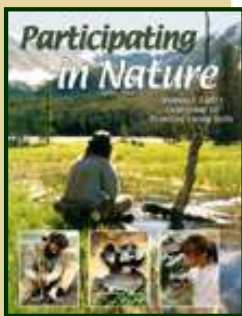
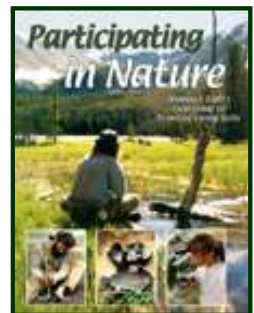
[Living Homes](#)

How to make your way in the wilderness

A review of *"Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills"* by Thomas J. Elpel (Fourth Edition, 1999, HOPS Press, Pony, Mont., paper, 156 pp.).

Nettle fiber was traditionally used by Tlingits to make fishing line and net bags. But how? After all, stinging nettle stalks get their untouchable reputation from the fact that they contain formic acid in the hypodermic-style needles, or hairs, on the undersides of their leaves. How did Tlingits manage to use the fiber and not get stung?

This is one of many questions about using natural resources answered by Thomas J. Elpel in *"Participating in Nature."* Elpel harvests the dead stalks, carefully avoiding live ones. "The formic acid becomes weaker as the plants become coarse, and the dead stalks are entirely free of it," he explains in his chapter on water. Then he describes how to flatten the stalks and make cordage of them, as can be done with plant fibers from milkweed, fireweed, cattail, yucca, evening primrose and domestic hollyhocks.



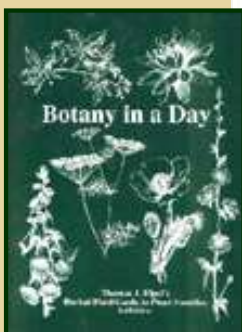
[Participating in Nature](#)

Elpel, the founder of Hollowtop Outdoor Primitive School in Pony, Mont., gives workshops about primitive living skills.

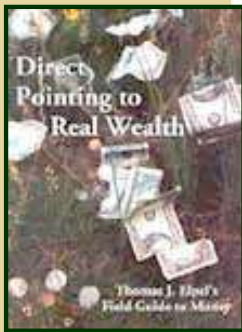
Among the topics covered in *"Participating in Nature"* are building a shelter, making fire, staying warm, finding food, felting with wool, making wooden containers, stalking, fishing and trapping.

Bush skills learned from these pages could save people suddenly stranded by a boat or plane accident. Victims of such circumstances often panic because they have no idea how to use the natural resources around them. It never occurs to them even to salvage useful bits of wreckage.

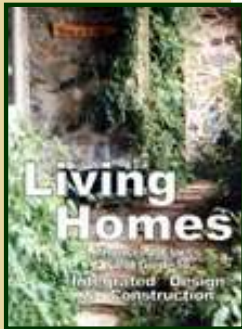
This compendium of nearly-forgotten lore does not expect the reader to surrender the advances of civilization. Elpel is not averse to making use of modern appliances - digging out his "aboriginal blender" to puree brains for tanning hides, or using an electric wringer from an old washing machine to soften hides for clothing. He recycles tires for durable footwear. He mentions conventional sandpaper for smoothing arrow shafts, but tells how to make "sand leather." He criticizes gold



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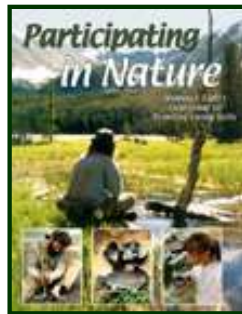
mining, but admits to using a computer with gold in its innards.

"*Participating in Nature*" contains fascinating information that could help city dwellers overcome their repugnance for getting down in the dirt and exploring the wonders of the natural world. Any Scout leader should own a copy. Digging, cleaning, drying, pulverizing and brewing dandelion roots for coffee or making nettle cordage and trying to catch dinner with it, for example, will elucidate subsistence to anyone who goes through the process.

As pristine territory becomes more and more scarce, it tends to be devalued by those who would develop it. Getting in touch with the diversity and value of flora and fauna helps to reacquaint human beings with their aboriginal past and is perhaps the best way in the long run to preserve wilderness for the future.

--Ann Chandonnet, [Juneau Empire](#) . Juneau Empire. Web posted Sunday, October 21, 2001.

[Go to Participating in Nature](#)



If you want to separate yourself from the modern world and get intimate with the Earth, grab a copy of Thomas J. Elpel's *Participating in Nature* and head for the woods. Not for a day, or even a week -- with this primitive living guide you'll learn enough to survive on your own till long after the cows come home.

Not your average "How to start a fire by rubbing two sticks together" manual, *Participating in Nature* is more like a Boy Scout Handbook edited by Thoreau. Elpel covers the basics, of course -- fire-starting, field botany, hide tanning, and fishing by hand, all with little or no supplies -- but he also packs in loads of useful material for the more advanced outdoorsman: weaving baskets from willow branches, constructing a toasty, rainproof lean-to, making durable rope from plant fibers, and building functional , effective hunting weapons.

Elpel also offers primitive living courses and other outdoor education programs at his wilderness retreat in Pony, Montana. Website: www.hollowtop.com

--Mike England, [Outside Bozeman](#). Bozeman, Montana. Vol. 1, No. 2. Winter 2000-2001. Page 45.

[Go to Participating in Nature](#)

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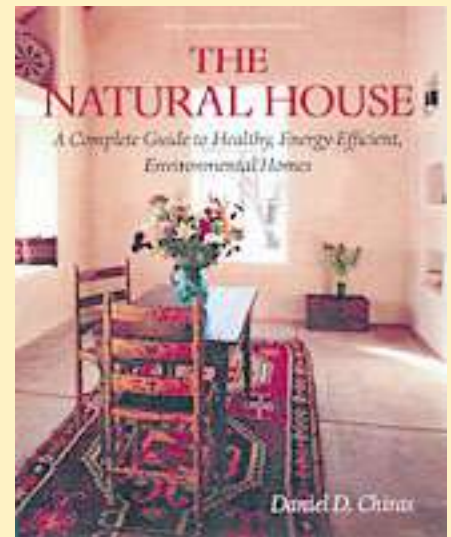
The Natural House

A Complete Guide to Healthy, Energy-Efficient, Environmental Homes

by Daniel D. Chiras

In the early 1990s, people were still asking a question that now sounds surprising: "Is it really possible to build a house that is economical, energy-independent, gentle on your health, nourishing to the soul, and kind to the environment?" Now that books such as *The Independent Home* and *The Straw Bale House* have sold tens of thousands of copies, that question is much easier to answer. Gracious, comfortable, and ecologically benign homes are being built all across America. But many people--including potential homeowners, professional contractors, and architects--are intrigued by solar techniques and natural materials, yet lack an overview introducing the basic choices now available.

The Natural House addresses that need with style and substance. This exciting new book, written by a veteran author who himself lives in a straw-bale and rammed-tire home, takes the reader on a tour of fourteen natural building methods, including straw bale, rammed earth, cordwood, adobe, earthbags, papercrete, Earthships, and more. You'll learn how these homes are built, how much they cost, and the pros and cons of each. A resource guide at the end of every chapter offers a wealth of information.



With a writing style that is clear, understandable, at times humorous, and fun to read, the author shows how we can gain energy independence and dramatically reduce our environmental impact through passive heating and cooling techniques, solar electricity, wind power, and micro-hydropower. Chiras also explains safe, economical ways of acquiring clean drinking water and treating wastewater, and discusses affordable green building products.

While Chiras is an advocate of natural building, he takes a careful look at the "romance" of natural building techniques and alerts readers to avoidable pitfalls, offering detailed practical advice that could save you tens of thousands of dollars, whether you're buying a natural home, building one yourself or renovating an existing structure, or considering hiring a contractor to build for you.

The Natural House \$35.00

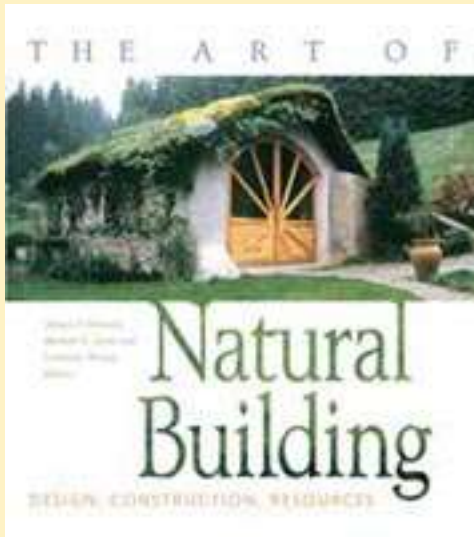
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The Art of Natural Building Design, Construction, Resources

Edited by Joseph E. Kennedy, Michael G. Smith and Catherine Wanek

The search for housing that is healthy, affordable, and environmentally responsible is leading a growing number of people to take a fresh look at building techniques long shunned by the modern construction industry.



Recently, books on specific techniques such as straw-bale construction, cob or rammed earth have become available, but there has been little to introduce the reader to the entire field. The Art of Natural Building fills that void wholly by being a complete and user-friendly introduction to natural building for non-professionals as well as architects and designers. From straw bale and cob to recycled concrete and salvaged materials, this anthology of articles from leaders in the field focuses on both the practical and the esthetic concerns of ecological building designs and techniques. Above all, this empowering guide demonstrates that anyone can design and build a home from natural materials that is beautiful, low-cost, and

environmentally-sensible.

Profusely illustrated, The Art of Natural Building is divided into five sections. The first provides an overview of the natural building movement from the various perspectives of sustainability, lifestyle, and health. The second section looks at planning and design, followed by a section that focuses on specific techniques and the vast variety of materials used in natural building. Next, examples of diverse natural dwellings are shared-from a Hybrid Hobbit House to a thatched studio and a cob office. Finally, complementary systems, such as solar appliances, composting toilets, and alternative power systems are covered. Packed with additional resources and a bibliography, this is the encyclopedia of natural building!

All three editors are central practitioners in the natural building movement. Catherine Wanek is the publisher and editor of The Last Straw Journal. Joseph F. Kennedy has expanded the boundaries of ecological architecture with NASA's space station habitability module. Michael Smith is the author of The Cob Cottage. 304 pages. 200 photos & drawings. \$27.00

The Art of Natural Building \$27.00

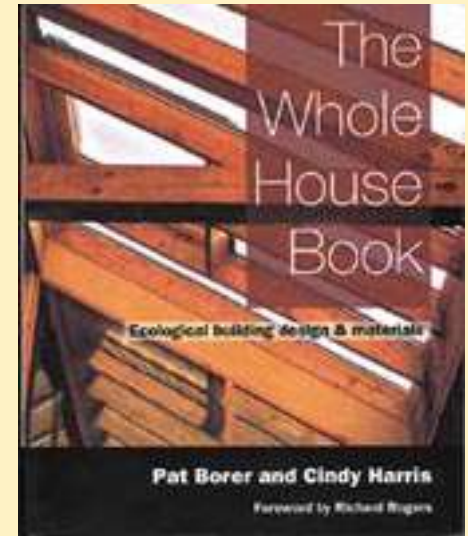
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The Whole House Book

Ecological Building Design & Materials

By Pat Borer and Cindy Harris



A full-color, green building encyclopedia for professionals or self-builders, this book's wholistic approach to design combines social, economic and environmental objectives with an evaluation of buildings' local and global impact. Chapters range from creating a healthy house with good air quality, to designing a home with minimum reliance on fossil fuels. Case studies highlight sustainable materials, solar roofs, ecological building in North America and France - and more! Note that this book originates from Europe and may contain measurement units, etc. not commonly used in the US. 320 pages. 500+ color illustrations. \$30.00.

The Whole House Book \$30.00

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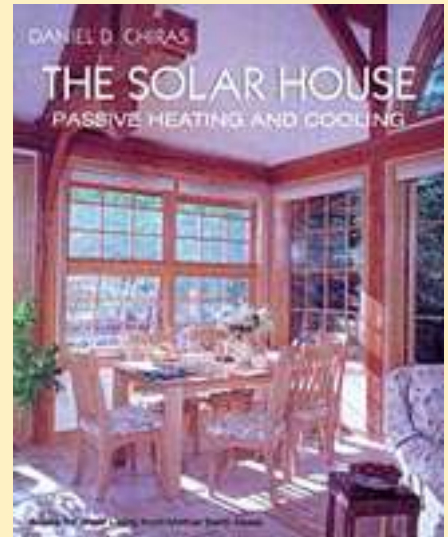
The Solar House

Passive Heating and Cooling

by Dan Chiras

Passive solar heating and passive cooling -- approaches known as natural conditioning -- provide comfort throughout the year by reducing, or eliminating, the need for fossil fuel. Yet while heat from sunlight and ventilation from breezes is free for the taking, few modern architects or builders really understand the principles involved. Now Dan Chiras, author of the popular book *The Natural House*, brings those principles up to date for a new generation of solar enthusiasts.

The techniques required to heat and cool a building passively have been used for thousands of years. Early societies such as the Native American Anasazis and the ancient Greeks perfected designs that effectively exploited these natural processes. The Greeks considered anyone who didn't use passive solar to heat a home to be a barbarian! In the United States, passive solar architecture experienced a major resurgence of interest in the 1970s in response to crippling oil embargoes. With grand enthusiasm but with scant knowledge (and sometimes little common sense), architects and builders created a wide variety of solar homes. Some worked pretty well, but looked more like laboratories than houses. Others performed poorly, overheating in the summer because of excessive or misplaced windows and skylights, and growing chilly in the colder months because of insufficient thermal mass and insulation and poor siting.



In *The Solar House*, Dan Chiras sets the record straight on the vast potential for passive heating and cooling. Acknowledging the good intentions of misguided solar designers in the past, he highlights certain egregious -- and entirely avoidable -- errors. More importantly, Chiras explains in methodical detail how today's home builders can succeed with solar designs.

Now that energy efficiency measures including higher levels of insulation and multi-layered glazing have become standard, it is easier than ever before to create a comfortable and affordable passive solar house that will provide year-round comfort in any climate. Moreover, since modern building materials and airtight construction methods sometimes result in air-quality and even toxicity problems, Chiras explains state-of-the-art ventilation and filtering techniques that complement the ancient solar strategies of thermal mass and daylighting. Chiras also explains the new diagnostic aids available in printed worksheet or software formats, allowing readers to generate their own design schemes.

The Solar House \$30.00

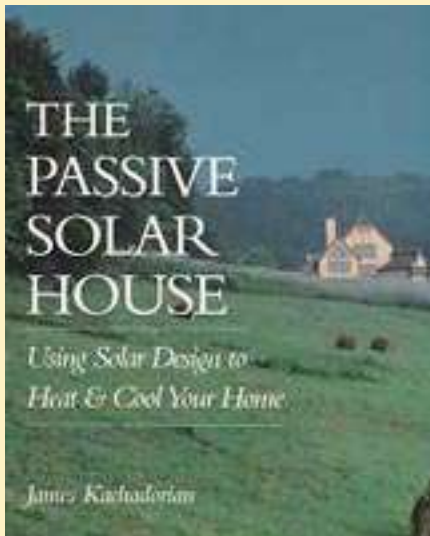
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The Passive Solar House

Using Solar Design to Heat and Cool Your Home

by James Kachadorian



The Passive Solar House gives readers a comprehensive look at the ten key principles of solar design that can complement any style of architecture or method of building. Kachadorian's sensible approach is both appealing and reassuring for those who think innovation in solar design ended in the 1970s. Kachadorian emphasizes that solar homes need not look experimental or futuristic, nor do they require complicated, expensive, or hard-to-maintain gadgetry. Good planning is worth much more than special technologies or equipment.

The Passive Solar House contains information on how to save money when building, how to avoid overheating, and which interior design features will lead to year-round comfort. Heavily illustrated, with color photos and easy-to-use formulas, this book is perfect for anyone considering a building project which maximizes energy efficiency. The author's clear, simple presentation of the basics combined with his technical authority make the material accessible to the owner/builder, professional contractor, or architectural student.

The Passive Solar House \$25.00

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Strawbale House Construction

A Brief Overview

by Thomas J. Elpel, Author of Living Homes

Strawbale buildings are all the rage in alternative construction today, and with good reason--they are cheap, easy to build, and very energy efficient. Strawbale buildings look similar to adobe, with massive walls, wide window sills and typically rounded corners, but with the added benefit of a higher insulation value. The soft, sometimes curvy edges of strawbale construction can lend a fairy tale look to the finished structures. The fun part of strawbale construction is that anyone can do it. Anyone can help stack the fluffy, oversized bricks in place.



Strawbale homes and outbuildings were first developed by pioneers in the Sand Hills of Nebraska where there was lots of straw, but few trees. The early pioneers built houses of sod, up until the late 1800's when baling technology provided the first compressed, string-tied rectangular bales. The next logical step was to stack those bales like bricks to make warm walls. Strawbale buildings from the early 1900's are still in use and in excellent condition today.

Due to publicity in the 1980's and 1990's there are now strawbale buildings popping up all over the world--in wet and dry climates, from hot southern environments to chilling northern extremes.

Strawbale homes are very well insulated. The orientation of the straw in the bales makes some difference in the insulation value. Bales laid flat (with strings running around the top and bottom) rate about R-2.4 per inch while those laid on edge (with strings running around the sides) rate R-3 per inch. However, the bales are usually wider when laid flat than on edge, giving a higher overall R-value. The bales are slightly stronger too, when laid flat.



There are two types of strawbale houses. One type has **load-bearing** walls, where the weight of the roof is supported by the bales, while the others are **non-load bearing**, where the roof is supported by a framework and the bales are filled in afterwards. There are advantages and disadvantages to either approach.

In a **load-bearing** strawbale building the windows and doors have to be placed carefully to avoid compromising the strength of the walls, and the roof has to be designed to equalize the load distribution to the walls. The size of the building, the height of the walls, and compression and settling of the bales under the weight of the roof and potential snow loads must also be considered. All of these obstacles are overcome when using an independent support structure for the roof. My neighbor built a very large load-bearing strawbale workshop, but it has only two doors and no windows. Two pictures of the building are shown in the pictures here. The details of the project are featured in *Living Homes*.

Typical support structures for **non-load bearing** strawbale buildings include conventional lumber framing as well as timber framing, framing with poles or logs, or concrete posts and beams. The support structure holds up the roof, taking the pressure off the bales (and the builder). Besides, a supporting framework enables you to put up the roof first, so that the rest of the work can proceed inside the shelter, protecting yourself, your tools and the strawbales from the weather. That's important since it only takes one rainstorm to soak the tops of the unprotected bales, quickly rotting out your good work.

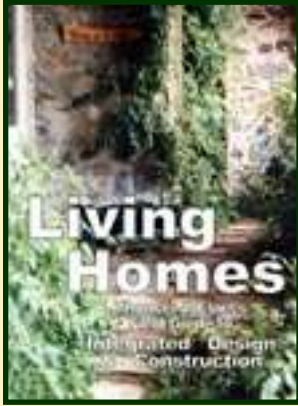


On the other hand, a supporting framework often requires more lumber than you would use with load-bearing walls, and the framing tends to get in the way of the bales, requiring extra design work to position the framing for minimal interference with the walls, and/or to notch into the bales to fit around the framing. The strawbale home pictured here is a non-load bearing structure built by another neighbor. It is also featured in *Living Homes*.

Living Homes

Integrated Design & Construction

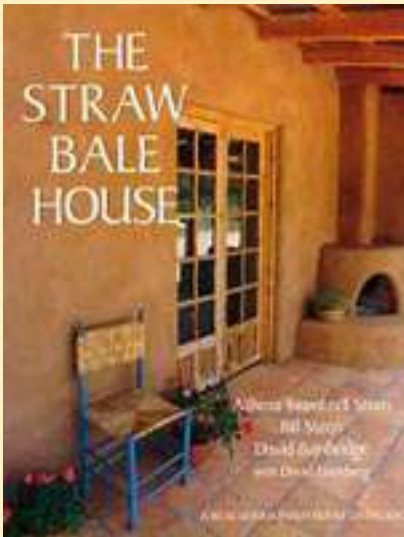
by Thomas J. Elpel



Although there is only one chapter on strawbale construction in *Living Homes*, it is packed with the essential details of strawbale construction and tied together throughout the book with all other aspects of building, from innovative foundation solutions to creative roofing ideas, solar design, heating, plumbing and wiring. For complete details on the book, please go to: [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#)

Living Homes: Integrated Design & Construction \$25.00 Quantity:

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The Strawbale House

by Athena and Bill Steen

Imagine building a house with superior seismic stability, fire resistance, and thermal insulation, using an annually renewable resource, for half the cost of a comparable conventional home. Welcome to the straw bale house! Whether you build an entire house or something more modest--a home office or studio, a retreat cabin or guest cottage--plastered straw bale construction is an exceptionally durable and inexpensive option. What's more, it's fun, because the technique is easy to learn and easy to do yourself. And the resulting living spaces

are unusually quiet and comfortable.

The *Straw Bale House* describes the many benefits of building with straw bales: super insulation, with R-values as high as R-50; good indoor air quality and noise reduction; a speedy construction process; construction costs as low as \$10-per-square-foot; use of natural and abundant renewable resources; a better solution than burning agricultural waste straw, which creates tons of air pollutants.

The Strawbale House \$30.00

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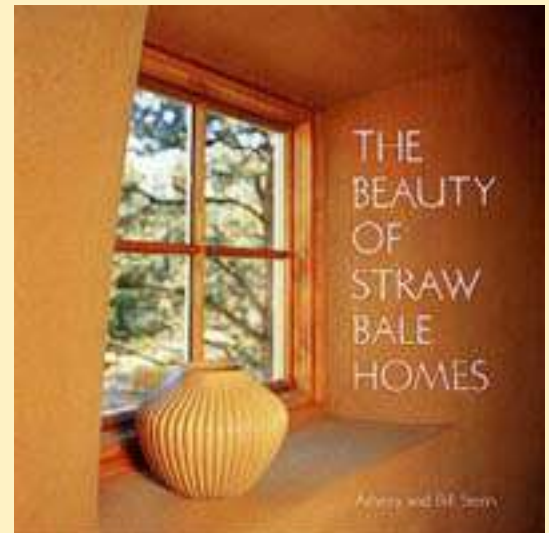
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The Beauty of Strawbale Homes

by Athena and Bill Steen

While enthusiasts of straw bales praise the exceptional energy efficiency of bale buildings, and the wise use of resources involved in utilizing an agricultural byproduct as an affordable construction material, the real reason straw bales have excited builders and homeowners nationwide goes beyond energy conservation, resource recycling, and affordability. People love straw bale homes because they are so often extraordinarily beautiful and inviting.

In the past two decades, the bale-building renaissance has attracted some of our most gifted architects, artisan builders, and craftspeople. Certain qualities of straw as a material -- and the hands-on process of constructing walls with a completely natural substance -- have appealed to both very experienced builders and those who find this to be a uniquely accessible form of creating shelter. The characteristic thick walls and wide windowsills of straw bale houses, the possibility of incorporating curves and even arches, and the rousing experience of family "wall-raising" have become well-known. Combined with older styles of plastering and earthen floors, these very contemporary buildings have a timeless quality that's easy to recognize yet hard to achieve with conventional manufactured materials.



Athena and Bill Steen, co-authors of the original *Straw Bale House* book, have created a book that celebrates in gorgeous color photographs the tactile, sensuous beauty of straw bale dwellings. Their selection of photos also demonstrates how far bale building has come in a very short period of time: In addition to handsome homes, small and not-so-small, this book shows larger-scale institutional buildings, including schools, office buildings, the Real Goods Solar Living Center, and a Save the Children center in Mexico.

In addition, this book includes an introductory essay by the Steens noting the key lessons they have learned in years of building with bales: insights into the design and construction process, and critical advice about design elements that ameliorate the impacts of moisture, weather, and wear-and-tear over time. Each photograph is also accompanied by narrative text highlighting a given building's special features and personal touches.

The Beauty of Strawbale Homes \$23.00

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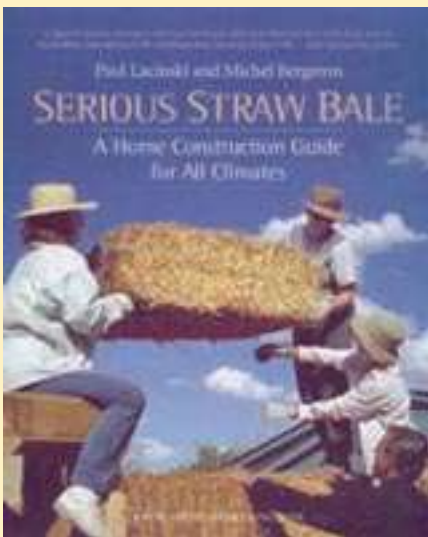
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Serious Straw Bale

A Home Construction Guide for All Climates

by Paul Lacinski and Michel Bergeron

When *The Straw Bale House* was first published the response from many people was a loud, "Huh?!" But those days are gone and we've entered a new era. Even building-code officials and insurance companies now look favorably upon straw bale buildings, with their extraordinary energy efficiency and wise use of agricultural waste for construction materials.



Bergeron and Lacinski's book is the first to look carefully at the specific design considerations critical to success with a straw bale building in more extreme climates--where seasonal changes in temperature, precipitation, and humidity create special stresses that builders must understand and address. The authors draw upon years of experience with natural materials and experimental techniques, and present a compelling rationale for building with straw--one of nature's most resilient, available, and affordable byproducts. For skeptics and true believers, this book will prove to be the latest word.

Thorough explanations of how moisture and temperature affect buildings in seasonal climates, with descriptions of the unique capacities of straw and other natural materials to provide warmth, quiet, and comfort year-round. The book includes omprehensive comparisons between the two main approaches to straw bale construction: "Nebraska-style," where bales bear the weight of the roof, and framed structures, where bales provide insulation. Also included is detailed advice--including many well-considered cautions--for contractors, owner-builders, and designers, following each stage of a bale-building process.

This is a second-generation straw bale book, for those seeking serious information to meet serious challenges while adventuring in the most fun form of construction to come along in several centuries.

Serious Strawbale \$30.00

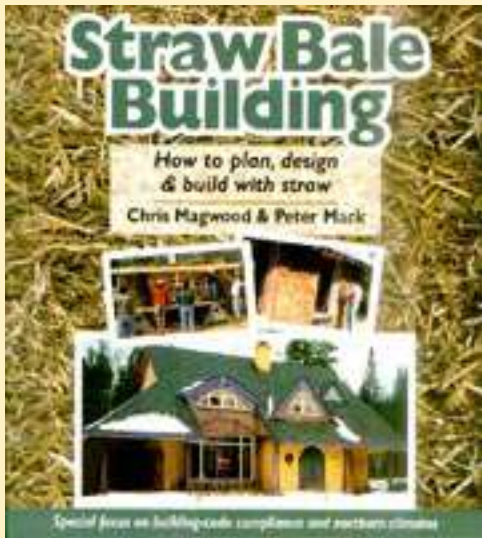
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Straw Bale Building

How to plan, design & build with straw

by Chris Magwood & Peter Mack



Straw bale buildings have grown tremendously in popularity over recent years. At the same time, designers and builders have increased their knowledge about this unique construction method, making possible homes of unparalleled beauty and energy-efficiency.

Now, with *Straw Bale Building*, this technique is explained in the fullest depth yet, enabling everyone who wants to build with bales to do so with confidence, safety and flair and to do so in compliance with local building codes. Furthermore, while many early straw bale buildings have been built in drier, southern climates, *Straw Bale Building* includes a special focus on northern climate construction.

Straw Bale Construction guides the reader through every stage of the design and building process and is heavily illustrated with both architectural quality drawings and photographs of on-the-job action. With its extensive listing of further resources, it provides all you need to plan and then create the building of your dreams!

The authors Peter Mack and Chris Magwood are professional straw bale house builders, co-founders of Camel's Back Construction. Together they have constructed fifteen straw bale houses and structures and teach a popular, on-going straw bale building workshop in Ontario, Canada.

Straw Bale Building \$25.00

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Straw Bale Details

A Manual for Designers and Builders

by Chris Magwood & Chris Walker



Straw Bale Details is the perfect companion for those who are serious about building with straw. There isn't a lot of text in the book, just high-quality drawings detailing how all the parts fit together in a straw bale house.

It focuses entirely on the specific design theories and practices that result in well-built, long-lasting bale structures, and extends the range of books like *Straw Bale Building* through large, easy-to-read architectural drawings rendered for a wide variety of building options, including load-bearing and post-and-beam designs. A range of foundation, wall, door and window, and roof-plate scenarios are presented, along with explanatory notes and possible modifications. Also included is testing data from the

most recent rounds of bale wall exploration, and interpretations of the data are given to help base designer and builder decisions on sound science.

Chapters include: Foundations & Floors; Curb Rails; Walls; Openings; Top Plates; Pre-Stressing; Roofs; Wall Mounting, Electrical & Plumbing Systems; as well as sections on Key Scientific Test Results; Building Code Provisions; Bale Basics; Plasters & Finishes; and a Bibliography.

Straw Bale Details \$33.00

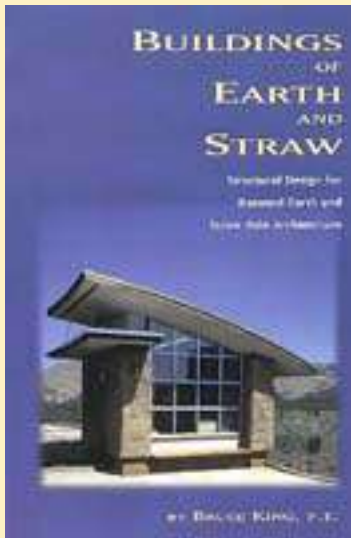
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Buildings of Earth and Straw

Structural Design for Rammed Earth and Straw-Bale Architecture

by Bruce King, P.E.



There are many other excellent books on strawbale and rammed earth construction to help guide the novice builder down the path to building the house of their dreams. *Buildings of Earth and Straw* is intended more as a companion to the other guides, rather than a competitor. Author Bruce King has tackled the engineering side of working with earth and straw building materials to create a common language for builders, architects, and building inspectors. With this book as your guide, you can build a strawbale or rammed earth house in a way that is truly structurally sound and you can provide the building inspector with the engineering data to back it up.

Although parts of the book will require an engineering background to understand it, most of the content is accessible to the lay person, and King makes even the mundane engineering interesting, and at times, humorous. This book is truly essential for anyone building a strawbale or rammed earth house in places where building codes are enforced. In places where building codes do not exist, this book is still highly recommended, to insure that you build a safe and stable structure.

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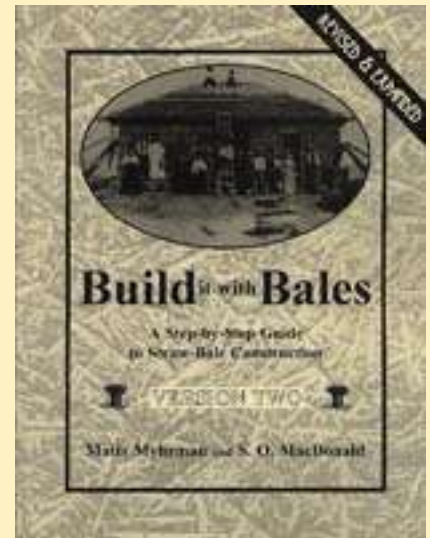
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Build it with Bales

A Step-by-Step Guide to Straw-Bale Construction

Version Two

by Matts Myhrman and S.O. MacDonald



Matts Myhrman and his wife Judy Knox formed Out on Bale, Ltd., an international center for straw-bale construction. They founded, and for six years published, *The Last Straw Journal*. Their current focus on natural building research and education includes leading workshops that use life-affirming methods to explore personal and societal path-changing.

Steve MacDonald and his wife Nena built their house of straw in 1988 in southwestern New Mexico. For many, including Matts and Judy, it became their starting point in the straw-bale revival. His *Straw-Bale Primer*, also illustrated by son Orien, helped many early practitioners and became the basis for the first version of this book.

Build it with Bales \$30.00

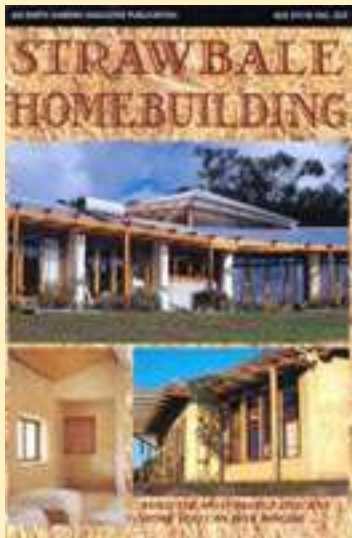
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Strawbale Homebuilding

Edited by Alan T. Gray and Anne Hall

Build the most energy-efficient home you can ever imagine . . . *Strawbale Homebuilding* presents the detailed experiences of owner-builders, architects, and professional builders who have created interesting homes around Australia from this revolutionary house-building method. The book sets out to complement the inspiring information published in the classic text *The Straw Bale House*, which has now sold more than 100,000 copies around the world, and has produced thousands of strawbale homes.



There are stories in *Strawbale Homebuilding* from owner-builders who have built their home in the snowy, deep south of Tasmania without any form of major heating because they have used passive solar design principles and super-insulated strawbale walls. There is a story from owner-builders at Carnarvon on the remote north-west coast of Western Australia who have built a safe and comfortable home in one of the world's highest-risk tropical cyclone zones. There are luxury homes in trendy inner Sydney suburbs and even large homes in housing estates, impossible to distinguish from their conventional neighbors.

The beauty of these straw bale homes is that they save their owners a small fortune in heating and cooling costs, because a straw bale home is six to nine times better-insulated than a conventional home. "This book shows how people can understand, cost, build, and maintain an affordable, super-insulated home without being mortgaged to the bank for the rest of their lives," said the book's publisher, Mr. Alan T. Gray. "A straw bale home can save its owners around \$20,000 in heating and cooling costs over the life of the average mortgage. Most people can think of better things to do with \$20,000 than giving it to bank shareholders," he said. "We have set out to publish a book that complements *The Straw Bale House* and shows people that strawbale houses are within their reach.

The book is of interest to potential strawbalers anywhere, because it presents the real-life tips and experiences of ordinary people who wanted to live in something more interesting, and more eco-friendly than the usual suburban, mass-built box," said Mr. Gray. *Strawbale Homebuilding* is published by *Earth Garden* - Australia's magazine of self sufficiency and practical environmentalism.

Strawbale Homebuilding \$20.00

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Stone Masonry Construction

A Brief Overview

by Thomas J. Elpel, Author of Living Homes

Traditional Dry-Stack Stone Walls: Stone masonry originated with dry-stacked stonework where the walls are carefully layed up without mortar. Gravity serves as the glue that holds everything together. Free-standing dry-stack stone walls are usually made larger at the base and then taper in slowly as the height increases. For absolutely no expense but the labor, farmers built miles upon miles of stone fences this way in Ireland and in the northeastern states.

Many old Irish houses were built in a similar way. Where "mortar" was used, it was often merely mud or limestone plasters with little strength. The mortar functioned as caulking to stop the flow of air, rather than as cement to bond the stones together. Short, dry-stacked stone walls are especially ideal for landscaping projects. Taller walls require more skill and time. For more details on dry-stack stone walls, be sure to check out [Building Stone Walls](#) and [Stonework: Techniques and Projects](#).

Traditional Mortared Stone Walls: Mortared stone walls evolved out of dry-stack stone work with the emergence of cement mortars. The first cements were made of burnt gypsum or lime mixed with water to make a paste with slight bonding capability. Stone walls still had to be built as carefully as they were without mortar. The cement paste just filled the gaps between the stones and cured to form a soft, rock-like substance.

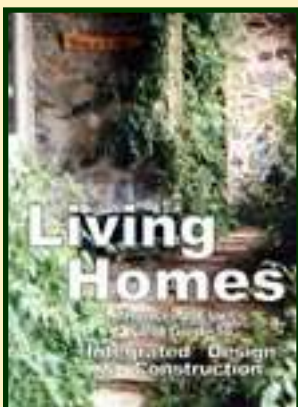
The basic formula for modern cement originated in England in 1824. It is called "Portland cement" because the color is similar to the rocks on the English island of Portland. It is still called Portland cement everywhere in the world it is manufactured. This cement is made with calcium from limestone or chalk, plus alumina and silica from clay and shale. The ingredients are ground, mixed in the right porportions and burnt in a kiln at a temperature of about 2500 degrees F (1350»C) to drive out water bound up in the raw materials. In the kiln it fuses into chunks called clinker. It is cooled and powdered, and gypsum is added to control how fast it sets up. Portland cement is mixed with sand and water, and often lime to make a smooth mortar for stone and brick work. Adding the lime makes the mortar softer and more flexible.

With the aid of Portland cement it is possible to build a taller stone wall that does not taper inward like a dry-stacked wall. The cement has some ability to "glue" a stone wall together with less care, but proper stoneworking techiques are still important. Building a free-standing stone wall is a true art and requires a lot of time and skill to do it well. For more details on traditional mortared stone walls, be sure to check out [Building with Stone](#).

Veneered Stone Walls: Most stonework today consists of a non-structural veneer of stone against a structural wall of concrete or cinderblock. Concrete consists of Portland cement mixed with sand, gravel and water. The larger particles of gravel interlock like little fingers to make the concrete resistant to cracking. Steel reinforcing bar can be added to serve as much longer "fingers" to make a wall that is very resistant to cracking. Concrete is a fast and relatively inexpensive way to put up a structural wall, so few people take the time for labor intensive traditional mortared stone walls any more.

Instead, the structural wall is put up first, and thin, flat stones are essentially glued onto the face of the wall with cement mortar. Metal tabs in the structural wall are mortared in between the stones to tie everything together, otherwise the stonework would just peel right off the wall. The structural wall serves as a form on one side of the wall to make it really easy to lay up the stonework, provided the rocks have good flat edges to work with.

Slipform Stone Walls: A slipformed wall might be described as a cross between traditional mortared stone wall and a veneered stone wall. This is the method of stone masonry we have used the most. Short forms, up to two feet tall, are placed on both sides of the wall to serve as a guide for the stone work. You place stones inside the forms with the good faces against the form work and pour concrete in behind the rocks. Rebar is added for strength, to make a wall that is approximately half concrete and rebar and half stonework. The wall can be faced with stone on one side or both sides. With slipforms it is easy even for the novice to build free-standing stone walls.

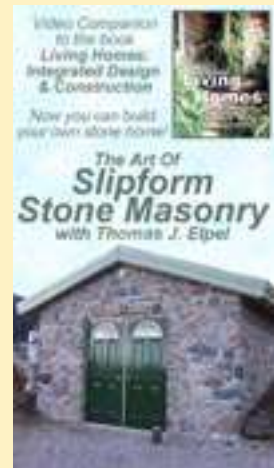


Tom's article *The Art of Slipforming* was featured in the December 1997/January 1998 issue of *The Mother Earth News* magazine. We received more than 150 letters from people enthusiastic to learn slipform masonry first-hand. Those who are familiar with the slip-forming process wrote to tell us the article was a significant advancement over the available literature on the subject. That article and much more are included in my book [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#).

Framed-One Side Stone Walls: If you build a slipform stone building with stone on the outside and framed walls on the inside, then you eventually have to come to the conclusion that it would be smarter to build the frame wall *first*. By building the interior frame first, you will have half the formwork done, plus a straight and plumb guide to work from for doing your stonework. This is exactly the method used by Charles Long, featured in [The Stone Builder's Primer](#). Long doesn't use slipforms at all, but

simply does traditional mortared stone masonry with the benefit of a frame wall to serve as a form on the back. This method works exceptionally well when the rocks are squared and brick-like, but for rounded stones the novice would need forms to aid in the process.

In my article in *The Mother Earth News*, I proposed a similar method of slipform stone masonry, where the entire house would be framed with polystyrene beadboard insulation panels before beginning any stone masonry. The beadboard panels would serve as forms inside the wall and the stone masonry would be slipformed up the outside. That way it would be easier to build straight, plumb walls with less labor and fewer slipforms. The beadboard panels would also eliminate expensive wood framing on the inside of the walls while maximizing energy efficiency by eliminating thermal gaps through the framing. At least that was the theory. I hadn't actually tried it myself.



The first person to try this method was Dani Gruber of Colorado. She read the article in *Mother* and wanted to test out the new method of slipforming I had proposed. She didn't just build a house, but more of a castle, as featured in her story [Slipforming--The Next Generation](#)

In June of 2001 we built our own project with this new method of slipforming, although on a slightly smaller scale. We built a small workshop of stone beside our home, and produced a [step-by-step video tape](#) of the process.

Tilt-Up Stone Walls: I would like to see much greater use of stone, since it is such a long lasting and beautiful material. After building a couple of houses with the easy, but still labor-intensive slipform method, I started dreaming of ways to mass produce highly efficient stone houses using modern technology. Tilt-up stone masonry seemed like a logical choice--that is pouring stone walls flat on the ground and setting them in place with a crane.

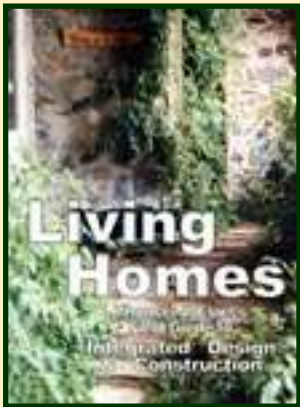


My brother Nick grew interested in the idea and decided to figure it out himself. He liked the idea of building with stone, but didn't care for the slipform masonry technique we used. He chose tilt-up stone masonry as a faster way to build, that would also eliminate the cold joints that run throughout slipformed walls. Pouring the walls would simultaneously grout the stonework, insuring an integral bond that would prevent problems with the mortar cracking and falling out later. With tilt-up construction he would be able to bring the stonework up higher without having to lift each individual rock and bucket of concrete.

Nick bought a building lot a block away from our place built his house with the tilt-up method. I wrote about the process in the January 2003 issue of *Fine Homebuilding Magazine*. The article is included in more depth here: [Tilt-Up Stone Masonry](#). It is also included in my book [Living Homes: Integrated Design & Construction](#). Let me emphasize that tilt-up work is NOT for beginners. It requires an experienced carpenter and mason, and it is really suited for mass-production, where the same forms are used again and again.

Stone Masonry Books & Videos

Living Homes Integrated Design & Construction by Thomas J. Elpel



Living Homes includes in-depth coverage of slipform stone masonry, building an efficient masonry fireplace, measuring and mixing concrete, footings and foundations, plus tilt-up stone masonry construction. Stone masonry coverage is together throughout the book with all other aspects of building, from innovative foundation solutions to creative roofing ideas, solar design, heating, plumbing and wiring. For complete details on the book, please go to: [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#)

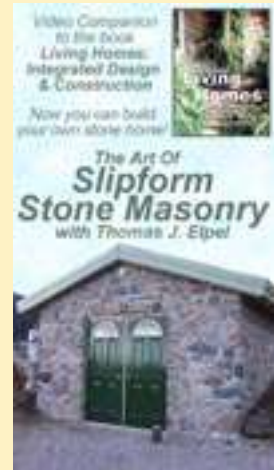
Living Homes: Integrated Design &
Construction \$25.00 Quantity:

The Art of Slipform Stone Masonry
Video Companion to
[Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#)

Want to build a stone house? It's easier than you might think! *The Art of Slipform Stone Masonry* brings to life the nuts-and-bolts of the slipforming process featured in Tom's book *Living Homes*.

Slipforming is the process of using forms on both sides of the wall as a guide for the stonework. The forms are filled with stone and concrete, then "slipped" up the walls to form the subsequent levels. Slipforming makes stone work easy even for the novice.

In this unique video, Thomas J. Elpel and Robert Taylor build an insulated workshop out of stone, demonstrating the building process from site excavation right through to putting the roof on and finishing the inside. Working through the month of June in Montana, they brave the rain and snow, gusting winds, searing heat and stunning rainbows to bring this project to fruition.



The video is designed as a companion to Tom's book *Living Homes*. The principles of design and construction are out-lined in the book, enabling the reader to create dwellings customized to their own unique situations. In this video you will see just one application of those principles, but in vivid detail from start to finish. With both the book and the video you too will be able to design and build in a way that is completely unique to your own Vision. *The Art of Slipform Stone Masonry* is recorded on **certified quality recycled VHS tapes** for an environmentally friendly video! November 2001. ISBN: 1-892784-10-6. 1 hr. 50 min. **\$25.00**. For additional details on the workshop we built, please [click here](#).

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. *The Art of Slipform Stone Masonry* is only available in NTSC format.

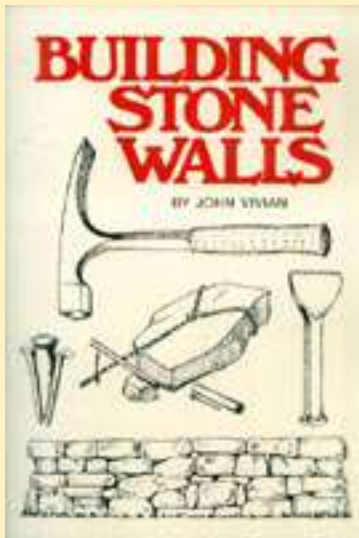
The Art of Slipform Stone Masonry Video \$25.00 Quantity:

Discount: Order both *Living Homes* and *The Art of Slipform Stone Masonry* and save **\$5.00**.

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Building Stone Walls

by John Vivian



Building Stone Walls shows you everything you need to know to build sturdy mortarless (dry-stacked) stone walls for landscaping. Learn how to make either free-standing stone walls or stone retaining walls, plus how to build a proper foundation. Coverage also includes: how to find good rock, how to build seats, steps and gates into a wall, and how to make a mortarless stone birdbath, plus diversions or dams in a stream. Carefully detailed, clear drawings show the techniques to follow--and how to avoid problems. First published in 1976, the material covered in this book is just as timeless as stone itself. 108 pages. \$12.00

Building Stone Walls \$12.00

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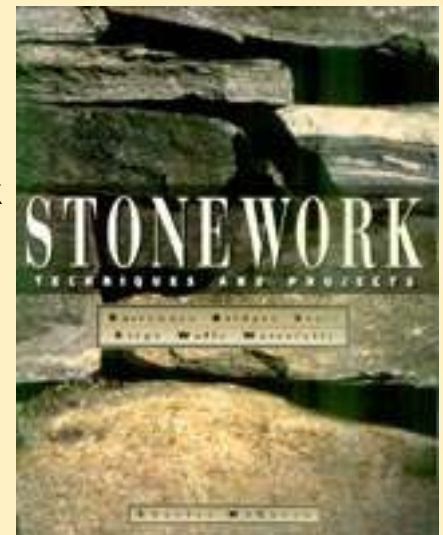
Stonework

Techniques and Projects

by Charles McRaven

No building material rivals stone for beauty, permanence, and enduring popularity. Discover the lasting satisfaction of working with stone and learn the tricks of the trade from a master craftsman. Builder Charles McRaven offers the benefit of his fifty years of stonework experience in *Stonework*, a book that will inform, entertain and inspire anyone using or working with stone.

McRaven helps even first-time builders comprehend the intricacies of working with different stone types, including sandstone and quartzite, limestone, granite and greenstone, shale, slate and other stones. He covers how to choose the most suitable stone and where to locate natural or commercial sources of stone, including recycled stone, plus cutting and shaping stone and handling and safety issues



Featured projects include how to build a stone wall with and without mortar, plus curved walls, arches (with and without mortar), and using stone for gardens, paths, pools, waterfalls, landscape accents, pillars, gateways, doorways, stone steps, even bridges and entryways. 1997. 183 Pages. \$19.00

Stonework: Techniques and Projects \$19.00

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Building with Stone

by Charles McRaven



Concrete and steel may weight as much, but nothing can rival stone for its beauty and durability. *Building With Stone* is an introduction to the art and craft of creating stone structures and projects by a man who has made stonework his vocation. In this book the author covers some similar techniques and projects as in his book *Stonework: Techniques and Projects* (see above), but he goes into greater depth with mortared wall systems and buttresses, detailing the traditional techniques of hand-layed stone for building anything from a barbecue pit to bridges, houses, or barns.

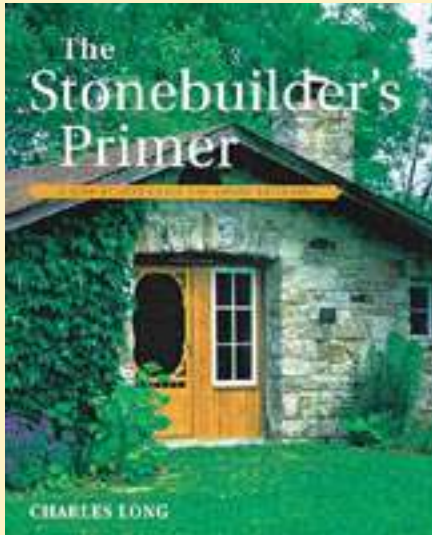
Throughout the book is Charles McRaven's stonebuilding philosophy--that careful craftsmanship and time well spent during construction will repay itself many times over. The physical challneges will be offset by tremendous satisfaction and the knowledge that long after the builder is gone, the structure will continue to serve.

Based on years of experience, this book will educate the novice and inspire the seasoned artisan. A stone builder at any level will learn how to evaluate each stone and undertake each step in the procedure with and eye toward aesthetics and useful permanence. The final chapter covers proper restoration techniques for stone structures. 1980, 1989. 192 Pages. \$18.00.

Building with Stone \$18.00

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The Stonebuilder's Primer

A Step-by-Step Guide for Owner-Builders

by Charles Long

"It must be more complicated than that." Is the frequently heard comment of visitors to the author's farmstead in rural Ontario. Setting out to create an aesthetically satisfying home of stone on a limited budget--and with no previous construction experience--Charles and Elizabeth Long not only succeeded in their efforts but developed a "compromise method" of stone construction that is both simpler and truer to the stonemason's art than the popular slipform method.

Drawing upon his years of personal experience, the author describes the complete building process in clear, easy-to-follow steps and, in so doing, dispels the myth of difficulty that surrounds stone construction. Fully illustrated with hundreds of diagrams and photographs. 1998. 126 Pages. \$18.00.

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Tilt-Up Stone Masonry

A Technological Lift to the Ancient Art of Stone Work

by Thomas J. Elpel

Stone masonry is the stuff of castles and cathedrals and of houses that have been around for centuries, or will be. It is the Gold Standard of the construction world.

There would be far more stone houses in the world today, but stonework is considered too labor intensive-and therefore too expensive-to be practical. Builders often settle for a veneer of stone across prominent walls to give the illusion of the real thing.

As a child I dreamed of building my own castle of stone. I drew fantasy pictures of the place where I would someday live. At the age of 21 I moved into a tent with my bride, Renee, on our five-acre plot and started building our Dream home of stone and log, using free rocks from the roads and hills. We used the slipform method, placing forms on both sides of the walls to guide the stonework, then moved the forms up the walls as we went. It didn't cost much money, just lots of time, but we had plenty of that. We paid for the house out-of-pocket a little at a time, and in a few short years we had a very energy-efficient and beautiful home for the cost of \$10 a square foot.

It was also my Dream to make resource-efficient stone houses available and competitive in the marketplace. It simply makes more sense to me to build quality houses that will last for centuries than to toss up structures that need constant repairs to keep them standing. But when Renee and I built and sold a small stone house on speculation, we discovered the other side of the labor issue. Sure, it was greatly economical to build our own stone home, but not so economical to build and sell one to someone else. There had to be a way to short-cut the labor and mass-produce stone houses.

It was then that I began to dream of tilt-up stone masonry--that is pouring stone walls flat on the ground and setting them in place with a crane. But I didn't have any time to pursue the idea, while already engaged in writing and publishing books.

Fortunately, my brother Nick grew interested in the idea and decided to figure it out himself. He liked the idea of building with stone, but didn't care for the slipform masonry technique we used. He chose tilt-up stone masonry as a faster way to build, that would also eliminate the cold joints that run throughout slipformed walls. Pouring the walls would simultaneously grout the stonework, insuring an integral bond that would prevent problems with the mortar cracking and falling out later. With tilt-up construction he would be able to bring the stonework up higher without having to lift each individual rock and bucket of concrete. Nick bought a building lot a block away from our place and started building.

Experimentation

As with any new building technique, there were many hurdles to cross to get a working system. Tilt-up construction is hardly new, but the panels are usually faced with coarse, decorative gravel that is simply raked into the forms before the pour.

Nick wanted to securely embed real stones with mortar joints that were neither too shallow nor too deep, while being careful to avoid cement stains on the rock faces. He also needed to find a way to structurally connect the walls to the footings and to the other walls-while artfully hiding the joints between them. We practiced on his garage first, before starting the house.



In 3' x 3' test panels placed face-down, Nick swept sand in between the stones to make a slightly recessed joint, then poured the concrete, but unfortunately, the cement water soaked through the sand and stained the front of the stones. Therefore, to insure high-quality stonework, Nick called in a concrete truck and we poured the walls of the garage face-up, setting the rocks carefully into the fresh mortar. We worked as fast as we possibly could, placing stones and finishing the joints as we went.

Working in November in Montana helped to retard the cement, so we could do more work before the concrete set up.

Before the pour, Nick cast concrete trim for the windows and garage door in moulds cut from polystyrene "beadboard" insulation. Wire mesh in the back of the trim enabled us to anchor the trim pieces securely into the wall panels along with the stonework. We mixed concrete as necessary to finish the panels, completing them without any cold joints. The panels consist of approximately 5 inches of reinforced concrete wall, faced with stones 2-3 inches thick, for a total thickness of 7-3/4". The rocks should not be any thicker, as that would compromise the structural wall of concrete and rebar. Although this method worked, setting an entire wall of stones at once was fast-paced and stressful work.



The garage consisted of many small panels-seventeen in all--two for each side of the

building, three inside the garage, plus six roof panels. With the aid of a crane, the panels were set onto concrete blocks, then welded together where Nick embedded metal plates into the walls.

Because the project was built into a hill, only two sides of the building were faced with stone. The other walls were plain concrete panels completely hidden after backfilling the site. The concrete roof served as a load-bearing surface which was later covered with earth to make the yard. Rebar protruding from the panels was bonded together with a footing at the bottom and a bond beam at the top. To hide the joints between the panels, Nick left a gap in the stonework, then laid those sections up by hand after the walls were up.

Building the House

While we saved time on the stone panels of the garage, we realized it would be cheaper and easier to pour the concrete walls in the back with conventional concrete forms. We were also unsatisfied with the weld plates, bond beam, and the custom stonework at the corners that were required to tie all the parts together. There had to be a better way.

Nick concluded that it would be better to pour the walls with the stones faced-down, so he added bentonite clay powder to the sand between the stones to make the recessed joint. The bentonite swelled when wet and sealed the joints, greatly reducing the problem with cement stains on the rock faces. Pouring the walls face-down also enabled Nick to cast the window trim in place.

I suggested interlocking corner blocks to aesthetically and structurally tie the walls together, and Nick switched to larger panels so there would be fewer joints. This is how the system works from the ground up:

Footings

Bonding the walls to the footing is a unique challenge in tilt-up construction that virtually requires putting up the panels first, then pouring the footing underneath. The solution Nick found was to pour concrete pads at the corners or other joints where two panels come together. The pads should be big enough to support the ends of the two joining panels, usually about two feet square. Rebar should extend out of the concrete pads into the future footings. Rebar should also extend out of the bottom of the wall panels, to bond into the footing.



Pads and footings should be placed below the frost line. That wasn't an issue with Nick's place, since both the house and garage are nestled into the hill. However, on a flat building site, it may be advisable to design a floor plan where the main level is placed

below frost line to avoid using extra concrete.

When you pour the pads, you should also pour a "deadman" anchor in the center of the house. It should be a very solid and unmovable pad of concrete, so that you can bolt a temporary brace to it to support the wall.



Forming the Walls

Bonding tilt-up panels to the footing is only half the challenge. The walls must also be bonded to each other, to look and function as a single unit. Weld plates should be pressed into the wet concrete to connect the wall panels together at the joints, but this is only a temporary fix. For true bonding the walls must be permanently connected.

Nick built wooden forms to create the interlocking corners. The corner blocks were made slightly thicker than the walls (8-1/2" x 15") to accentuate the visual strength of the corners. Oriented-strand board (OSB) was used for the form work, to give a random texture to the concrete blocks. Plywood should not be used, as that would leave a definite grain in the blocks. The corners can be caulked inside the forms for a slightly rounded edge.

Note that the wood moulding used to accentuate the edges of the blocks should be slightly bevel-cut to pop out of the wall easier. Also, since the wood swells up from the water in the concrete, the wood should be allowed to dry and shrink before removing it, to prevent chipping the concrete.

Nick modified a standard rebar bender to wrap the rebar around the beadboard cores in the corners. The cores left a round void (after drilling out the beadboard with a spade bit) to drop a 1-1/4 inch-diameter rebar pin down through the corners. With the rebar also wrapped around the columns, it was much like an interlocking hinge, except that mortar was poured down the hole and troweled between the joints to permanently bond the panels together. Leave a full inch for each mortar joint between the corner blocks, so you have plenty of room to maneuver the panels. Measure everything as many times as necessary to insure accuracy. You cannot afford to get the panels up in the air, only to find they do not fit together!



Keep in mind that the ground is part of the formwork, so it must be perfectly flat, but you don't need a concrete slab to work on. Level the site as much as possible, then stake

down the perimeter forms and level them at the corners. Next, rake the ground smooth inside, adding or removing dirt as necessary. Make a screed that fits inside the forms to check for level, and spread a thin layer of sand over the site to make a good surface to work from.

Window and door frames must be included in the formwork before the pour. Be sure to use standard sizes to reduce cost and labor later on. Nick used wooden frames combined with moulded trim made with the aid of custom-cut beadboard molds. The beadboard factory is nearby, so Nick provided a profile of the trim, and the factory used a hot wire to cut that pattern from the insulation. The mold was placed around the window frame and simply filled with concrete to make permanent trim. The beadboard was removed in bits and pieces after the walls were lifted, which left a slightly beady texture in the concrete. Some type of form release on the beadboard might also be helpful. Note that the beadboard is easily injured, so it would be better in the long run to make reusable forms from sheet metal.



Structurally, keep in mind that the concrete and rebar holds this type of wall together as it is lifted and set in place. The stone portion of the wall does not count towards the total strength of the wall during tilt-up, and any stones that penetrate too deep into the concrete could compromise panel strength. Nick's walls were 7-3/4" thick with only 2-3 inches of the total for stonework. Because the stones are thin, they should also have small faces, ideally less than 12 inches across, to bind them securely into the wall. Bigger stones may be prone to popping off of the wall, leaving ugly patches of concrete.

Nick used flat field stone for his projects, collected from the local hills. He felt that gathering the stones was too much trouble, and that it would be far better to have a source of good stones that could easily be scooped into a dump truck and delivered to the site. Fore-thought should be given to the best spot to dump the stones, to avoid moving them again and again.

Each stone was placed carefully in the forms, leaving space for mortar joints all the way around. Although faster than slipform stone masonry, it still took time to sort through the puzzle pieces to find just the right stones each step of the way.

To make recessed mortar joints, Nick used a mix of 4 parts masonry sand to 1 part bentonite clay powder and sprinkled it about half an inch deep between the rocks. The bentonite swells when damp, making a waterproof barrier to prevent the cement slurry from leaking through the joints and staining the rock faces. He spread the sand/bentonite mix between the rocks, then swept the back of the rocks clean with an air hose and

misted the site to dampen the bentonite and start the swelling. Further experimentation would be helpful to find a sand/bentonite mix that seals the joints even better, yet can be removed more easily after the walls are up.

Nick used 1/2" rebar spaced one foot apart throughout the walls, with additional, thicker rebar around windows and doors. Switching to 5/8" rebar would guarantee even stronger walls at nominal extra cost. The rebar should be propped into the middle of the panels for maximum strength. Panels up to about 24 feet wide, tapering to a peaked roof of similar height, can be lifted with a mid-sized crane. Larger panels would require more serious engineering and a much larger crane.



After the rebar, you must imbed coil inserts for pickup points the crane can grab on to. The legs of the pickup points should be placed behind a section of rebar to insure that the pickup point doesn't rip out of the wall in mid air. A plastic plug keeps the threaded hole free of concrete, so the lifting cable can be bolted right to the wall. Note that in a large wall there are four pickup points to evenly spread the load. It is advisable to consult an engineer for optimal placement. Be sure to see the *Dayton Superior Tilt Up Construction Handbook* (www.daytonsuperior.com) for more details. Anchor bolts should be inserted along the tops of the walls to tie into the roof.

Pouring the concrete is much like pouring a slab. Six-sack cement is recommended for optimal strength. A vibrator helps fill the voids between the rocks. Fill the forms and screed off the top. Then tap the weld plates into the mortar, positioned so that they will nearly touch when two walls come together. This is also the time to add metal brackets to attach floor joists, purlins, or a ridgepole, if those are included in your plans. The concrete must cure for at least one week before lifting, but three or four weeks would be better, just to be on the safe side.

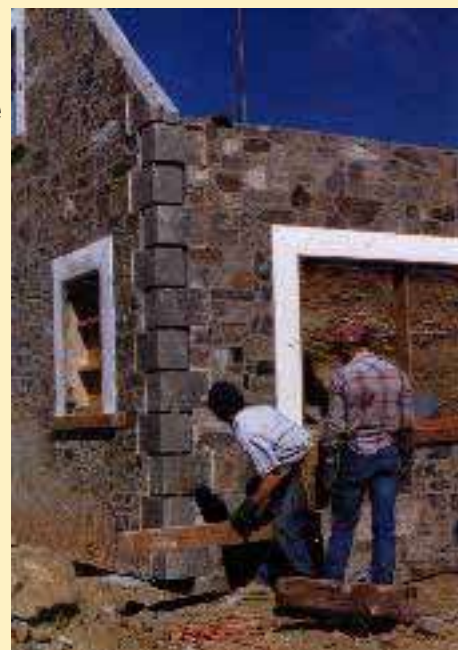
Nick built the forms, set stones and poured the concrete for all four wall panels of the house in about two weeks, working mostly solo.

Lifting the Walls

Lifting the walls is clearly the most exciting aspect of building a tilt-up house, both for the builder and for spectators. People may drive by for weeks not knowing what you are up to, but all of a sudden there are these massive stone walls standing there like they've always been there. Lifting the walls is also the most hazardous aspect of the work, so make safety your top priority.

Hiring a crane can become very costly, so simplicity is required to do the job quickly and efficiently. Ideally the building site should be flat for easy access, and the walls should be formed right next to the house, such that each wall can be tilted right into place, without having to transport them across the job site. That was not an option for Nick's house, being built into the side of the hill. On both the garage and the house, the walls had to be moved out of the way before putting them back in place, so most walls had to be moved at least twice. Getting the crane in place on the hill and supporting the out-riggers also proved a daunting task, and took more time than setting the house walls in place. In other words, up to three-fourths of the crane cost went towards leveling the crane or moving walls out of the way, rather than setting them in place.

If you absolutely must pour the panels in a stack as Nick did, then be sure to separate them with a layer of sand and not just plastic, which can create a vacuum seal, sticking the panels together like glue.



Before you start a tilt-up house you will have to find out what types of cranes are available and how much they can lift. Each cubic yard of concrete and rock in the walls weighs 2,500-3,000 pounds. Check the phone book, or simply watch for cranes at construction sites, and stop to ask questions. If they can't help you with your project, they can probably lead you to someone else who can. Note that a crane can lift more when the load is close to the rig, such that the boom is almost straight up and down. The lift

capacity drops dramatically as the boom is lowered toward a horizontal position. In other words, a crane rated to carry the weight of your panels may not be able to reach far enough with the load to do any good. You will need to describe the panels you are working with and your job site, to make sure that the crane can lift the panels *and* put them where they belong.

Also note that the crane may not have the proper attachments to lift wall panels. A crane

usually comes with a hook, and everything else is purchased or rented as needed. If necessary, show them the pictures here, and they can tell you what they have or need. You may be able to purchase or make the attachments and give them to the operator as partial payment. Or you might want to keep them for your own future projects. Make sure that every little part is ready to go, before the crane shows up and starts billing you \$200 or more per hour while you run to the hardware store for extra parts.

After the cables are bolted onto the wall, the lift is all crane work. If necessary, you can stand at the edge of the panel to guide it as it floats through the air. Avoid passing beside the panel, where it could flatten you like a pancake in an accident. Be sure to make guide marks ahead of time on the concrete pads, so that you know exactly where to put the wall. As long as the crane is lifting some of the weight, it is relatively easy to pry the wall in any direction with a prybar. The wall must also be checked for square with the house and plumb along the face and the edges. Plastic shims are available from Dayton Superior, or you can cut some scraps of metal in varying thicknesses for the same purpose.

When the wall is exactly where it belongs, lock it in place with the aid of braces bolted with coil anchors from Dayton Superior between the wall and the deadman concrete pad in middle of the floor. Nick made his own braces, but you can also rent them. Have the crane slack the cables gradually, to make sure everything is okay.

Subsequent panels can be set into place without the need for a brace. Again, check and recheck for level, plumb and square. Weld the panels together with the weld plates imbedded in the concrete at the corners. You will likely need to use metal scraps to bridge the gap between the plates. Make sure these are good welds, as that is the only thing that will be holding the house together until the footings and corners are poured with concrete. Nick also bolted a ridgepole across the house to tie the peaks together.



Expect the panels to be quite messy when you first lift them off the ground. The sand and bentonite mixture really adheres to the wall, and Nich had to scrape it out of every nook and cranny with a screw driver. A pressure hose may be more effective.

Finishing Touches

After the walls are up, it is time to go back to the beginning and pour the footings. Use plenty of rebar and pour a wide footing. Also insert the rebar pins at the corners and pour the cores full of concrete. From that point the rest of the construction can be finished any way you choose.

Since Nick's place is built into the hill, he only tilted up three sides of the house, then used conventional concrete forms to pour the back walls. Rebar from the tilt-up panels extends into the poured concrete walls. Slipform stone masonry was used for the stonework on the porch. The roof and interior walls were framed and insulated with conventional materials.

The eaves of the house were stuccoed for fire-proofing. The stucco-screens were pre-bent then attached with a nail-gun. Nick applied a single coat of stucco consisting of 1 part masonry sand to 3 parts masonry of cement.

Nick built a stone stairway from the house down to the garage. He poured concrete risers for the stairs, then set the stones into a sand and gravel base without mortar. Another innovative idea Nick worked with was a wood-fired boiler built into the side of the hill down by the garage. He never has to haul firewood into the house or clean up the mess of it later. Hot water from the boiler is circulated through the garage and a radiant floor in the house. The boiler only has to be used two or three days a week through the winter to keep the house warm.

Conclusion

Tilt-up construction is definitely not for beginners. For one thing, you will not save any money on materials versus the slipform method I described earlier, because there is just as much concrete, and usually more rebar, in a tilt-up stone wall, versus a slipformed stone wall. In addition to the materials cost, you may need to hire an engineer to check your plans and a crane operator to lift the walls, which could cost thousands of dollars before you are done. Also keep in mind that moving concrete panels weighing thousands of pounds each is implicitly hazardous.

Nevertheless, for the experienced builder, or someone who wants to make numerous copies of a single structure, tilt-up construction may be the way to go. With the appropriate building site and a set of plans optimized for that site, that there would be a definite savings with tilt-up stone work. More importantly, you can build a low-maintenance structure that will truly withstand the test of time.



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Of all the alternative building technologies, stone masonry is neither the cheapest nor the fastest. But there is a certain irresistible charm about a stone house, and I would not settle for anything less. Besides, a stone house can out-last any other kind of construction by hundreds of years.



Stone houses have both enduring and endearing qualities about them. There is an aura of timelessness about them, as if they have always been there and always will be. Perhaps this feeling of timelessness is exuded from the rocks themselves. Building with materials as old as nature makes a home seem as if it were part of the story of the land.

The method of stone masonry we use is called "slipforming". Short forms, up to two feet tall, are placed on both sides of the wall to serve as a guide for the stone work. You fill the forms with stone and concrete, then "slip" the forms up for the next level. Slipforming makes stone work easy even for the novice.

Slipforming is an old-fashioned style of masonry, resulting in a random or "rubble-stone" appearance, without the uniform joints or sharp, clean lines of most modern masonry. In fact, slipforming is comparatively messy, and you will often find cement drips permanently adhered to the face of the rocks when you remove the forms. But these stains also contribute to the "patina" of the stone work, giving it an "antiqued" appearance. We rarely remove the drips, even when we can.

Tom's article *The Art of Slipforming* was featured in the January 1997 issue of *The Mother Earth News* magazine. We received more than 150 letters from people enthusiastic to learn slipform masonry first-hand. Those who are familiar with the slip-forming process wrote to tell us the article was a significant advancement over the available literature on the subject. That article and much more are included in [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#).

To be notified of upcoming stone masonry classes, please click over to our [Primitive Living Skills Class Schedule](#) and enter your e-mail address into our [HOPS Classes Call List](#).

Are you offering a stone masonry class?

-OR-

Do you want some volunteer labor to help build your home?

We receive many e-mails from individuals who want some hands-on experience learning stone masonry. Please send us a note through our [E-mail Contact Page](#) if you are offering a stone masonry class, or if you know of anyone who offers stone masonry classes, or if you are building your own home and you want some volunteer laborers to help you. We'll post your note here to hopefully bring you some help!

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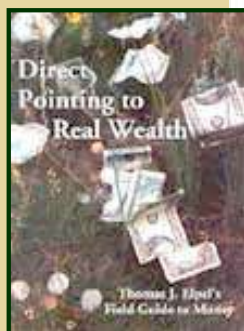
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Slipform Stone Workshop

Class Project: June 2001

A new stone workshop in just one month! Robert arrived here from New York City on June 4th to learn stone masonry. We went to work immediately setting forms to pour the footings and the slab. Exactly one month later--on the 4th of July--we put on the metal roof! Along the way we somehow shot video of the entire process, and still took a couple well-deserved days off. The building is 12 feet wide and 16 feet long, as measured on the inside.



The original idea behind the project was simply to create a storage shed for our camping gear and bicycles. But we couldn't just build any old shed... it had to look good beside our stone house, and that meant building the shed with matching stonework and the same kind of roof. And since we were building with stone, I also wanted to test out some ideas which I had previously proposed, but never actually tried-- that is, framing the entire structure with insulation panels, then slipforming the stonework up the outside. In other words, this would be a pretty elaborate and highly insulated storage shed!

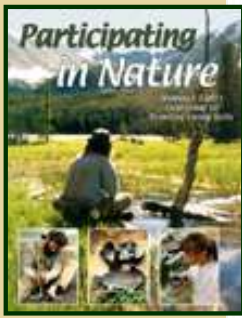
Soon we added cute little windows to the plans for the south wall, with more windows in the doors, plus complete wiring and lighting inside. We started thinking "workshop" or even "studio" more than "shed". Ultimately we may have to build something else to hold our bicycles and camping gear...

To read more about the workshop and video [click here](#).

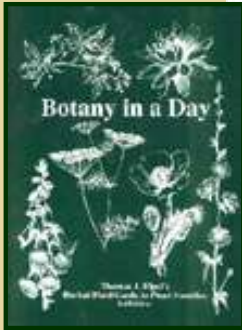
A Slipform Stone Wall

Class Project: Fall 1998

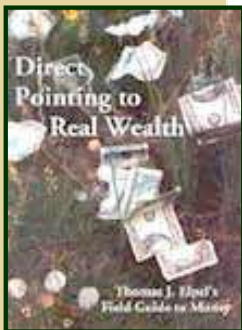
In the fall of 1998 we built a slip-form stone retaining wall to stop the hill from eroding onto our patio. Six participants joined us from places as far away as Missouri, Washington, Nevada and Arizona. We are deeply grateful for all of their help. We have always done these projects by ourselves, so this was a new experience for us too.



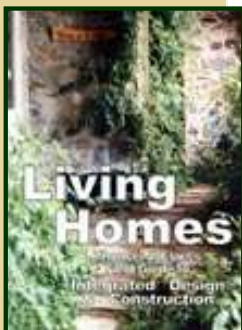
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[Living Homes](#)

Although there was little formal structure to the workshop, participants learned to gather stones, set forms, mix concrete and build stone walls. Other skills included hammer-drilling, cutting and tying rebar, and grouting the stonework.

The front of the retaining wall is faced with stone, with poured concrete on the back-side. We painted over the concrete with tar and back-filled it with earth. We also buried a 400 gallon water tank behind the wall to store rainwater collected off the roof of the house. The water is used in the garden bed on the patio. Later we planted an apricot tree there, where it gains extra warmth from the wall behind it.



Follow these links to see more pictures of the [wall](#), plus [grouting the wall](#), and the [crew](#), [more crew](#) that built it, and the [Finished Wall](#) (as seen from the roof) click on the links, then use the back arrow on your browser to return here.



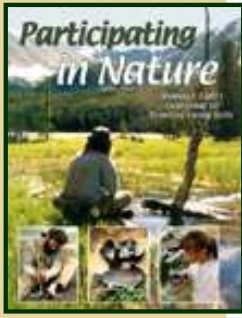
Our "Russian" Fireplace

Our big masonry project for 1997 was the construction of a "Russian" masonry stove, or in our case, a "masonry fireplace". Masonry heaters originated in Europe. The stoves are designed to burn a hot fire, with the air supply and chimney damper wide open. This results in a clean burn, with little visible smoke. The distinctive feature of the heaters is a series of baffles to pull the heat out of the exhaust. The masonry absorbs the heat of the fire, then radiates it gradually back into the room. An article about Masonry heaters was featured in the October-November 1994 issue of *The Mother Earth News*.

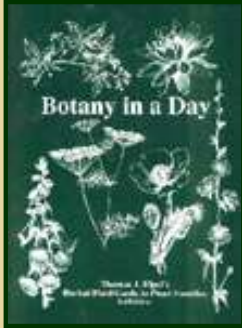
We studied many designs, including the commercially available kits made from refractory cement, and decided none of them were quite matched to our situation, so we designed and built our own. We built the firebox and the baffles out of standard fire brick, and layed up the stone by hand. The masonry style we used is different and much more time-consuming than our usual slip-forming work, but gave more of the effect we wanted in this project. Years of slip-forming experience gave us the necessary skills to lay up the fireplace by hand.

A chapter on Masonry Stoves is included in [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction](#)

Also be sure to read [Masonry Stoves: A Brief Overview](#)



[Participating in Nature](#)



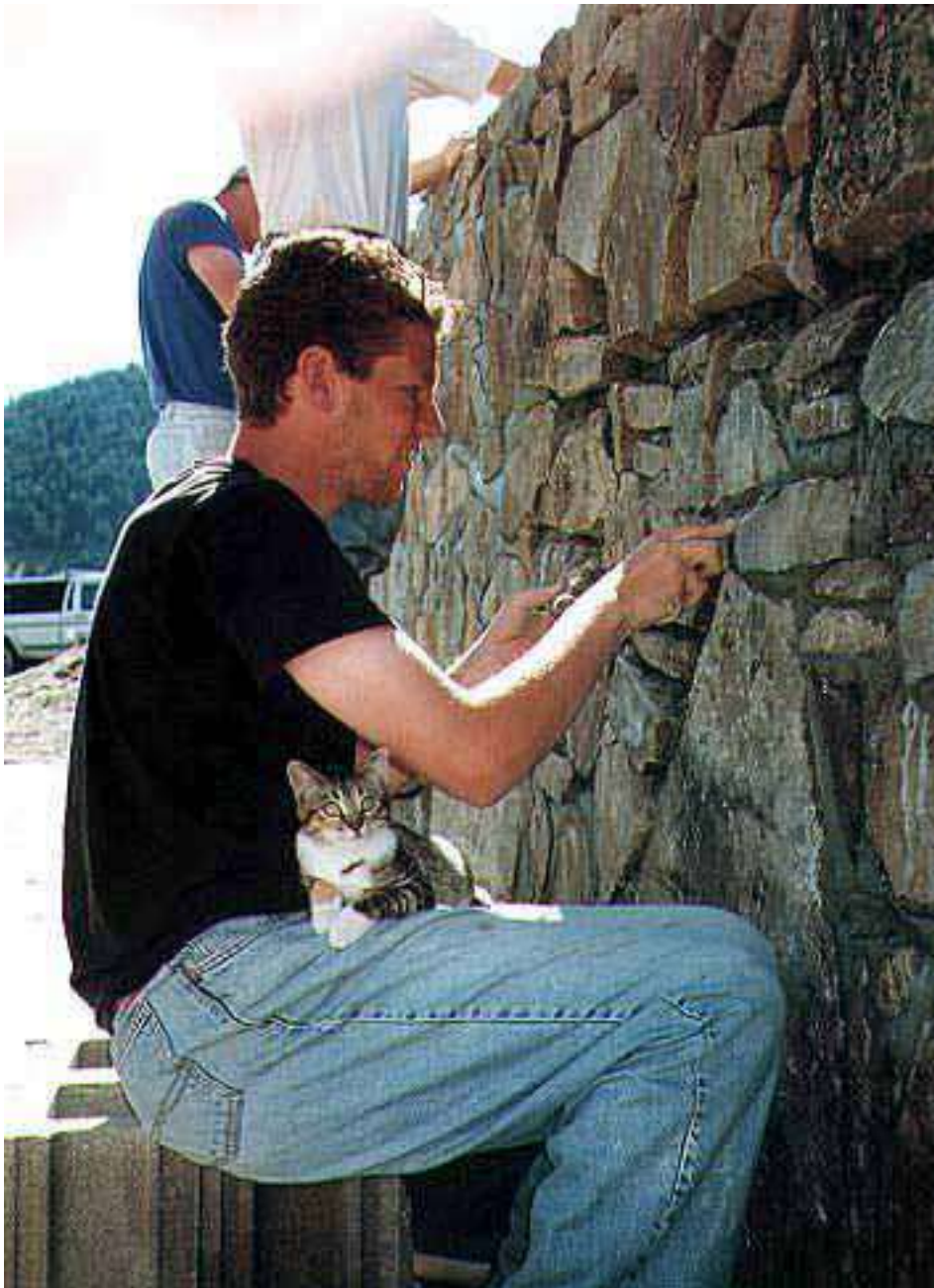
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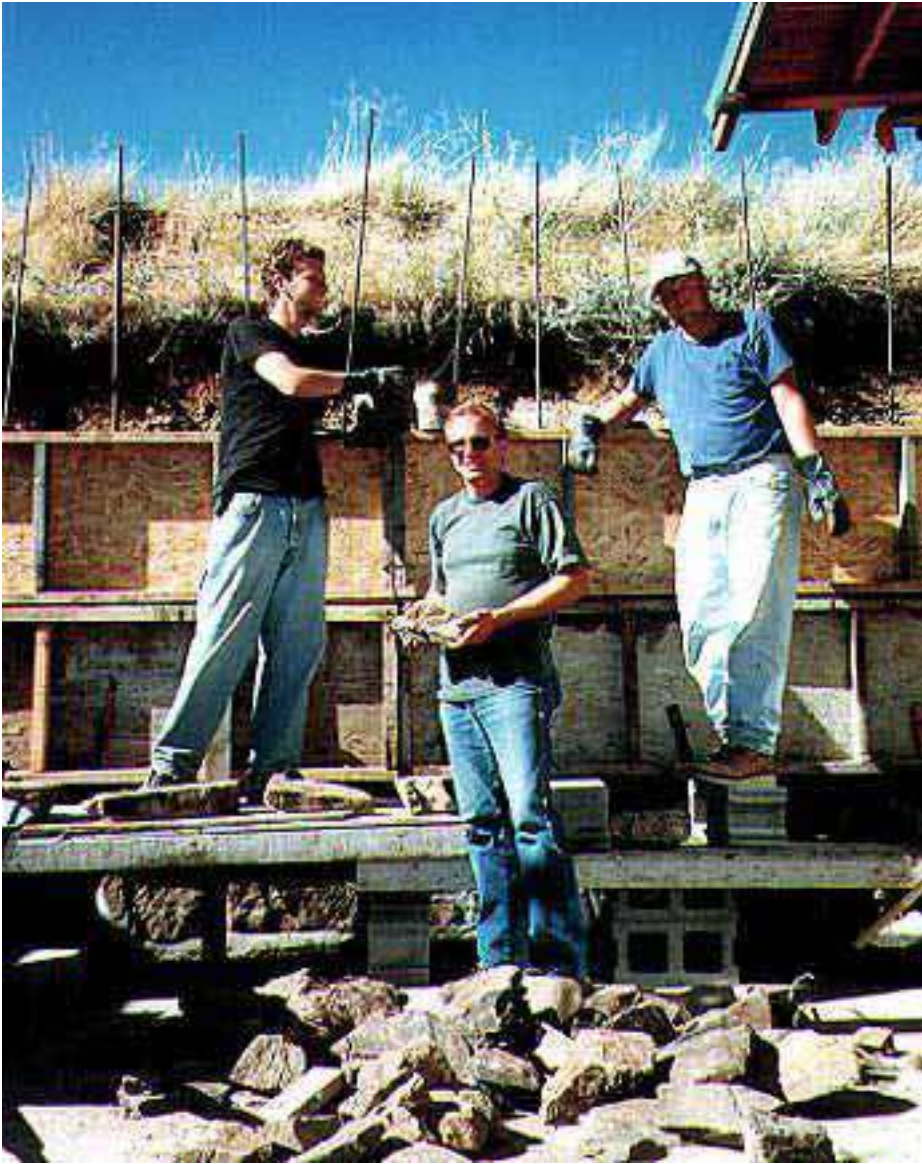
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The Masonry Stove or Russian Fireplace

A Brief Overview

by Thomas J. Elpel, Author of Living Homes



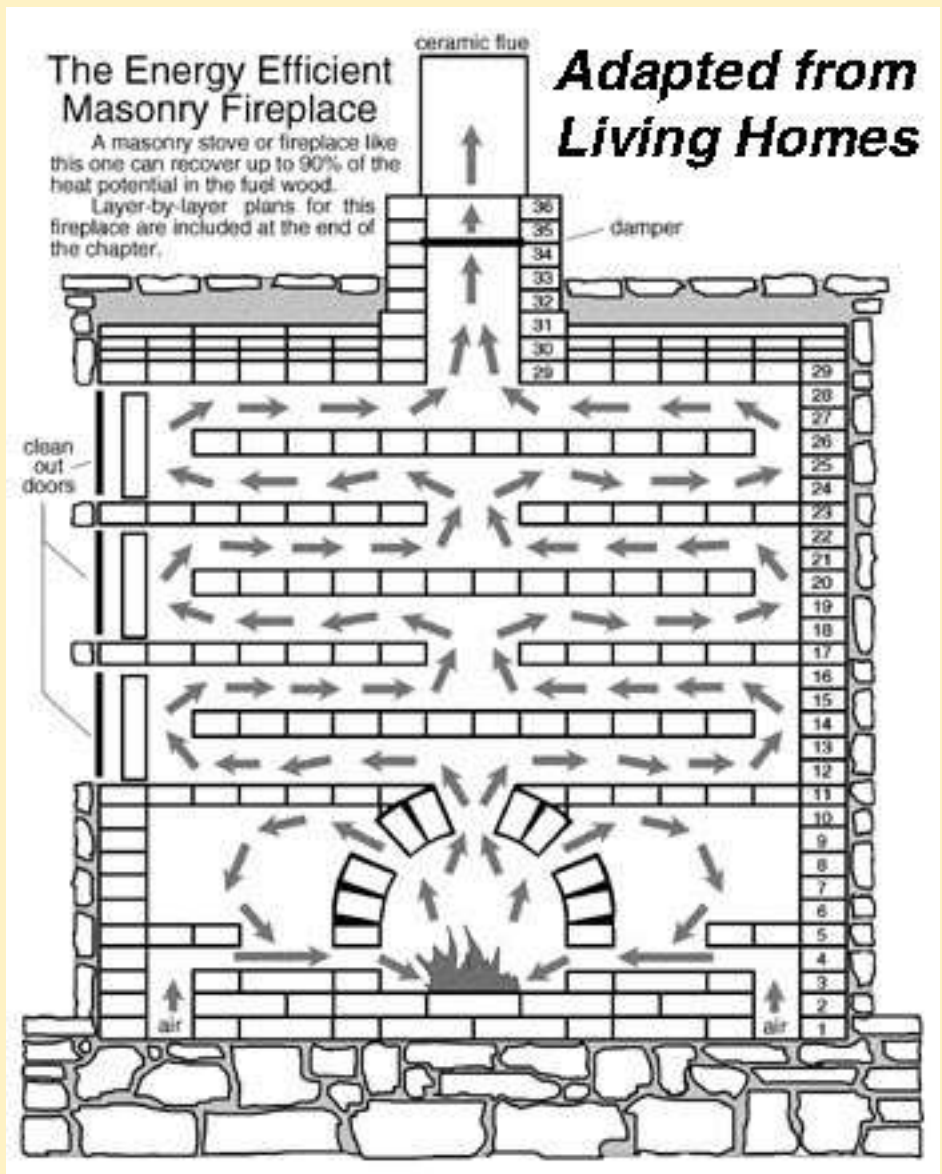
Many animals use simple sticks and rocks and leaves as tools, but only humans have learned to use and control fire. It is the one technology that truly sets our species apart. Mastery of fire enabled our ancestors to stay warm and move into new lands, to make pottery, build shelters, manipulate ecosystems and to join hands around the circle of light, singing songs deep into the night.

Today we have a much greater mastery of fire, and we harness it in many forms, using coal, oil, natural gas, and electricity as substitutes for the wood fires of our ancestors. These substitutes effectively power our industries and run our cities. Yet, for the country home with a source of fuel wood, it is still hard to beat the efficiency and aesthetics of a good old-fashioned wood fire.

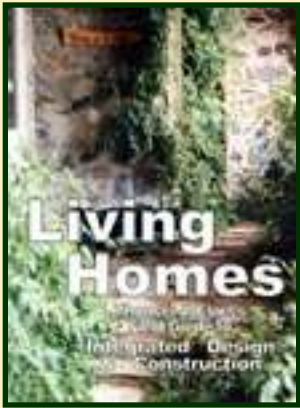
The aesthetics of the wood fire are an important point. It is for that reason alone, not energy efficiency, that builders still put cheap fireplaces in so many condominiums and apartments today. And although I envision a world of houses so energy efficient that they need no heating system, I would not willingly give up my own wood stove! I like to stare at the flames and soak up the warmth on those cold winter days, even when the house is already warm.

The type of fireplace we built is traditionally called a "masonry stove". It is also called a "Russian fireplace", but the idea came from eastern Europe more than Russia. The original designs had solid doors like stoves. The type I advocate are made to look like fireplaces yet function as masonry stoves, so they are best described as "masonry fireplaces". I use the terms stove or heater interchangeably, and fireplace to specify stoves with a visible fire.

Masonry stoves are designed to burn a hot fire, with the air supply and chimney damper wide open. This results in a clean burn, with little visible smoke. The distinctive feature of the heaters is a series of baffles to pull the heat out of the exhaust. The masonry absorbs the heat of the fire, then radiates it gradually back into the room.



I first learned about masonry stoves while in high-school through an article in *The Mother Earth News* magazine (October-November, 1994). A house at *Mother's Eco-Village* in North Carolina included a masonry stove designed by Basilio Lepuschenko of Maine. Our initial house plans included only a wood cookstove in the kitchen, but later we built an addition to the house and we wanted an efficient fireplace for the new family room. I wrote away for Lepuschenko's stove plans and studied them intently, but the designs did not fit our space. We also ordered **The Book of Masonry Stoves** for more ideas, and we studied the pre-manufactured kits made from refractory cement. The kits cost \$4,000-\$5,000 and still required brick or stone facing, plus the chimney. We could not afford much more than \$1,000 for the whole job.



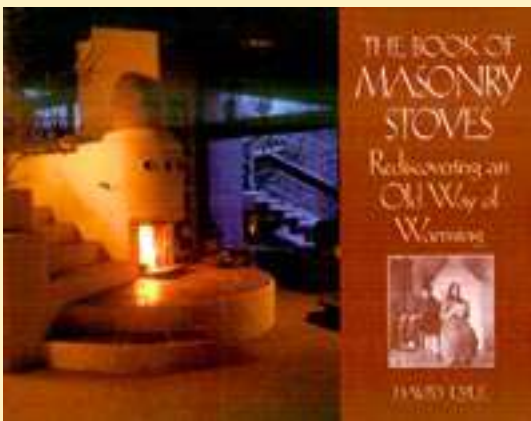
As was often the case, we were forced by necessity to design and build our own fire place from the ground up. We built the entire core of ours out of ordinary fire brick and faced the front with stone. The total cost of the project was about \$1,000. We light a fire in the masonry fireplace about once a week through the winter, on average. It takes all day to heat up the mass of rock, but then it radiates heat out for the next three days. By the end of the week the house starts feeling a little cool, but we usually put on long-sleeved shirts and wait for the weekend and company before lighting the fire again.

The plans included in my book *Living Homes* are based on the masonry fireplace we built, but with a few improvements for a next-generation design. For complete details on the book, please go to: [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#)

Living Homes: Integrated Design & Construction \$25.00 Quantity:

-Please scroll down the page for the "Add to Order" button.-

The Book of Masonry Stoves **Rediscovering an Old Way of Warming** by David Lyle



Masonry stoves have been widely used in Europe and Asia for centuries. The stoves provide clean combustion at a high temperature to avoid pollution and creosote build-up. These are efficient and very safe heating systems.

The Book of Masonry Stoves represents the first comprehensive survey ever published of all the major types of masonry heating systems, ancient and modern. Through this book you can learn about the origins of the masonry stove and see many examples past and present. The book includes plans for building one style of masonry stove, with enough cut-away drawings of other stoves to give the reader many more ideas and inspirations.

The Book of Masonry Stoves \$25.00

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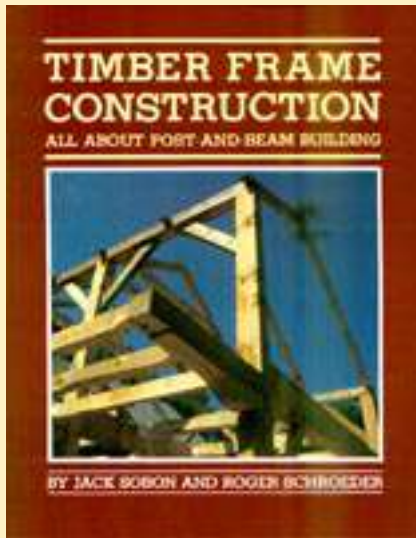
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Timber Frame Construction

All About Post-And-Beam Building

by Jack Sobon & Roger Schroeder



If you have only dreamed about the beauty of building with timbers, this book will open your eyes. It will convince you that this method is not only practical today for homes and other buildings, but is often less expensive than "stick built" construction.

Timber frame builder Jack Sobon and writer Roger Schroeder offer this book for builders as well as those wishing to have the work done for them. Here is practical how-to for both beginners and experienced carpenters who want to try this method. Coverage includes: the basics of timber framing, how to design for strength and beauty, how to combine modern tools and time-tested methods, plus dozens of illustrations and photos that make it easy to understand. *Timber Frame Construction* includes plans to build a 12 x 16 garden tool shed, an appropriately-scaled project for the beginning timber framer.

Timber Frame Construction \$20.00

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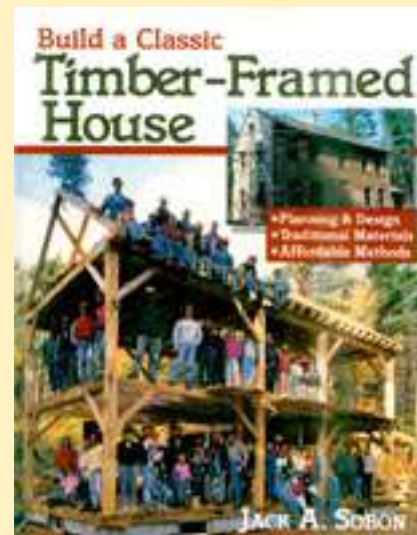
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Build a Classic Timber-Framed House

by Jack A. Sobon

The timber-framed home is attractive, affordable, and easily expanded to meet the needs of a growing family. With the step-by-step instructions in this book you can build your own classic timber-framed house--one that's enduring, and features a level of craftsmanship rare in modern construction. Following the traditional "hall-and-parlor" home design, architect and builder Jack Sobon carefully and clearly explains:

- finding the ideal building site
- creating the master plan
- selecting the best tree species
- hewing and milling timbers
- assembling the frame
- installing wall sheathing , windows, and doors
- designing and finishing the interior
- expanding on the plan.



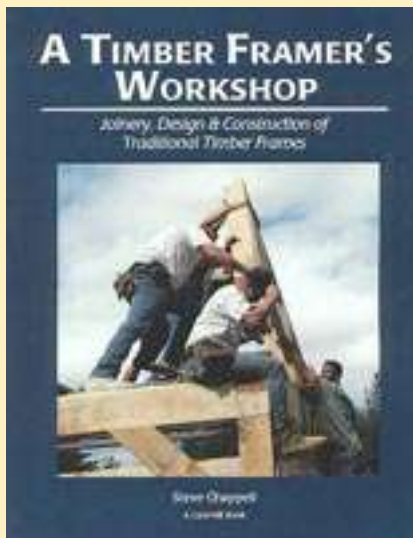
One of the best-known and most distinctive figures in the timber-framing revival, Jack Sobon knows how to make home building affordable with economical hand tools, by taking control of the processing of building materials, and through using local inexpensive supplies. The basic house design of this book is easily adapted to meet many different needs.

Build a Classic Timber-Framed House \$22.00

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A Timber Framer's Workshop
Joinery, Design & Construction of Traditional Timber Frames
by Steve Chappell



Timber Framing has been a part of our building culture and an inspiration to mankind since the Middle Ages. As we enter a new millennium, it is designed to remain as one of building's most enduring forms, not only because of its intrinsic beauty, but because it is a pure and complete structural system.

Steve Chappell is a builder at heart and a teacher by nature. His journey in timber framing began on the northern coast of California in 1970, when, by chance, he joined a group of individuals in the construction of a joined timber frame. The group was led by a New Englander who grew up playing in his uncle's barn. Inspired by the experience, he moved to Maine in 1973 to study the buildings first hand. Building, teaching, and writing about the craft has been his passion ever since.

As the founder and director of Fox Maple School of Traditional Building, Chappell has instructed hundreds of individuals over the past 15 years through hands-on workshops from Maine to California, New Mexico to Alaska, and across Canada. He is the Editor & Publisher of *Joiners' Quarterly*, *The Journal of Timber Framing & Traditional Building*, a magazine he founded in 1983, in which he has written extensively about timber framing and traditional building. In this book, his nearly 30 years of experience and insight is evident through the subtle nuances that he conveys. His intimacy with the craft is ever present, and his passion contagious. If you want to understand traditional timber framing, read this book. Chappell portrays the craft, with all its nuances, the way it was meant to be.

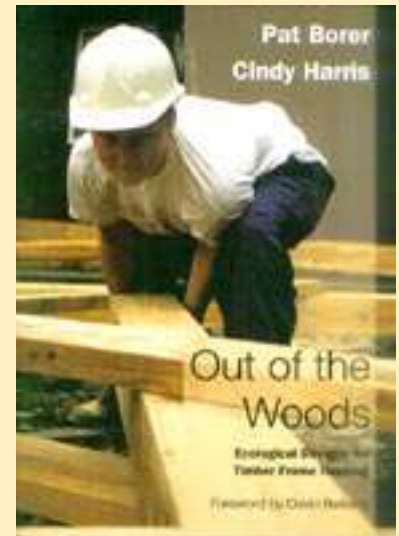
A Timber Framer's Workshop \$30.00

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Out of the Woods
Ecological Designs for Timber Frame Housing
by Pat Borer & Cindy Harris

Out of the Woods presents the simple and modernized "Walter Segal approach" to building timber frame structures. Traditionalists might not call it timber framing at all, since the wooden members are bolted together rather than connected through precise joinery and wooden pegs. The subtitle "*Ecological Designs for Timber Frame Housing*" is based on the approach of designing on a grid to use standard size materials inside and outside to reduce cutting waste on the jobsite.



Whether or not you do all the building work yourself, this full-color, easy-to-follow book, packed with photos and plans, will help you design your building to be as ecologically friendly as possible, inside and out. Coverage includes:

- The advantages of owner-built timber frame construction from the ideas to the plans.
- Designing for low energy use.
- The pros and cons of each design feature from the foundations to the roof.
- The potential for groups and individuals to build their way out of the housing crisis.
- A green guide to assessing the environmental impact of most common building materials.

Published by the Centre for Alternative Technology in the United Kingdom.
(Measurements are given in metric.)
3rd Edition, June 2001. 120 Pages. \$20.00

Out of the Woods \$20.00

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-Be informed before you build.-

Cost: \$82.00 (Save \$10.00)

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- [Out of the Woods](#)

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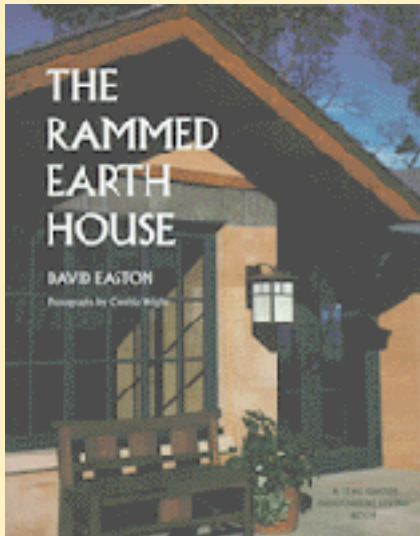
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The Rammed Earth House

by David Easton and Cynthia Wright



The Rammed Earth House is an eye-opening example of how the most dramatic innovations in home design and construction frequently have their origins in the distant past. By rediscovering the most ancient of all building materials--earth--forward thinking home builders can now create structures that set new standards for beauty , durability, and efficient use of natural resources.

Humans have been using earth as a primary building material for more than ten thousand years. Rammed earth, as practiced today, involves tamping a mixture of earth, water, and a little cement into wooden forms to

create thick, sturdy masonry walls.

Rammed earth combines pleasing aesthetics and intense practicality with a powerful sense of place. Rammed earth homes are built entirely on-site, using basic elements--earth, water, and a little cement. The solid masonry walls permit design flexibility while providing year-round comfort and minimal use of energy. The builder and resident of a rammed earth house will experience the deep satisfaction of creating permanence in a world dominated by the disposable.



Earthbuilt homes offer their inhabitants a powerful sense of security and well-being and have a permanence and solidity altogether lacking in so many of today's modular, pre-fab houses. David Easton is the founder, along with Cynthia Wright, of Rammed Earth Works (REW Associates), a company that over the past twenty years has designed and built more than one hundred rammed earth structures for residential and commercial clients around the world.

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The Rammed Earth House: Book + Video (Save \$5.00)	\$55.00	Quantity:

Note: David Easton invented "terra tile floors", using a soil-cement mixture which is troweled about an inch thick on the floor and cut apart into separate tiles. I read his article

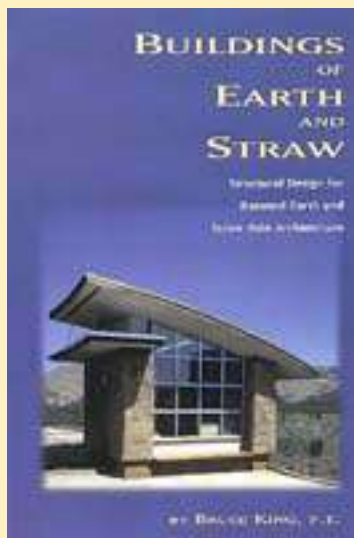
in an old issue of *Fine Homebuilding* magazine and learned to make our own terra tiles. Along the way we added a few techniques of our own to the process. Easton barely covers the topic in his book *The Rammed Earth House*, so be sure to check out my book **[Living Homes: Thomas J. Elpel's Field Guide to Integrated Design & Construction](#)** for more indepth coverage of this unique flooring method.

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Buildings of Earth and Straw

Structural Design for Rammed Earth and Straw-Bale Architecture

by Bruce King, P.E.



There are many other excellent books on strawbale and rammed earth construction to help guide the novice builder down the path to building the house of their dreams. *Buildings of Earth and Straw* is intended more as a companion to the other guides, rather than a competitor. Author Bruce King has tackled the engineering side of working with earth and straw building materials to create a common language for builders, architects, and building inspectors. With this book as your guide, you can build a strawbale or rammed earth house in a way that is truly structurally sound and you can provide the building inspector with the engineering data to back it up.

Although parts of the book will require an engineering background to understand it, most of the content is accessible to the lay person, and King makes even the mundane engineering interesting, and at times, humorous. This book is truly essential for anyone building a strawbale or rammed earth house in places where building codes are enforced. In places where building codes do not exist, this book is still highly recommended, to insure that you build a safe and stable structure.

Buildings of Earth and Straw \$25.00

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Ceramic Houses and Earth Architecture

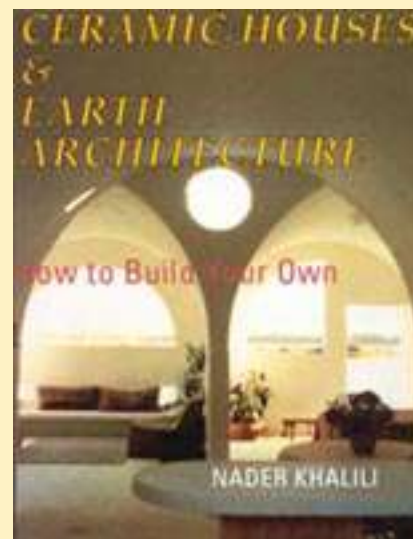
How to Build Your Own

by Nader Khalili

Khalili's classic, authoritative manual describes how to build arches, domes, and vaults with earth, as well as techniques to fire and glaze earth buildings to transform them into ceramic houses. This newly revised edition also provides insight into the latest response by building officials to Superadobe or earthbag technology (structures of sandbags and barbed wire), a patented system that is free for the owner-builder and licensed for commercial use.

Nader Khalili's ideas on ceramic houses and earth architecture have been published by NASA and utilized by the United Nations, and have passed building and safety tests in California. This new edition is now in its fifth printing.

Fine Homebuilding magazine said this of the book: "This is an extraordinary work. Though very much the personal expression of an impassioned visionary, *Ceramic Houses* is full of experiential advice, technical guidance, and encouragement to those who would join the author in his search for cheap, durable, attainable housing for much of the world."



Nader Khalili, an Iranian-born California architect and author, is the designer and innovator of the Geltaftan Earth-and-Fire System known as "ceramic houses" as well as the Superadobe building technologies. He received his education in Iran, Turkey, and the United States, and has been a licensed architect in California since 1970. In 1975, he closed his successful practice in the United States and Iran designing high-rise buildings and journeyed by motorcycle for five years through the Iranian desert, where he worked closely with local villagers to develop his earth architecture prototypes. His impressions have been collected in his book *Racing Alone*. Mr. Khalili serves as a consultant to the United Nations and is a contributor to NASA on construction technologies for the moon and Mars. He is the founder and director of the Cal-Earth Institute, Geltaftan Foundation--dedicated to research and development in earth and space architecture technologies for the moon and Mars.

Ceramic Houses and Earth Architecture \$25.00

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Building with Earth

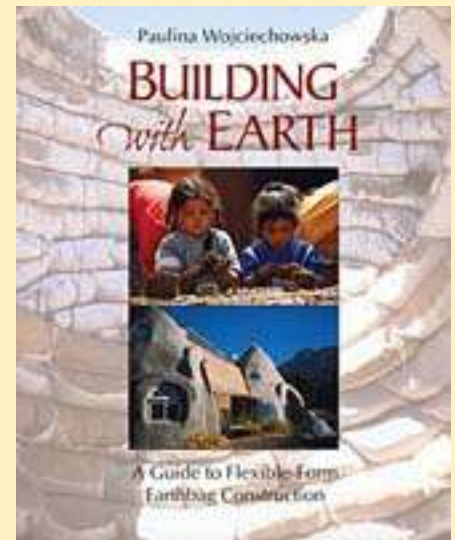
A Guide to Flexible-Form Earthbag Construction

by Paulina Wojciechowska

While developers around the globe are looking toward the industrialized United States in hopes of promoting American-style tract houses, shopping malls, and skyscrapers, our country's pioneering natural builders are looking in the other direction -- hearkening back to ancient traditions to create beautiful, affordable, and resilient dwellings of earth. *Building with Earth* is the first comprehensive guide to describe the re-emergence of earthen architecture in North America, where adventurous builders are combining timeless forms such as arches, vaults, and domes with modern materials and techniques.

Using cheap recycled or salvaged polypropylene tubing or textile grain sacks, even relatively inexperienced builders can construct an essentially tree-free building, from foundation to curved roof. With ordinary barbed wire between courses for tensile strength, and with beautifully textured earth- and lime-based finish plasters for weather protection, "earthbag" buildings are being used for retreats, studios, and full-time homes in a wide variety of climates and conditions.

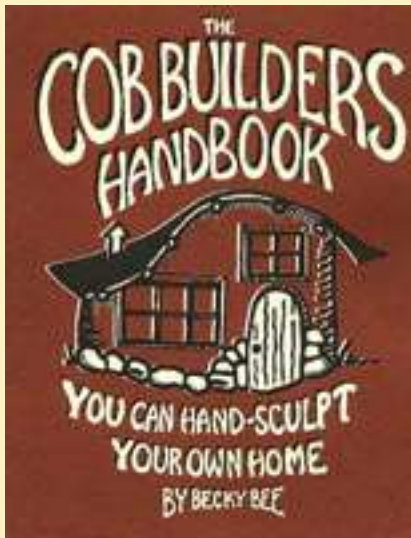
This book will tell and show readers how to plan and build their own earthen "Superadobe" building. This book takes you back to the future: In rediscovering the origins of traditional architecture, readers are introduced to cutting-edge earth-based techniques now being researched for their potential in building durable dwellings for residence on the moon!



Paulina Wojciechowska was born in Poland and spent her formative years in Afghanistan and India, fascinated by the region's age-old architecture created by artisan builders. Eventually she entered architecture school at Kingston University in Great Britain. After working in London architectural firms, she traveled to the United States and Mexico to study and work with the "natural," "alternative" and indigenous building methods and low-cost housing. She apprenticed with master "Superadobe" builder Nader Kahlili at the California Institute of Earth Architecture (Cal-Earth) as well as with straw-bale building pioneers Athena and Bill Steen at the Canelo Project.

Building with Earth: Flexible-Form Earthbag Construction \$25.00 Quantity:

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The Cob Builders Handbook **You Can Hand-Sculpt Your Own Home**

by Becky Bee

If you want to break free from rigid-square buildings to create a more fluid, rounded, organic home, then *The Cob Builder's Handbook* is the book for you. Cob is the process of mixing clay-bearing earth with sand, straw and water to make a thick mud that you can hand-sculpt into a house. Starting on a foundation of stone, you make thick, straw-reinforced clay walls, kind of like adobe, but less formal and more creative.

A cob house isn't the sort of thing you would build on a suburban lot, or any place where building codes are enforced. It might be described as an anti-establishment type of construction--ideal for those who are exploring the frontiers of sustainable living: generating their own electricity, growing their own food, using composting toilets, and recycling household water to the garden. In a lifestyle that is completely connected to the earth, a cob home seems to grow right from the landscape like part of your garden.

The Cob Builders Handbook \$24.00

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The Hand-Sculpted House

A Practical and Philosophical Guide to Building a Cob Cottage

by Ianto Evans, Michael G. Smith, and Linda Smiley

Are you ready for the Cob Cottage? This is a building method so old and so simple that it has been all but forgotten in the rush to synthetics. A cob cottage, however, might be the ultimate expression of ecological design, a structure so attuned to its surroundings that its creators refer to it as "an ecstatic house."

The authors build a house the way others create a natural garden. They use the oldest, most available materials imaginable -- earth, clay, sand, straw, and water -- and blend them to redefine the future (and past) of building. Cob (the word comes from an Old English root, meaning "lump") is a mixture of non-toxic, recyclable, and often free materials. Building with cob requires no forms, no cement, and no machinery of any kind. Builders actually sculpt their structures by hand.



Building with earth is nothing new to America; the oldest structures on the continent were built with adobe bricks. Adobe, however, has been geographically limited to the Southwest. The limits of cob are defined only by the builder's imagination. Cob offers answers regarding our role in Nature, family and society, about why we feel the ways that we do, about what's missing in our lives.

Cob has been a traditional building process for millennia in Europe, even in rainy and windy climates like the British Isles, where many cob buildings still serve as family homes after hundreds of years. The technique is newly arrived to the Americas, and, as with so many social trends, the early adopters are in the Pacific Northwest. Cob houses (or cottages, since they are always efficiently small by American construction standards) are not only compatible with their surroundings, they ARE their surroundings, literally rising up from the earth. They are full of light, energy-efficient, and cozy, with curved walls and built-in, whimsical touches.

The Hand-Sculpted House is theoretical and philosophical, but intensely practical as well. You will get all the how-to information to undertake a cob building project. As the modern world rediscovers the importance of living in sustainable harmony with the environment, this book is a bible of radical simplicity.

The Hand-Sculpted House \$35.00

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"Sixty percent of families have so little savings that, if they lost their jobs, they could sustain their lifestyles for only about one month. The next richest twenty percent could only hold out for three and a half months."

--Source: Rosemary Brown & Cindy Mitlo. "It Pays to Plan." Co-op America's Financial Planning Handbook. 2001 Edition. Page 8.

Escaping the Job Trap

Its a Matter of Time, NOT Money!

By Thomas J. Elpel, author of [Direct Pointing to Real Wealth](#)

As a one who has successfully built a resource-efficient home and a green publishing business, people often ask me what they can do to make their own life situations more sustainable. That is a challenging question to answer, since sustainability issues tend to be tied to all aspects of the way we live and work; it can be difficult to make real change without changing everything. Creating a truly sustainable lifestyle can require a whole new approach to the way you make a living and achieve your Dreams. The key to success is in being able to escape the Job Trap.

I meet a lot of people with great Dreams. For many it is a Dream to own their own home without a mortgage. For others it is a Dream to start their own business, to be free from an existing job they are not satisfied with. Some people simply want to travel the world or be free to sit under a tree and play a guitar. Most people I meet have a million dollar idea they would love to bring to fruition, but neither the time nor the resources to make it happen. Other people have described to me their frustration with being trapped in a way of life they do not believe in and how they Dream of living a more sustainable lifestyle. Nearly everyone I meet is too busy treading water, trying to stay afloat among the bills and debt to even think about their Dreams anymore. Like a mantra, I hear people say it over and over again: "I know I could break free if I could just make a little more money." That idea is one of the grand illusions of the universe.

It is unfortunate to see wave after wave of kids graduate from school and fall into the same trap. It is the powerful allure of money. Junior is delighted to get that first job, flipping hamburgers, making the minimum wage. Its new. Its different, and he gets more money than he ever had before. So he spends it. Stereos, CDs, clothes, movies, dates, Saturday night. It doesn't take long until what seemed like a lot of money is no longer enough. But then he discovers credit cards and payment plans and pretty soon he has a nice car and quite a bit of debt, and oh what a thrill it is to have his own apartment too!

Realizing that this flipping hamburger thing just won't do, Junior goes off to college, accumulates more debt for student loans and works an eight-hour shift each day after school to keep the cash flowing. All that studying and working makes him kind of crazy and reckless by the weekends, so he spends more than he should just to "loosen up and have a good time".

He goes back to the weekly grindstone, only to discover a couple months later that he on his way to becoming a Daddy. Suddenly there's another person and a baby in the picture and a whole lot more bills. But he makes it through college okay, gets a better paying job, rents a bigger house to have some "elbow room" for the family, and still can't quite make ends meet. He feels trapped, disillusioned and ultimately desensitized to his childhood Dreams, working not because he is inspired to, but because he has to keep going day in and day out to keep the trap from snapping shut and devouring him and his family completely.

The sad thing is that Junior could have gone into virtual retirement by age twenty-two, with just a little clairvoyance to avoid the usual pitfalls. Here's one simple example. Junior could have joined the military. That may not be everyone's dream job, but he would be accepted without any job skills at all. Starting with absolutely nothing, he gets paid to learn, with free room and board to boot. Being wiser than your average eighteen-year-old, he saves every penny possible, buys a house for \$25,000 in a quaint little country town where real estate is cheap because everyone else left looking for work. Then he invests in some energy-efficiency measures to reduce the power bills, and buys a secondhand car and some used furniture. When Junior leaves the armed forces a few years later he has some decent job skills, but more importantly, no house payment, no car payment, low energy bills, and no real need to work. Junior has the freedom to do whatever he wants, to go hunting and fishing, to make a million dollars, or to raise a family while working just two or three months a year to buy basic groceries--easily supplemented by weeds out of the garden and roadkill off the highway.

When you ask people what stops them from pursuing their Dreams to write a book, start a business, or spend a month watching polar bears in the arctic, it all comes down to the same mantra, "I know I could break free if I could just make a little more money..." The funny thing is, it isn't actually money that most people need. It's time.

Have you ever heard someone say: "I know I could make a million dollars, if I just had 250 grand to invest in my ideas." They may be joking, but they are also telling the truth. I bet you could invest 250 grand and make a million too. But where do you come up with the dough to start with? Well, if you had 50 grand and a few years of free time to pursue your ideas, I'll bet you could make that 250 grand. Simple enough. We can play this game backwards until you only need a thousand dollars and some free time to make the 10k you need to make the 50k to make the 250k you need to make a million. From that

standpoint, you could make a million with the money you have, but not right now because you've got to go to work to pay the bills before the landlord bumps your family out on the street-or worse-the cable company disconnects your Show Time channels. Most people are so busy treading water trying to stay afloat, that they never have the Time to make a million dollars or to pursue any of their other Dreams.

So you see, the key to success is simply Time, having the freedom to do pursue your Dreams without worry of being dragged under in a sea of bills. True, more money would sure help to eliminate those bills, so here's my suggestion: Go ask your boss to quadruple your hourly wage. But if you don't think that will work, then stay here and let's consider some alternative means.

I am frequently asked for financial advice, usually from people who earn a lot more than I do. Together we can review their life and work situation, but its not like we can just punch some numbers into a calculator, spin it around and come up with enough additional money to solve all their worldly problems. Real results require real change. It's not about working harder. The key is in conserving materials, energy, money and time to get more out of what you have. Since all things are connected, saving some of one tends to lead to savings of the others in a positive feedback loop that just gets better and better. Conserving energy conserves money which conserves time since you don't have to work quite as much. And if you have time to spare then you can achieve your greatest Dreams. The opposite is also true, wasting resources encourages a negative feedback cycle, encouraging more and more waste.

Consider a lightbulb. An incandescent bulb is cheap up front, but costs more to operate and burns out quickly. A compact fluorescent bulb, on the other hand, costs more up front but lasts longer and uses much less electricity. In the long run you can realize a net savings of up to \$40 for each compact fluorescent bulb you use. The trouble is that most people are already strapped for cash, and it is difficult to justify spending \$120 on a dozen compact fluorescent bulbs, especially when there are a dozen incandescent bulbs sitting on the same shelf for only \$12. So you buy the cheaper bulbs and pay the cost for more electricity, and guess what? When they burn out and need replacing, you are still strapped for cash, so again you go for the incandescent bulbs, virtually guaranteeing that you will be broke when those burn out too. It is a negative feedback cycle where poor choices lead to further poor choices. Wasted energy translates to wasted money, which translates to wasted time. And if you are short on time then you probably won't get around to weather stripping a leaky door either, in which case you will waste more energy, money, and time, and so forth. Follow this line of reasoning and eventually you discover that the whole reason that you are stuck in a meaningless job in a world where you cannot get ahead is simply because you bought the wrong bulb! Switch bulbs and you will be able to quit your job. Sound far-fetched? It may not by the time we get through examining these cycles of waste.

Let's take a look at the home mortgage, since that is typically the biggest investment as well as the biggest loss that you will ever make. Normally you buy the largest house you can possibly afford payments on without starving your family for more than a few days each month. Let's say the purchase price is \$100,000 with payments of \$665 a month at 7% interest for thirty years. In the beginning, most of the payment is lost towards interest. Only \$81 actually goes towards the principle the first month. You might as well take a match and burn the other \$584 spent on interest. It's gone! Twelve and a half years later, you've paid the bank \$100,000 for the house, yet only \$20,000 went towards the principle. By the time you actually own the building, you've paid out about 2.3 times it's value. Is that a bad investment or what?

Just think about how much you are paying for rent or a mortgage now. Imagine if your home was all paid off and you could spend that money in any way you wanted to, or simply quit your job. Sound impossible? Not really. Regardless of their income level, most people make enough money to pay off a house in just a few years, but waste nearly 100% of their income on things like interest payments, unnecessarily high energy bills, and garbage bags which are purchased with the intent to be thrown in the garbage, if you can imagine such a crazy thing as that!

So here is one alternative: Buy a house that costs half as much (\$50,000), but pay the same \$665 a month that you would for a \$100,000 house. At that rate you will have the house completely paid off in less than nine years and you will have \$50,000 in equity, which you can still put towards a bigger house if you want.

Now a lot of people pay a premium for rent, only because their work demands it, or so they say. They have a great paying job, but they have to pay high rent to stay in the area, so they remain trapped, making a great income, but having absolutely nothing to show for it. A \$64,000 income and they can barely scrape by from paycheck to paycheck. That's bull! Buy a house for the family in a small country town for next to nothing. You can keep your fancy, schmancy high paying job in the city and pay off the house in less than a year while you live in a camper parked alongside all the other truckers at the travel station. Then you won't need the high paying job and you will have the freedom to pursue other avenues that could ultimately bring you much greater rewards. Sound a little extreme? Not at all! A year of discomfort versus a lifetime of slave labor? I'll take the short cut any time.

I had one marketable skill when I graduated from high-school: I could start a fire with a bowdrill set, basically rubbing two sticks together. At the age of twenty I got a job as an instructor, taking troubled teens on wilderness expeditions. I earned \$1100 for three week segments of hiking around the desert with these kids that were only a few years younger than I was. The food was free, even if it was rice and lentils and ashcakes. The rent was free too, since we each carried a wool blanket and poncho and slept on the ground. Soon Renee was leading these trips too, and our incomes went up with experience. In the

summer we quit, bought land, moved into a tent and started building our Dream home. That was in 1989.

With a combined income averaging \$10,000 to \$12,000 a year we lived simply and invested everything we could in building materials. Building the house more than doubled the value of our income, while avoiding interest on a home loan doubled it again. Construction proceeded slowly throughout the process, due to our chronic lack of money. We moved into the house after the second summer, with no doors, few windows, and no insulation in the roof. Winter stopped about three feet from the stove. This might all seem a little rough, but I later realized that we saved at least \$150,000 in interest payments by eliminating the need for a loan. That is not a bad wage for a couple years of camping out!

If you averaged our total income over several years, combining our wages, plus home improvements, plus avoided interest payments, we were squeezing at least \$50,000 a year from our marginal income. Given that all things are connected, how much do you think we paid towards income taxes? Practically nothing. Our W-2's said we were only making ten to twelve grand a year!

I have given these different examples for paying off a home mortgage quickly and efficiently because that is usually one of the biggest expenses people ever face, and because it is a limiting factor that governs so many other decisions. For example, as long as you are obligated to make a \$1,000 a month house payment then you are less likely to do something risky like quit your job and start your own business. But if you first find a way to eliminate the mortgage, then you can easily afford to make \$1,000 less each month, for as long as it takes to get your business up and running. That alone can make the difference between success and failure in a new enterprise.

I can tell you with absolute certainty that I would not have made it as a writer and publisher if we were making mortgage payments through all those years while I stared at the computer learning to write, but not having much to show for my efforts. Nor would we have been able to afford to adopt three children or to buy a fancy canoe and spend a couple weeks each year as a family paddling down scenic rivers.

With mortgage payments we would have been dependent on a regular income instead of our own resourcefulness. We would have been forced to take lower paying local jobs, only because they were steady and dependable, unlike the higher paying opportunities that come and go on short notice. We would have spent more time commuting back and forth each day, and we may have frittered away more funds just because we were in town and tired of working. We could have become cogs in the machinery of the world, supporting an unsustainable way of life because there seemed to be no other way out. Treading water in a sea of bills, we would have bought those incandescent bulbs because the compact flourescents were way to expensive up front. One decision limits another,

and it is difficult to make real change without changing everything.

When you do successfully eliminate mortgage payments, high energy bills, and other similar limiting factors, then you will find that the world is a new and exciting place full of grand opportunities. You can continue to be idealistic and optimistic because you have a unique freedom to pursue your Dreams, whatever they might be. If you want to spend a season photographing polar bears in the arctic, then go get a job for a couple months and save up your money. It doesn't take long to save up a pile of money when you have few other expenses. This is true financial freedom--or should we call it freedom from finances?

Let me emphasize that the path we took was not always easy, nor is it the solution to everyone's problems. For years, while struggling to launch my writing career, we often felt both immensely wealthy and desperately poor. Our house is the sort that people look at and exclaim, "Those people must be loaded!" Yet we could rarely scrape up enough change to go to the movies.

The point that I want you to take home from this is simply a different way of looking for solutions. Sure, making more money is definitely helpful, but not always something you can control. If you find yourself chanting the mantra, "I know I could break free if I could just make a little more money." then maybe it is time to look for another way out.

Transitions

One question that must be faced is how do you change your life situation from where you are? I know my wife and I had a pretty idyllic situation when we started out. No debts, no payments, no kids. Just the two of us and an old, but very reliable car. Other people I talk to have big credit card debts, or student loans left to pay, and dependents. Certainly, these factors make it more challenging to pay down a mortgage and quit a job, but also probably more worthwhile to really go for it.

I do want to point out that the reward for your efforts will be directly proportional to the amount of change you decide to make in your life. Switching lightbulbs, riding a bicycle to work, or eating the garden weeds will make small, yet positive differences in your financial situation while also helping make the world a slightly better place. But, if you want to make real change-to be out of debt and successfully unemployed- well, then you need to stack up as many changes as you can. You need to step outside the cycles of waste and create a whole new lifestyle, conserving energy, resources, money and time wherever you reasonably can. It is almost like creating a whole new identity-you as a person who is free from the treadmill of waste, free to do whatever you want for the rest of your life. Let me give you an idea of what can be achieved, based on the success stories of people who are making real change in their lives.

The first is of a school teacher who read the early draft versions of my book *Direct Pointing to Real Wealth*. He wrote to me to say how he was deeply in debt, but very inspired by my book. In fact, he moved out of his apartment and into an old chickenhouse on a neighbor's property! Now, I wasn't quite sure what to make of this. I found it a bit alarming that this otherwise rational person "flew the coop" after reading my book. But later he sent pictures of a small log cabin he was building. He did not own the land, but had permission to build the cabin and live there for twenty years. The last time I heard from him he had just been fired--or at least forced to quit--his teaching job. Apparently he left work without permission to audition as a candidate for the *Survivor* show. He wasn't selected for the program, but didn't mind losing his job either. In our three or four years of correspondence he went from being deeply in debt to being debt-free, with enough money left over in the bank to live on for the next two years without working. More importantly, he had Time on his hands to pursue all of his Dreams. So I consider that a true success story and I hope to inspire a lot more people to get fired from their jobs too!

Another man I know is losing his job in phases. He works as an environmental economist for the state. I met him while I was working on the current edition of *Direct Pointing to Real Wealth*, and I asked for his help editing the book. In the process he became sufficiently inspired that he has since undertaken several projects to increase the energy-efficiency of his home, plus working to pay down the mortgage more quickly. Now, he wasn't 100% satisfied with his job, but not at all ready to drop the pay and benefits cold turkey either. I understand that completely. It took me about eight years of tinkering at my own business before it finally produced a sustainable income. So, he asked to have his job cut to a four day work week, and got it! Now he has three day weekends to go play, or to work at other jobs. Suddenly he is exploring all kinds of new frontiers, learning nature awareness skills, working with disabled people, editing other books, and working part-time for an energy-conservation company. He even took fire-fighting training just for the experience of it. He has opportunities "coming out of his ears" and I wouldn't be surprised to hear him asking for further cuts in his regular job.

A third success story-in-progress was a family I met while on a business trip to Saint George, Utah this March. Being a thrifty kind of guy, I drove around looking for a quiet and safe place where my son and I could roll out our sleeping bags on the ground for the night. We found a good spot early in the day, then didn't make it back to camp until well after dark. I was surprised upon our return to find that the place had become a kind of transient subdivision. Except our neighbors were not in sleeping bags. These were landless families who lived in motor homes and just drove out to park on this piece of state land each night after work. The family I camped next to actually owned land farther away and were getting ready to build their own home, but for now they were minimizing expenses where they could, raising their kids in a motor home. They also had a small commuter car, but basically they drove their house to work each day, successfully avoiding rent payments to save up for their own home.

In other words, where there is a will, there is always a way. The key to success is in being able to escape the job trap. Having great debts or being straddled with dependents will not make the path to freedom and sustainability any easier, but there is always a way out, if you commit to finding and achieving it. When you successfully eliminate most of your expenses and the need for a regular income, then you will find clear sailing ahead, and a freedom that you probably have not experienced in a long, long time.

Letters from those who are Breaking Free

Hello,

I was threading thru your website and found some of your work very inspiring. My name is Jim Smith. I'm 29 years old living in San Diego (yes, the biggest little town in the country). I discovered myself about 2 years ago when I went thru a life changing event.

I was in the rat race, living from paycheck to paycheck. When I discovered myself, I also discovered that I was making about \$80k/yr. Going with the territory in San Diego, a 1 bedroom condo would cost about \$300k, so there were very few places that I could afford.

Well the funny thing is, my dream was to wake up in the South Pacific, in the tropics somewhere, enjoying the warm air, warm water and gorgeous beach. Of course going there would require me being a yachtsman's making millions.

Well, after a little research and patience (and a lot of people, including my parents saying that I'm crazy) I got myself a \$1,500 boat. It's a 25 foot sailboat. It has a galley and a head. I modify my V-berth into a closet, converting my saloon into a 6'x3' bed. Put in solar power. So now it's pretty much my bachelor pad.

I looked at options to anchor my boat at different places for free, but restrictions would require me to move it and my job would make it hard for me to commute. I ended up with a mooring about 1/4 mile from a parking lot (10 minutes of exercise rowing) for \$120/month.

I now live on less than \$12k/year (all expenses, including treating friends out and major repair) and everything else goes into my savings. I plan to work for another 6 years (nothing like have a bundle of money to give you all sorts of options) and learn more about boating. I found the boat that would be perfect for me, costs about \$25,000 brand new.

I'm also learning about ways to live off of the ocean, fishing, beans, and seaweed. I'm

planning my first trip to Mexico when I retire (6 years from now). The cost of living in the Baja peninsula is about \$200/month for me if I choose not to fish or harvest seaweed. It would be practically free for me if I choose the more natural ways. Of course, as of this moment, I could quit my job now and still have enough money for the rest my lifetime (but having more options is cooler).

I try to preach this to some of my friends and co-workers; they all look at me kind of funny. I guess it's hard for them to see that I'm not really dependent on a job to maintain my life and would go sailing to the south pacific at a moment's notice when my job no longer needs me.

I think you did great and you are fortunate to have a partner who understands your journey. Maybe I will see you some day in one of your wilderness classes, as basic living is one of my interests. Keep on teaching people how to break free. I guess you can say that I'm a fan of living wisely. -Jim Smith (used with permission)

Tom(and Renee),

I attended your school for a few days back in 1994 and will remember the enlightening experience forever. I didn't want to leave. However, I did return to Bozeman and eventually finished my degree in Architecture. I was very glad to see that you made it into Fine Homebuilding as I think this is one of the greatest magazines (no BS and good hands on info) and I have been collecting them since I was a student and working summers in Bridger Canyon as a carpenter's helper. I don't exactly fit the mold when it comes to Architects. I tend to like projects more along the lines of what you are doing and have no desire to build tall glass corporate monuments or McMansions in the suburbs of Denver.

In fact, everything that you have done from building sustainable buildings to teaching primitive skills is what I always dreamed of. I admire you for finding your vocation so early in life.

However, at a point in my life back in the late 80's while I was living a simple life, I was convinced by friends and relatives with good intentions that I "needed to get serious about a career". So I committed to enrolling at MSU and finishing a degree program.

I now find myself with a very good career but trapped in a way by the modern world. I have student loan debts and a mortgage which are substantial but not really overwhelming like many people I know living here in Denver. Most aspects of my life are modest and in control and I am quite happy and healthy.

I have been heavily influenced by the writing of Thomas J. Stanley PhD.. I would describe the way I live my life here in the big city as a combination of "The Millionaire Next Door"

and "Direct Pointing to Real Wealth" with a little bit of "Participating with Nature" thrown in for excitement. I am definitely an anomaly among my peers.

My perception of the success to your approach is that Montana is a very free place to "Do it yourself". This equates to not necessarily needing; formal education, running water, conventional toilets or code compliant anything. This gives the average hardworking individual an opportunity to improvise and live cheaply without some standard or restriction enforced by your local government. This also leads to a much less infrastructure dependant lifestyle. You obviously have flourished in this environment. I wish I went to Montana when I was unmarried and living a low drag lifestyle. I probably would be following in your footsteps right now.

My questions to you are.....

1) Do you think you could be as successful if you were required to apply your philosophy and skill in a major metro area where regulations abound?? I have done some work with Habitat for Humanity and it is amazing how the building code gets in the way of doing the right thing for the right price.

2) What means do you use in your current lifestyle to plan financially for; childrens education, emergency healthcare and retirement(in the event you can't continue to work)? I currently utilize IRAs, and have extensive benefits via my employer. This seems like a real costly challenge for most independant business owners.

3) Do you know anybody that has "undone" conventional committments(house, job, college/retirement saving etc) in an ethical way to return to a way of living similar to yours?? I hear many stories of "City People" selling their assets for a simple life in the country. This only works if you are already affluent. We are not. We are already simple and struggle to survive in our current environment without becoming infrastructure-dependant-brainwashed-consumers like most people we know here. It is actually quite funny, they all say "if only I could make more money, my problems would be solved". NOT!!!

I am curious to know if you think a happy medium is achievable in this day and age for the average person? Many of the options are very attractive to me, but may be considered extreme by my wife and daughter. I am not optimistic that people will realize the benefits of sustainable living and control over consumerism in the near future. Most do not even realize they are being manipulated by marketing and they sure don't understand the exchange of calories for \$\$\$\$ concepts.

I hope you don't mind me asking these questions. Your opinions would be greatly appreciated. I really hope that I can join one of your school functions in the future with my wife and daughter. I really believe you are a pioneer in your thoughts and lifestyle and I am proud to have been able to experience this for myself back in the early days of

Hollowtop Outdoor Primitive School.

Take care and thanks for any advice you can offer,

Edward "Lee" Taisarsky
(used with permission)

Lee,

Thanks for writing. It is good to hear from you.

I know what you mean about taking advice from well-intentioned people who think you should have a good career. I hear that from a lot from people. I never experienced too much of that myself, or maybe I just never heard any of it, since I was so stubbornly focussed on doing my own thing. I do recall that my mom offered repeatedly to pay for a college education for me. I think I turned 30 before she gave up.

As for your questions:

1) Do you think you could be as successful if you were required to apply your philosophy and skill in a major metro area where regulations abound?? I have done some work with Habitat for Humanity and it is amazing how the building code gets in the way of doing the right thing for the right price.

Answer: I think that building codes generally serve a good purpose, and I always recommend that people build to exceed code. On the other hand, strict codes tend to suppress innovation. For example, while strawbale houses are commonly accepted by code now, I highly doubt that the first few were built where there were any codes. If we didn't have places where codes were lax, then strawbale construction may have never emerged as a viable building technology.

Nevertheless, I think that it is very possible to live a truly sustainable, even "wild" lifestyle in the city. For example, one of the things we do here is to find some way to improve our household energy situation every year, regardless of the price of energy, and you can do that wherever you live. Projects have ranged from sealing the mortar chinking between our logs with latex to block air infiltration, to building a masonry fireplace, to replacing poor quality doors and windows-even insulating under a flower bed to keep cold air from creeping under one wall of the house. Sometimes we strive to reduce our need for firewood to heat the house. Other times we strive to reduce our electricity needs. Last year we bought a super-efficient front-loading washing machine, which uses less hot water. We heat our water in a wood cookstove and by solar panels, so getting a more efficient washing machine helped to give us longer hot showers. Last fall we installed a 2500 watt photovoltaic system here, so we are now producing all of our own electricity. If you do just one energy-efficiency project a year, you will slowly but steadily wean the

household from fossil fuels. Now that our house is no longer dependent on fossil fuels, we are inspired to get one of those efficient hybrid cars to reduce our gas consumption. It is quite a good sport, I think, and you can do it no matter where you live.

You might also check out the book "*Extreme Simplicity: Homesteading in the City*" for some good ideas. We'll probably add that title to our store sometime later this spring.

As for the "wild" part, I've always been fascinated by how many wild food resources are available in the city. That is because cities were often founded in places of great abundance. Someday I would like to shoot a series of urban "wilderness" survival videos. In each one we would go to a major metropolitan area like Portland, Los Angeles, Denver, etc. and take a group of people out to live for a week or so migrating across the city, foraging and camping all the way. We will release them with titles like "Wilderness Survival in Dallas, Texas" and so forth. Sounds like fun, huh?

2) What means do you use in your current lifestyle to plan financially for; childrens education, emergency healthcare and retirement(in the event you can't continue to work)? I currently utilize IRAs, and have extensive benefits via my employer. This seems like a real costly challenge for most independant business owners.

Answer: For most of our adult lives we have done nothing about these issues, simply because we were living on \$10,000 to \$15,000 a year and either building our house or raising our kids.

We had no house insurance, but we did build our house to be resistant to disasters, so there was no real great risk in not having house insurance. (We have it now only because we are applying for a home-equity loan to buy another piece of property.)

We had no retirement fund, but no debts of any kind either, so we could retire on next to nothing if we had too. However, the way I figured it, if we had no debts, than it shouldn't be too hard to eventually make enough money to put away some kind of a nest egg. Income-wise we finally made it into the middle class for the first time in 2001. The fact that we have no mortgage payment or any other debts means that we are doing pretty well. In 2002 we had enough extra cash sitting around to open an IRA. We picked the greenest fund we could find (Portfolio 21) and put in \$5,000 to help lower our tax bill.

We still don't have health insurance, but we live a pretty healthy life-style. We've been talking about getting a health insurance policy, or at least opening a health care fund of our own, but haven't gotten around to it yet. Our three adopted kids have Medicare, and our fourth child qualified for "Blue Chip", a lower-income program that we expect to be dropped from this year because of our higher income.

At this point our business is booming, and it would not be too difficult to support our kids in college. We intend to support their choice to go to college or not, and we try not too

influence them either way too much. However, I think the life-style we role model for our kids is a strong influence that you can do just about whatever you want in life without a college education, you just have to start doing it. Our kids have been heavily influenced by school structure, which I think tends to limit innovation and self-motivation. We will be trying home-school next year, and I am hoping the kids will like the experience of being able to choose what they want to study and find satisfying the process of going out and learning it independently.

One thing to keep in mind is that the lower your income is, the more subsidies there are to support your family. For example, we used to get free school lunches for the kids because of our income level. We also used to look forward to tax time because our income was so low--and with three kids--we paid nothing in and got back a couple grand every year from the Earned Income Credit. There were a lot of perks like that.

Question 3) Do you know anybody that has "undone" conventional commitments (house, job, college/retirement saving etc) in an ethical way to return to a way of living similar to yours?? I hear many stories of "City People" selling their assets for a simple life in the country. This only works if you are already affluent. We are not. We are already simple and struggle to survive in our current environment without becoming infrastructure-dependant-brainwashed-consumers like most people we know here. It is actually quite funny, they all say "if only I could make more money, my problems would be solved". NOT!!!

I am curious to know if you think a happy medium is achievable in this day and age for the average person? Many of the options are very attractive to me, but may be considered extreme by my wife and daughter. I am not optimistic that people will realize the benefits of sustainable living and control over consumerism in the near future. Most do not even realize they are being manipulated by marketing and they sure don't understand the exchange of calories for \$\$\$\$ concepts.

Answer: One of the first people who read my book *Direct Pointing to Real Wealth* was a teacher heavily in debt with student loans. Inspired by *Direct Pointing*, he moved into a chickenhouse with no rent, paid off all of his debts in a very short time, and no longer had to work full time for a living. He left his teaching job when he no longer needed it and has been off on many creative ventures since then, including a boxing career. He sent a postcard just a few days ago to say that he and his girlfriend now go around to schools and businesses as motivational speakers. I think he includes primitive skills in his talks. His website is: www.JohnYost.com.

Now, I highly doubt that you and your wife and daughter are going to move into a chickenhouse tomorrow, but you don't have to either. I would start with some creative imagining as a family... "If we could live our lives absolutely any way we wanted, what would we do?" The possibilities are quite limitless.

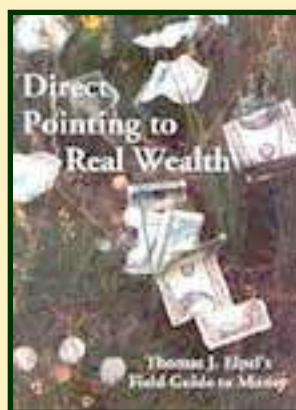
In 1999 we had a net income from all sources of \$14,000. That was enough to support Renee and I and our first three kids. That summer we spent \$2,000 from that income on a fancy canoe and a two-week canoe trip down the Green River in Utah. In spite of our income, I felt like the richest guy in the world to be able to take our family on that kind of an adventure. This year we realized that our kids are growing up too fast, and we haven't yet toured the world together. So we plan to home school starting in the fall. We will all study Spanish, then go live in Mexico for about six weeks next winter when it is so cold here. I'm not trying to brag about our lifestyle. The point is simply that you can do absolutely whatever you want in this life.

I think one of the most damaging things that our schools and society teaches people is that you Cannot go live any way you want to. You have to get a respectable degree and jump through the right hoops to get anywhere in this world. I think people (parents, teachers, media, peers) are well-intentioned in that respect, but it is hard for people to "think-outside-the-box" when they never realize there is an outside to the box. The one thing I've learned more and more over the years is that the outside of the box is a heck of a lot bigger than the inside. There are simply too many rules inside the box to get anything done. But I also realize that the transition from one lifestyle to the other requires a significant re-wiring of the brain, and that's not an easy thing to do. We've been trained to see the world one way. But to jump the tracks and make your own path, you will have to learn to see the world in a completely different way.

I hope this helps!

Sincerely,

Thomas J. Elpel



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How many pounds of carbon dioxide are added to the atmosphere by burning one gallon of gas?

A gallon of gasoline weighs about 5 pounds, consisting mostly of carbon, plus a small amount of hydrogen and a few impurities. Through combustion each carbon atom combines with two atoms of heavier oxygen atoms, resulting in 19 pounds of carbon dioxide in the atmosphere.

The stability of the climate is threatened by greenhouse gas emissions, especially carbon dioxide released from fossil fuels and deforestation. The ecosystem naturally recycles an estimated 225 billion tons of carbon dioxide each year from processes like respiration, decay, and fires. Most of the carbon is removed from the atmosphere by forests and by microorganisms in the oceans. Human activity has tipped the balance by adding 5.5 billion tons of carbon dioxide to the air each year from fossil fuel use. Deforestation contributes another 2.2 billion tons of carbon a year to the atmosphere while simultaneously reducing the total amount of forests available to remove carbon. Although the amount of carbon dioxide we add to the atmosphere seems small by comparison to the amount recycled by nature every year, we are nevertheless greatly increasing the proportion of carbon dioxide in the atmosphere.

Excluding water vapor, the atmosphere consists of 78% nitrogen, 21% oxygen and 0.9% argon. Other trace gases, mostly carbon dioxide, make up an additional .039% of the atmosphere, up from 0.028% prior to industrialization.

Two-atom molecules like nitrogen and oxygen vibrate at high frequencies, so they do not absorb much of the heat that normally reflects off the earth and bounces back into space. But 3-atom molecules like carbon dioxide, water vapor, nitrous oxide and sulfur dioxide all absorb heat and reflect it back down on the earth, trapping heat in like a window, hence the term "greenhouse effect". **Carbon dioxide and other trace gases may be a very small part of the atmosphere, but they keep the earth's surface about 59 degrees warmer than it would be without these gases, so even a small increase in the amount of greenhouse gases can have a big effect on the climate.**

While it is virtually certain that altering the atmosphere will alter the earth's climate and weather patterns, it is difficult to predict how it will change. Global warming is the most likely scenario, and **already we have melted about 40% of the arctic ice cap in less than 30 years**. Global warming could flood coastal cities, increase the frequency of hurricanes and other weather-related disasters and transform crucial croplands into deserts. Paradoxically, global warming also increases atmospheric humidity, which can increase precipitation and potentially trigger an ice age. Rather than wait to find out what

happens, we would likely be wise to alter human behaviors to stop the buildup of greenhouse gasses.

Sea levels rose by about five inches during the last century, but this may have been the result of an ongoing warming trend since the end of the last ice age. The ocean absorbs additional heat each year, causing the water to expand and sea levels to rise. Actual sea level measurements can be misleading, since land masses like Scandinavia, northern Canada and Greenland that were once compressed under the weight of glacial ice are actually rising, making it appear that sea levels are dropping. On the other hand, the Nile Delta, eastern China, Bangladesh, and the eastern seaboard of the U.S. are all subsiding- that is sinking- due to ground water removal and other factors. In these places the sea level appears to have risen more than five inches. Measurements taken with the aid of satellites have helped to more accurately determine worldwide sea levels.

Half of the world's population lives in coastal areas. In the Netherlands where much of the country is already below sea level, it will cost an estimated \$10 billion dollars to raise the dikes high enough to keep out the rising sea. In the U.S., Massachusetts alone is expected to lose 250 square miles of land during this century. In impoverished countries like Bangladesh where 120 million people live in delta regions, rising sea levels will wipe out their fertile lands or contaminate the aquifers with salt water, causing a mass exodus from the land, but with no place to go. Some low-lying islands in the Pacific have already disappeared to rising sea levels. The island nation of Tuvalu, with a population of 10,000 people, is also expected to disappear in the coming decades. A similar fate awaits a chain of islands called the Maldives in the Indian Ocean where the highest point is 8 feet above sea level. The approximately 250,000 people there are very aware of the problem of global warming, but powerless to do anything about it.

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Slipforming a Wilderness Cabin

Introduction by Thomas J. Elpel

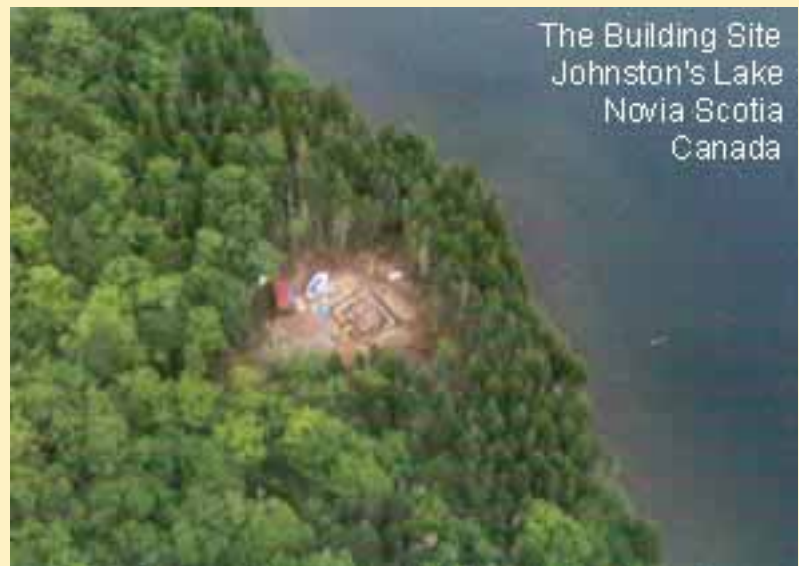
Ed Kent read my article *The Art of Slipforming* in the December 1997/January 1998 issue of *The Mother Earth News*, and later bought an early draft edition of **Living Homes**. He helped correct some of my chemistry in the book, and we have corresponded ever since.

Ed lives in Idaho, but returns to his family property on Johnston's Lake in Nova Scotia, Canada each summer. It has been his dream to build a stone cottage there for summer use, and he broke ground on the project in 1999. He has kindly given me permission to publish his story and letters here. This is his story-in -progress:

July 4, 2000

Dear Tom,

Thanks for your postcard, forwarded to me here in the "wilderness". I'm camped at Johnston's Lake, four miles by our new road from the nearest electricity or dwelling at West New Annan. Had seven yards Ready Mix concrete delivered for our footing--cost \$371 extra for the truck getting stuck 200 yards from camp. I put in a great 10" x 24" footing with three horizontal runs plus vertical rebar. I am using your 9-1/4 inch walls, and many more of your ideas. I left all my books home on purpose. I read too much--this is time for work.



I'm 66 years old, working alone, often mixing ten 1/2 bag batches per day. I'll be another two weeks finishing the stem walls--then looking forward to the slipform stone work. This place is all rock. I plan to use the pour-in-place tile floor as you have done--no wood for the first floor. I plan a second story, but will wait until I have walls over the windows and doors before I decide that . I thank you for the inspiration your books gave to help make this dream come true.

Best Regards,

Ed Kent

Slipforming a Wilderness Cabin

A work in progress, by Ed Kent



In 1856 my great-grandfather bought the 650-acre Whirley-wha woodlot in W. New Annan, Nova Scotia, Canada. He built 14 brigantine sailing ships (up to 375 tons) between 1852 and 1866, at his yard in Tatamagouche.

We've kept the land in the family ever since, and my mother deeded it to me in 1985. The last logging had been done in 1940, and by 1980 the Balsam Fir was mature and beginning its dying cycle. The cost of building a four mile logging road into the property exceeded the value of the timber until 1999, when I put together a deal with a forest cooperative, and now have a new road to Johnston Lake. It is a three-hour round-trip drive to the nearest town.

Prevailing winds down the lake tend to blow the mosquitoes away, but not the black flies. Since the property has shallow soil and much glaciated exposed

bedrock, I had planned on building a summer cabin on bedrock. The best level site I found is on many feet of compacted sand and rock with no clay, and excellent drainage. So much for plans of building on bedrock.

I considered scribe-fit Norwegian Log Building, having taken such a class. Locals tell me log cabins have a short life span in the damp climate. Vandals are also a problem. If they can't break in then they will cut a new door with a chainsaw.

I tolerate two small cabins at Whirley wha Lake, which were built 40 years ago, but are now "community property". Local sportsmen and women camp there year round, and there are many tales as to ownership won and lost in card games , etc. According to my understanding of Canadian Law, it takes 20 years of "adverse possession" before squatters obtain any rights at all. The 20 years would not start unless I objected. My attorney suggested that the goodwill from tolerating the camps will make my own camp safer.

1999: While the excavator and dozer were building the road, I had them dig a rough footing trench for a 24 x 28' cabin, and they took out a few scoops for an outhouse pit. The pit turned out to be so deep and so long I had to build a log structure over it to support the outhouse. I covered the other two-thirds of the pit with logs and brush. Now when you lift the lid and look down, it scares you. I figure I have a 100 year capacity. I built the outhouse in Idaho and brought it up on the rear of my utility trailer. Joanne said she wouldn't go with me if I put the "Y2K COMPATIBLE" sign on it as planned. There was so much rock saved from the excavation work that I didn't have to collect any for building the house. The heavy equipment also dragged in an 8 x 8 x 20' steel cargo container for storage.



Pad for a concrete pilister.

2000: After a month of hand digging, setting forms and rebar, I ordered seven yards of concrete for the footings. The truck got stuck 200 yards from camp. Suddenly it looked like I'd own not just seven yards of concrete, but the truck too. With a big 4WD loader we were able to save all, but it cost an additional \$371. I had ordered six-sack concrete, and it was green for several days, but finally set up fine. Enough concrete trucks!



Doing laundry in the cement mixer.

I poured 9-1/4" stem walls, 32" high to grade, using a 3-1/2 cubic ft. electric mixer and an old generator. I used air-entrainment and retarder additives to slow down the set time and improve the batch-to-batch flow pattern. One day I made 21 batches, working alone.

Since most of the stem wall would wait a full year before more concrete was poured over it, I left the top of the wall very rough and set in 3" washed stone every few inches, as well as the vertical

rebar, to help tie the old and new sections together. I did complete one-eighth of the first floor perimeter in stone. I built the slipforms in Idaho over the winter and hauled them up on the trailer. I used 5/16 x 3 1/2" bolts, plus washers and wing nuts (instead of nails) to tie the forms together horizontally and vertically.

The book *Why Buildings Fall Down* by Levy and Salvadori (Norton & Company) talks

about the lack of redundancy in failed structures. No question that my 18" pilasters and corner posts are redundant, as well as more work. The pilasters are faced on the inside for appearance. If this cabin is not still standing in 200 years, I will be very upset.

In 2000 the snow depth reached 5 feet. I plan the roof to be able to support 10 feet of snow, and to have little structural damage if a 60 foot tree falls on it. I plan a salt box roof line with a 5/12 pitch, since I don't want to work on a steeper pitch than that. I'll be using about 20' flattened logs for roof rafters, to include some overhang. Several feet of snow is pretty good insulation, if someone wants to be there in winter to run a maple syrup operation. An insulating roof could be added later. Fuel wood is plentiful, and the beech stands have little other value. I'll have a truss beam support the long rafters at 12' run, supported by the center post and side pilasters, and use collar ties for redundancy.



The slipforms were tightened from the outside with wooden levers.

2001: Arriving the first week of May was a big mistake. The snowmobile groomer packed down the snow, then more drifted in. I had to wait 10 days for it to melt. The road was bare through the maples and birch, but the snow was hip-deep in the shade of the spruce and fir trees.

For an easier method of wire-tying the slipforms, I switched to 17 gauge electric fence wire, which is much stronger, stiffer and cheaper than some sources of

wire. It is convenient to place the reel of wire on a rebar, have the wire run under a heavy rock to straighten it, and peel off about 50 feet or so before cutting it into 2 foot lengths.

To tighten the wire ties I used 2 x 2 levers, 16 inches long, with a 1/8" hole drilled 4" from one end. There are two 1-1/4" drywall screws set into the wood about 1/4" and 3/4" inches from the hole, leaving a gap between them. After threading the proper amount through the hole, the wire is gripped with pliers and wound around the first screw, then in figure-eights around both screws. A similar lever is attached on the other side of the wall. The short end of the first lever is propped up onto the 2 x 4 framework of the forms when the wire is pulled through to put the second lever in place.



Slipforming the first level. The rebar grid runs through the window openings for vandal protection when the cabin is vacant.

Raising both ends of the second lever up onto the framework usually provides plenty of tension against the spacers. If it is too tight, then a small block of wood can be placed under the long end instead.

All this can be done from one side of the forms, and the single wire reduces conflicts with rock placement compared to the two-wire system. Only half as many wires need to be cut when the forms are removed, and the lever arms are returned to the bench to remove the old wire ends with pliers. I found this method quicker and more convenient than the twisted wire system, and it uses about half the wire.



Preparing to pour a concrete pad for the central support post.

For security, I embedded 1/2" PVC pipes in the concrete outside the window frames. Plywood shutters will be affixed with 8" bolts into the holes. A grid of 3/4" rebar across the openings will give additional security, and provide extra strength to the lentils above the windows. The quality thermopane windows will be installed from the inside. Exterior storm doors will be installed with cheap locks to keep out the honest. A removable sandwich panel of steel and plywood will frustrate thieves. Inside that will be a conventional front door. In that area a rash of Vandalism happens about every 10 years--never by snowmobilers, but by kids in pickup trucks or ATV's.



Slipforming of the first level is mostly complete.

For a center post I chose a 15" diameter red spruce. Working alone I cut, trimmed, and dragged it to the cabin with my 4WD Ford. I used a dull, cheap machete as the chief tool for peeling. I then erected a 20' A-frame, looped a 100' logging cable through sheaf, and bolted on four guy wires, and tied on poly rope and come-a-longs for side and back stays. With the butt secure in a

steel fixture set in concrete, and using a 3 ton chain fall, the post was slowly pulled to the sheaf. That was pretty stable, but then it was important to keep the post moving in an absolutely vertical plane, by sighting it with a plumb bob, and adjusting the side stays. The A-frame slid down the cable, and the post was drilled and bolted to the 1/4" steel fixture with four bolts of 1" threaded rod, with washers and nuts. Although there is now a beam notched in and affixed in the wall, the 4 guy wires are adjusted to equal tension--

sort of a triple redundancy.

By the time I left in September, most of the first floor was completed to the top of the windows. I used up all the cement before quitting, since cement left from the year before was partly ruined by spring.

2002: I stayed at home in Idaho until mid June, thereby avoiding the snow, mud season, black flies, and most of the mosquitoes. Besides, five months last year was too long to be alone with just my 3 and 12 year old Australian Shepherd dogs for company.



I spent only three months in Canada this year, but I did complete the first floor exterior of an 8-foot diameter circular tower containing a 12-inch diameter concrete post and eleven spiral, rough concrete stairs to be finished later with terra tiles. I greatly appreciate all the good ideas you have shared through your book *Living Homes*.

The first floor interior of the tower will include a structurally separate masonry stove, bake oven and the corner of a massive Rumford-style fireplace. Above the fireplace smoke shelf/damper I plan a 6' x 6' x 8" forward leaning steel radiating surface, with flue connections at the top and also just above the smoke shelf, dampers, etc. This won't be started until the year 2005, and the design will permit easy changes to mistakes.

In the mean-time, I've started installing floor joists (flattened logs using Alaskan small log mill), and I am developing some composite log/concrete walls for the second floor. At age 68 I feel I have lots of time to complete and enjoy this camp.



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

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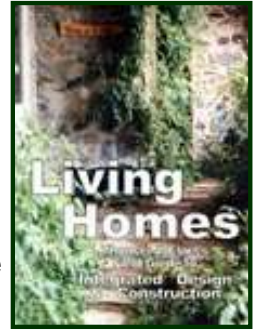


Wildflowers Store



Terra Tiles

Terra tiles are inexpensive floor tiles made from a mix of dirt, sand, and cement. Terra tiles were developed out of "rammed-earth" technology, where a soil-cement mix is poured into wall forms and tamped or compacted with hand or power tools to make very dense, strong walls. Terra tile mix is similar, but it is simply troweled into place without being compacted, and the tiles are cut with an over-size "cookie cutter". The idea was pioneered in California in the late 1970's, by David Easton, a rammed-earth contractor.



Through trial-and-error Easton developed a basic process for making terratiles, including some of what not to do-like trying to mix the very sticky mortar in a concrete truck, or trying to tamp it like the drier material used in rammed-earth walls. We learned about terratiles through articles by Easton (*Popular Science*, 1988) and by an associate of his, Magnus Berglund (*Fine Homebuilding*, 1985). In the course of tiling three homes, and recently an addition on to our own home, we have learned more about what not-to-do, as well as more of what really works to make truly beautiful, and very low-cost tile floors. Tom included the latest information on terra tiles in his book, [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction](#).

We do not presently have any terra tiles classes scheduled, but please check back often for new listings.

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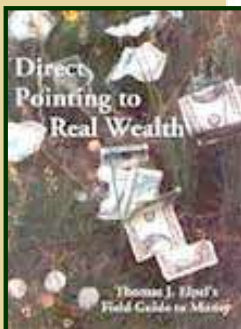
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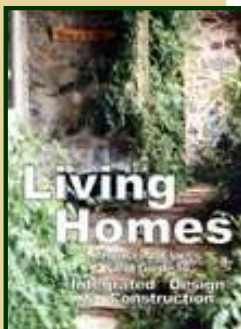
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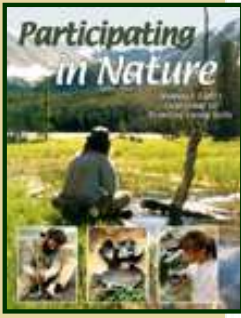
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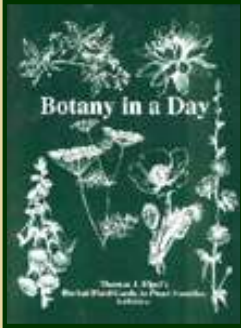
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Living Homes



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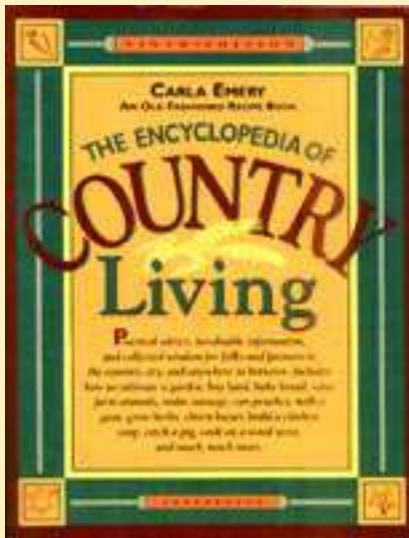


Botany in a Day

Encyclopedia of Country Living

An Old Fashioned Recipe Book

by Carla Emery



When Tom and I started out with our own "homestead", we had a 1977 edition of Carla Emery's book. I found myself referring to it often. I learned about leavening bread, homestead cooking, gardening, caring for critters, preserving foods... many things a newly married city girl knew nothing about. I found Carla's simple writing and anecdotes to be an inspiration to keep working hard because self-sufficiency is something I really wanted. Now that we have four kids, numerous animals, plus a home and business of our own, we feel like we have made it on our feet in the country, yet there is still so much to learn.

My favorite thing about Carla Emery's book is that she discusses her failures as well as her successes. I still find her book useful and entertaining. There are hundreds of country skills in this book that I haven't tried yet.

Some of the topics include: Moving to the country, buying land, sewing a quilt, living self-sufficiently, planning a garden and raising vegetables and herbs, saving seeds, improving soil, raising earthworms, growing mushrooms, wild foraging, growing grasses and grains plus winnowing and grinding grains, making pasta, establishing an orchard, pruning a tree, pressing apple cider, tapping sugar maples, sun-drying fruit, stocking a root cellar, making vinegar, caring for livestock, including feeding, doctoring and butchering, plus breeding rabbits, shearing sheep, milking cows, making cheese, raising chickens, turkeys, guineas and ducks, plucking feathers, cooking a goose, plus resource lists of books, magazines, and mail order suppliers for every subject imaginable.

The Encyclopedia of Country Living. Ninth Edition 1994. Seventh Printing 1998. 858 pages. ISBN: 0-912365-95-1. \$28.00

Encyclopedia of Country Living \$28.00

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Questions from Owner-Builders about Where to Buy Land

with replies by Thomas J. Elpel

Questions:

- [Where can we find cheap land with good water?](#)
- [How can I get informed about real estate before buying land?](#)

Questions Policy: To avoid re-writing my book [Living Homes](#) for every person that comes along, please read the book before you write to me. Then, if you have any questions beyond what is presented in the text, then yes, please do write and ask away! I may be a little slow to answer, since I have more than a few distractions, but I will get back to you in time, and I will answer your question to the best of my abilities. Please let me know if I can post your letter and first name to the website. Thanks!

Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our [E-mail Contact Page](#), and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

For your convenience (and mine) here is a **mortgage calculator** to figure out your monthly payments when buying property. Ideally you want to pay down as much as you can upfront, and pay as much as you can every month, to avoid losing too much money towards interest payments.

Mortgage Calculator
Loan Amount in Whole Dollars
\$
Interest Rate (6.8, 7.4, etc.)
%
Term
Years
Calculate
Monthly Payment
\$

Where can we find cheap land with good water?

Hello, I really love your ideas and can't wait to read your books. We plan to move this summer from southern Arizona to possibly eastern Oregon or Idaho, wherever we can find cheap land with good water...my question is, where do you think are the best areas? It seems that our wilderness is quickly disappearing. Thanks, Rob

Rob,

Land-wise, a "good place to live" depends on a lot of factors, the most important of which is usually dependent on where you grew up. Most people are strongly attached to a climate and scenery similar to what they experienced extensively as children, and may not be content in a new environment--even if it seems spectacular and exciting when they first arrive. If you moved around a lot as child then you may not be so anchored to any one place.



Personally, I spent much of my childhood in what is now the Silicon Valley of California, but every summer we came to Montana for three months to be near family. That was the time when we got out and played in the woods and creeks and mountains. Today I still have the strongest attachments to Montana, and I love living here. But I'm not much of a winter person since I didn't grow up experiencing winter at all. We also have orange trees, a fig tree and a banana tree (among other things) growing year-round in our greenhouse to help fill the connection to the California part of my childhood.

As far as wilderness goes, you are correct that we are rapidly losing it, and one of the greatest contributing factors is that so many people want to get their own piece of wilderness to build a house on before it is all gone. Here in Montana we also have some incredible scenic vistas, and most of them are being destroyed by people trying to build houses in places where they can get a really good view. So I would encourage you to think very carefully about where you choose to develop. If you can be part of a small community near wilderness then that would be much better than trying to be out in the middle of your own private wilderness.

I hope this helps!

Sincerely,

Thomas J. Elpel

Dear Thomas, Thank you kindly for your reply. Your thoughts and concerns are very well taken. I've always tried to be part of the solution rather than part of the problem and you have again made some points I've not considered. We have a lot in common, I'm sure. It's always a pleasure to meet another person who comes from a place of "whats best for everyone?" rather than "what's best for me?" and "how can I get more of it?". At 50 years old, I've travelled quite a bit, but now with a wife and 3 small children, we are looking for a life on the edge of civilization where we can live the REAL "good life". I've always taken the family camping and hiking and I'm so happy to hear the kids ask me regularly "when are we going to the mountains again, daddy?" Arizona is nice, but water is very scarce. Montana is surely too cold, so we'll probably choose somewhere in between. I'm certain I'll have more questions after reading your material, and who knows, perhaps we can talk

over a campfire sometime. Blessings from our family to yours, Rob

How can I get informed about real estate before buying land?

Hi,

Presently I'm trying to gather resources in purchasing land in the east coast. I've been surfing the web and looking for books that will prepare me in the laws, zones, flood areas, taxes, liens etc and I can't come up with one. As a novice in this venture I came across your website and decided to email you in hopes of possibly directing me in what I need to look for. To be a little specific, I'm interested in purchasing a few acres of land that has wooded areas and/or land where the fields are flat. I'm interested in having this land as an investment. Maybe you can direct me in what I need to do and advise me on reading materials.

Thanks

Alex

Alex,

Thanks for writing. I don't have a lot of detailed information, but enough to get you started. First, any time you work with a piece of undeveloped land, be sure to take the time to imagine how your actions will impact the land down the road, 10, 100, 1000 years down the road. Even if you just buy the property and resell it, you become part of the place and it becomes part of you. What happens on the land a thousand years from now is partly dependent on what you do with it today.

I realize that you are looking for land in the east, but I would still recommend you read the "Welcome to the West" guide offered by the **Corporation for the Northern Rockies**. For an overview of the steps in buying land, and everything you need to keep in mind, there are about 5 really good pages included in **Carla Emery's Old Fashioned Recipe Book**. I hope this helps!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

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Questions About Building a Low-Cost Home

with replies by Thomas J. Elpel

Questions:

- Is it still possible to build a low-cost home?



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Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our E-mail Contact Page, and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

Is it still possible to build a low-cost home?

Hi Thomas,

I read your page on Building a House on Limited Means and it's very inspiring to me. I'm 36 years old, married and have a 18 month old daughter. I built a home in San Jose CA and lost it due to lost of employment. I told myself next time I'm going to build it for cash, no loans. Well, it looks like the time has come to build that home. I'm planning to build it for \$40 TO \$50 a sqft. Do you feel this will be possible in 2003? I was wondering if you can provide some pointers since you built yours for \$10 a sqft. I know you must have done alot of the work yourself, which I plan to do too. I have experience in electrical, cabinetry, tile, finish work, painting, finish plumbing, wall framing and so forth even though I'm a software engineer. I'm going to school presently to become an architect the hard way, 3 years of schooling and 5 years apprenticeship.

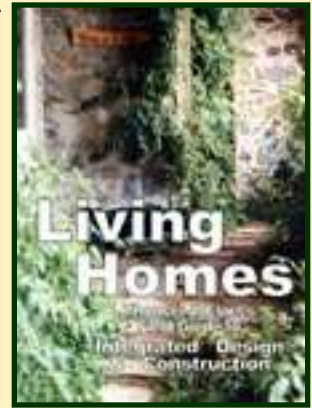
I want to keep my living expenses low so I can do drafting for a living and still have time for my family. I'll will be going from a \$100k job to a \$35k to \$50k job.

I was wondering if you might have any details on what your challenges were and what materials and methods you used to keep cost down to \$10.

Thank you so much for your valuable time,

Warren

Warren,



Thanks for writing. Sounds like you have some good hands-on skills for making your Dream come true. The architectural training will certainly be helpful for your design work.

While you are studying, try to keep in mind questions like "How can I design a house to be efficient enough that it doesn't need a furnace?" If you eliminate the need for a furnace and the ducting, then you will save a lot of money and have a much better product.

Also ask yourself what building materials are available free or very cheaply in your area, and how you might best use them in your project. This might include anything from piles of rocks to scrap lumber and insulation, garage sale appliances, doors, windows, and light fixtures, to culled trees that might be peeled for accent work. If you don't have any other place to store the materials, then you might consider renting a storage locker. You could collect just about everything you need for your house in there before you started building. It is much more efficient shopping or scavenging for a good deal when you have three or four years to find something, than when you need it right now and have to buy it new to keep the project on track.

Probably the greatest thing that helped us to keep costs down to \$10 a square foot was that we really didn't have any money at the time and even that price seemed high to us. Realistically, I think we would have spent a lot more on the house if we had more to spend. That's just the way it goes.

One result of our ultra-low budget approach is that we have had to redo some projects. For example, our original kitchen cost about \$300 for all of the cabinetry, counters, fixtures, and appliances. Basically we built everything out of scrap lumber and installed a used stainless steel sink, plus an older refrigerator and an antique wood cookstove I restored in high school. Although cheap, the kitchen looked pretty decent and worked quite well for more than ten years.

I'm glad that we didn't spend any more money on it at the time, because I don't think we had the skills then to do a really nice job on it anyway, and we needed to live in the kitchen awhile to get a better sense of how to fine-tune the design to our needs. The biggest flaw was that we didn't put cement board under the tiles, so the water worked its way through and swelled and rotted the wood.

We've just about finished a remodel of the kitchen, and it is much more customized to our needs now. We reused much of the lumber from the old cabinetry, so we just had to buy a few new boards, but we also bought a top-of-the-line \$1300 dishwasher, plus a newer, more efficient refrigerator, and a white enamel cast iron sink.

We also decided that the grout lines in the tiles were annoying to clean, so we wanted a solid surface counter. A nearby company makes some incredibly elegant counters out of essentially 100% recycled materials (mostly fly ash and ground up bottle glass) and we decided that was exactly what we wanted--until we got the \$5,000 estimate for the installed cost of the counter. However, the company owner was very helpful with ideas, and we did a poured-in-place "concrete" countertop (with sand, gravel, cement, dye, lots of fly ash, and some cement, plus acrylic bonding agent).

I have to say that looking at it or touching it is a sensory experience. This is one elegant countertop, and it only cost about \$500, which bought three times as much raw material as we needed. We certainly didn't have the skills to pull that one off when we did the kitchen the first time!

Also be sure to read my article [Escaping the Job Trap](#)

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

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Slipform Questions from Readers of Living Homes

with replies by Thomas J. Elpel

Questions:

- Where can I find free rocks for building with?
- Will round rocks work for slipform stone masonry?
- Is slipform stone masonry approved by building codes?
- How can we support the second floor if we are doing two stories in stone?
- How can I reduce the cost of the beadboard panels?
- How should the holes be spaced to anchor beadboard panels to the concrete?
- How should I build the window frames in a slipform wall?
- Can we slipform a veneer of stone against our house upon an angle bracket?
- What can you tell me about traditional Irish stone masonry?
- Is there a way to get that "wet-look" to bring out the colors in the stones?
- Is it feasible to build a three-tiered tower with slipform stone masonry?
- Would it be affordable to build a stone castle?



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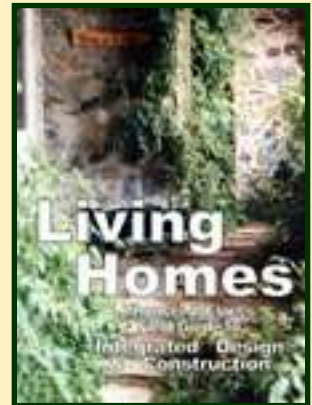
Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our E-mail Contact Page, and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

**NOTE: Are you offering a stone masonry class?
Do you want some volunteer labor to help build your home?
If the answer is yes to either question, please click here.**

Where can I find free rocks for building with?

This question was not in a letter, but it has come up a few times. There are many places you can find free rocks. **Farms** are always a good choice, where farmer's have removed them from their fields and stacked them in convenient piles. Just ask, and you will mostly likely be given permission.

Another source is public lands, especially here in the west where there are millions of acres of public lands. The **Bureau of Land Management (BLM)** has a casual-use policy: You do not need any kind of permit, as long as you are collecting rocks by hand (no heavy equipment) for personal, non-commercial use only. In other words, you can collect all you want for building your own home, fireplace, retaining walls, etc. Just stay on the roads with your truck and don't do any kind of excavation work. There are exceptions for special rocks like petrified wood or obsidian, and there are areas of special designation where collecting would be prohibited, but otherwise the rocks are free for the collecting. Inquire at your local office for issues of special concern.



You will need a permit to collect rocks on **Forest Service** lands, but the permit is free and you can collect up to five tons per year, and get a new permit the following year. A ton of rocks is approximately one pickup load about a foot deep. (That is a lot of weight; you don't want any more than that in the back of the truck.) The restrictions are similar to those on BLM lands--all work must be done by hand, without heavy equipment, and be sure to keep your vehicle on designated roads. Again, check in at a local office for restrictions on specific areas or types of rocks.

On **state-owned lands** here in Montana you need to obtain a rock picking permit from a local DNRC field office (Department of Natural Resources and Conservation) for collecting any rocks. State lands in Montana are managed for the benefit of the public school system. A rock-picking permit costs "about \$10 a ton". You can pick as much rock as you want, as long as you pay the \$10/ton fee. Again, you must be picking rocks by hand, and you must have legal access. Using heavy equipment requires a performance bond for reclamation.

The majority of the rocks we used to build our house came off of **county right-of-ways**. Basically, a primitive dirt road going into the mountains through a mix of private, state, and federal lands is often a county road, at least around here. You can consult local maps for guidance. The county owns a 60 foot right away, measured as 30 feet each direction from the center of the road. Local laws will vary, but here in Madison County, Montana, the rocks are considered a nuisance. The county has no rock policy, but they are definitely glad to be rid of them. While building our house, Renee and I often joked that we should send the county a bill for all the rocks we picked out of the roads...

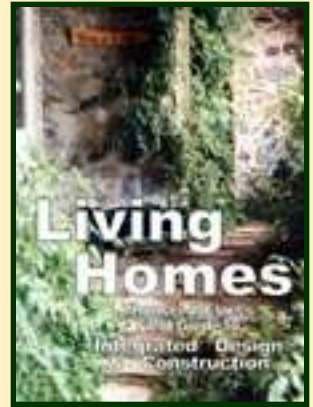
Will round rocks work for slipform stone masonry?

Dear Thomas,

I have been actively reading your book now for the last few days and getting very excited about putting slipform construction into practice. I have recently cleared a building lot for my cottage on a 300 acre wooded island in Honey Harbour on Georgian Bay.

As an experienced builder and a "child" of the seventies I have always taken on any project with a sense of commitment to environment, alternative techniques, and a more holistic approach to the end result.

I came upon your book in a rather humorous fashion. Many years ago in my first personal building project I spied a box of books in my rural landfill. These books were a general selection of great material all purchased from the whole earth catalogue, also in the box. One of the books was "Build your own home" by Ken Kern. That book has fascinated me for about fifteen years now, in particular the reference to Flagg and especially the use of the Magdiel form and rubble wall construction. From that knowledge I happened to be surfing looking for Magdiel info and came upon your book.



I am building a log home and was originally and reluctantly planning on a block foundation. I say reluctantly partly because of the hassles of getting blocks to an island.

I have a small Kubota backhoe on site and I also have plenty of stone! I feel that a slipform basement of stone is the perfect way for a self-built project. I have sand available and with some hunting I should be able to secure enough aggregate. How consistent does the concrete have to be?

The rocks that I have on site are more like the rounder type without a definitive flat face. Should I be concerned about this or does it mean more concrete? I suppose if I really looked around I could hand pick some stones with a flat face. Do you know anything about the Magdiel Form, where I can find any information, or whether I need to bother pursuing that avenue? I must say that I enjoy your book very much and feel that with it and my experience I have enough to go ahead and build. I can't wait until spring!

Yours Truly, Mark

Mark,

Thanks for writing. The round rocks will be just fine. You may need a stiffer mortar (less water), so that it will not run down the face of the stones in the forms.

I usually keep the mortar back from the face quite a bit, then grout it afterwards, but with the rounder rocks you might push the mortar farther between the joints, then avoid

chipping too much of it out. A good technique is to pull the forms off 24 hours after a pour and rake over the joints with the back of a hammer to drag off the concrete lumps, smoothing the joints. It won't be as smooth as a grouted joint, but it is quite a bit less work and it will effectively hold the rocks in place.

Sincerely,

Thomas J. Elpel

Is slipform stone masonry approved by building codes?

Hi, Tom

I'm writing to you from Missoula, MT. I am wondering about your experience--or the experiences of any of your readers--with slipforming & local building codes or the local construction/planning approval process. Are local building officials generally receptive to do-it-yourself slipforming? I'd be glad to receive any advice that you may have on this topic.

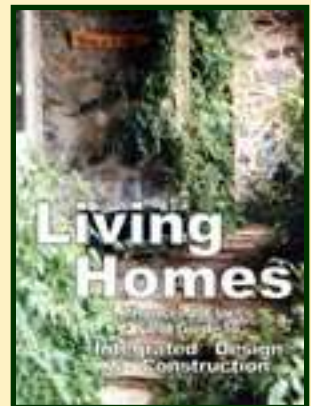
Thanks. Carrie

Carrie,

A slipformed stone wall might best be described as a "reinforced concrete wall with stone facing". That is technically what it is, and describing it that way would help to reduce confusion when dealing with building codes.

Sincerely,

Thomas J. Elpel



How can we support the second floor if we are doing two stories in stone?

Hi,

I don't plan to bother you at every turn, but I wanted to pass this on to you: Several 'Nay-sayers' in my life recently said things to me like:

"They're never going to let you do anything like that around here," and

"Well, you can probably get away with something like that in Montana".

So I was a bit nervous about meeting with the building inspector. To my surprise, he was already familiar with your slipform technique, and had absolutely no problem with it. Of course, why should he? He could sense, I think, that I was nervous, and told me of that what I was proposing was in no way 'crazy'. Then he started to describe other projects he has had to deal with that were much more controversial.

Anyway, I am curious about how Dani Gruber supported her second floor. My carpenter friend suggests that I imbed treated nailers into the outer wall, but I wonder how much that will affect the insulation factor, as you describe that wood framing would. If there is a better way, I am of course open to it.

Warm Wishes,

Mark

Mark,

Thanks for writing. Yes, you can imbed treated nailers into the outer wall to attach your header joist and joist hangers to support the second floor. The energy loss through the wood shouldn't be too bad since it would be a relatively small area of the total wall space.

Dani's house is a bit different, since the second floor is supported directly on top of the stone wall. She has a 9-1/4 inch thick stone wall up to the top of the eight foot beadboard panels. The floor takes up about half the width of the stone wall. Then she did a thin veneer of stone up about another three feet on the remaining width of the stone wall.

Sincerely,

Thomas J. Elpel

How can I reduce the cost of the beadboard panels?

Dr. Mr. Elpel,

I'm a little stunned today, because I have been receiveing phone calls with prices for the EPS panels. I'm shocked at the prices I'm getting which so far are \$1.80 to 2.21 a square foot, which is \$58 to \$70 a 4x8' panel. This means that I'm up to close to \$20,000 dollars in foam panels alone. I wasn't expecting this, and it leaves me wondering if the product you and Dani Gruber used was something else. Of course in your video, the scrap panels were free, so that wasn't figured into the final price of your workshop. Any information would be appreciated.

Sincerely,

Mark

Mark,

Yes, I know what you mean about sticker shock. The quotes you received are probably on the mark. Just make sure you are getting quotes for OSB board on one side only. The cost of these beadboard panels (www.r-control.com) should approximate the cost of a framed wall with foam insulation sprayed in place. In other words, it will be more expensive than a framed wall insulated with fiberglass, but better quality too. When I look at the process for making these panels it doesn't look like it should be expensive, so I wonder if the cost reflects the patented monopoly on the panels. I also know that our local factory operates at maximum capacity most of the time, so they are keeping quite busy enough without lowering prices. Anyway, if "Necessity is the mother of invention," then perhaps sticker shock is the father.

I can see several possible routes around the cost problem. First, you might explore the possibility of getting free panels off the factory scrap piles. I don't know how close you are to a factory, but it would be worthwhile to investigate, especially near the peak of the building season when the factory is at maximum production. Just go directly around back and see what's there and ask the people near the pile which ones you can take, or more appropriately, which ones you cannot take, since the workers may be saving a few scraps for small factory projects or their own personal building projects.

I think there has been some problems in the past with individuals assembling the scraps into buildings, since the panels are structural, while the scraps are not. But there is no problem using the scraps in a slipform wall, since the stonework is the structural part.

Second, you might look at a more modular approach to construction, to the greatest extent that the codes and building inspector will allow. In other words, build a small structure that looks mostly complete and move into it while you build the rest. Be sure to design the place so that you can easily add on to it. That way you can pay for the new panels as you go, or build in sections as you accumulate scrap panels.

Third, you might evaluate a variety of insulation systems that could be incorporated into different parts of your house plans. For example, our house (built before the beadboard method) is bermed into the hill on the north and east sides, with inexpensive beadboard insulation (no OSB board) placed against the concrete walls and backfilled to hold it in place. The south side of our house has a large greenhouse with lots of windows, so there is essentially no insulation there. The west end of the house (the family room addition shown in Living Homes) has double stone walls with rigidboard insulation sandwiched in the core. We used mostly urethane board, working with salvaged sheets found for free or damaged sheets bought at a reduced price from the lumber yard. We "welded" the joints together and filled all the holes with expanding foam sealant to insulate that end of the

house for next to nothing. While none of these examples may work in your situation, the point is simply that we used three different insulation systems for the walls in one house, but you would never notice except by my pointing it out.

In other words, you may need to return to the process of integrated design. Add the element of sticker shock into your criteria at the beginning of the process and design the house with the flexibility for modular step-by-step construction with the possibility of several creative approaches to insulation. That may not be the answer you are hoping for, and I really wish I could give you a magic formula so you could buy the new R-Control panels at 75% off, but that's just the way it is. Let sticker shock become the father of innovation and see what you can come up with.

Sincerely,

Thomas J. Elpel

Hello Mr. Elpel,

I found some things out about polystyrene panels that I thought might be useful to your readers: After getting a 'best price' of \$57.00 per panel, I went into a bit of a depression. That price was going to put me too far over my budget, and I started to question whether or not I would be able to go on as planned. In that mood I called Derrick. I had been given his number by one foam place, but had not been able to reach him, and I had in fact given up on him, since I have discovered that in the field of construction, there are people who just don't call you back, and leave you waiting for nothing. Most of us don't mind waiting for something--as long as we know it will come eventually, but waiting on people who may never call you back is very frustrating.

Anyway, I did reach him at last, and he was at home and fortunately, in a 'gabby' mood. I explained my situation and my feeling that my plan might be coming to an end soon. His response was "Mark, these people aren't listening to you, they are trying to sell you structural panels. These panels would be the walls. You just need them to be a straight edge and then to be insulation." He went on to describe the various densities of foam for assorted purposes, and said that I could use what is called '1 pound' foam, which they recycle out of what would otherwise be their scrap.

The bottom line is that I will be buying 130 panels that are 9' x 4' without the OSB for \$22.00 ea. This is \$71.00 more for the extended length (after you add what it would have been to buy the extra panels instead), but I think it will be worth it not to have to cut 130 1x4 pieces of foam/OSB. The 4x8s will be \$19.00 each, plus tax.

I will have to glue the OSB to the panels myself. The company gave me a sample of the product so that I could experiment with the gluing. They are very secretive about their gluing process, and would not advise me as to what type of glue to use, other than to say that petrochemical substances would eat the EPS. I went to the local Home Depot where

they steered me to 'Liquid Nails' for foam. I took a tube (caulk-gun style) home and it worked. The drying time was a whole day, even though it said 4 hours on the tube. After about 6 hours, it was still goopy-wet. I set an old glass 'slider-door' on top for weight, and the next day it was solid. I used 7/16" OSB, because it is only 1/16" thinner than 1/2" and that is what the foam manufacturer was using. Also it's less expensive. When I finished gluing the panel, it seemed to want to stand on end, and it was very sturdy. The R value of the panel is 22.9, so with the OSB it is at least 23.

I was concerned about the cost of the glue because I paid \$2.14 for the tube, and used a good deal of it on one panel. Since then I have found 'construction adhesive' in the paint area of a "Lowe's". I have not been able to try it because I have only the one panel, but I'm hopeful, since it says on the can that it can be used for EPS. If this proves to be a good product, I may try to get it in 5 gallon pails.

The OSB is \$6.89 plus tax per 4x8 panel, and I will need more of it for the walls, since I will have to cut the extra 1 foot. This is still expensive, but for me it is at least do-able.

A thousand thanks more,

-Mark

Mark,

Sounds like you found a good solution to the cost problem. Congrats on the thrifty thinking. I do have some minor concerns about the long-term durability of the glue... in other words, is the OSB going to be at risk of peeling away from the beadboard after a number of years? The R-Control panels are glued together in a large press, so there is a lot of weight to firmly press the OSB to the beadboard. Personally, I think you will be fine with your approach, especially since the panels will be locked in place by everything else—such as the interior walls that butt against it, the sheetrock that covers it, and the sheetrock on the ceiling material that butts up against it.

However, for extra insurance, you might think about some ways to permanently tie the OSB through the beadboard to the concrete. For example, if you are using wire ties for the formwork the way it is demonstrated in the video, then you might leave some or all of the wire ties in place. Sheetrock would easily lay right over small diameter wires (like tie wire), or you might look at making a shallow groove in the OSB for thicker wires. I would recommend a medium-sized wire, since tie wire isn't very strong, and could also rust through easily where it enters the concrete. The thicker, stiff wire I showed for doing a concrete pour in the video would be excessive for stonework and wouldn't lay flat, so look for something in between.

Sincerely,

Thomas J. Elpel

How should the holes be spaced to anchor beadboard panels to the concrete?

Dear Mr. Elpel,

My question today is about the holes you put in the panels to secure them to the masonry. Do you have a reccomondation as to the number and spacing of these holes? I would think there would be more stress at the top of the panels, so you would want more holes there, but I'm not sure. Since each hole takes away a little insulation, I want to be smart about it. Also I am thinking that I could make up a pattern to turn the hole drilling into an assembly line process, using a 'spare' piece of OSB with the 'drilling pattern' already drilled into it.

-Mark

Mark,

I don't know what the best spacing would be, but I think you have the right idea to predrill the holes in an assembly-line process. It is too easy to forget about it later on. The loss in R-value should be minimal, so I wouldn't worry about that part too much. I might put three holes across the panels horizontally, such that two were about six inches from the edges and the third was in the middle (sixteen inches apart from the others). Vertically, I might do a similar pattern, starting about six inches from the edge and spacing the rest sixteen inches apart. This number of holes might be overkill, but you can be certain the panel won't come off the wall. While you are doing some assembly line work, you might want to predrill the panels for your form wires to go through, and make some grooves to lay the wires flat across the OSB, under the sheetrock.

Sincerely,

Thomas J. Elpel

How should I build the window frames in a slipform wall?

Dear Mr. Elpel,

I'm still a little iffy on how my windows are going to work. Dani Gruber's article said that your book was very clear on this point. So I went back and re-read that part. I don't claim to be as intelligent as Dani, but I still don't feel that I have a clear picture. It occurs to me that there are pictures of Dani's house in your book 'Living Homes', so she must have read another book by you, or at least a different edition, and maybe there is more info on the window process there. I'm sure I will figure it out eventually, but I'll take any

information I can get.

Building, I have learned, can be an emotional rollercoaster, at least for the beginner, but I'm enjoying it on some level. I really thought I'd be 'slip-forming' by now, and if I had it to do over again, I would start several months earlier. But I'd still be doing it.

-Mark

Mark,

For the window framing, we've used 2 x lumber in the past, but I really liked the method we used in the video, where we built the frames out of scrap beadboard panels. In fact, you could recycle the scraps cut out from the window and door openings to make the window and door framing.

The one thing I might do different on a house would be to push the beadboard panels all the way to the outside of the wall and stucco the edge to make a six-inch wide "picture frame" around each window, instead of bringing the stonework all the way in as we did for the workshop in the video. Optionally, the beadboard could be trimmed down to make a more narrow frame.

Sincerely,

Thomas J. Elpel

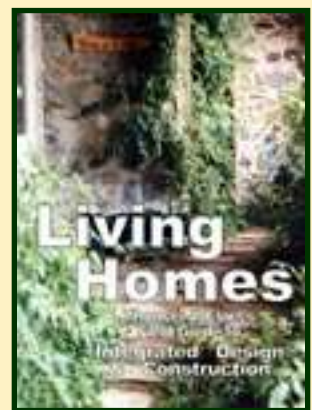
Can we slipform a veneer of stone against our house upon an angle bracket?

Hi,

*I recently purchased your **Living Homes** book and have found that I agree with nearly all of the things you say. (I would say all, but I don't agree with anyone that much) My husband (he is much more conventional than I am) and I are planning to build a new house this year. I have managed to talk him into building to last instead of putting a double-wide on a basement.*

We are planning to use the foam concrete forms for the basement and walls, he thinks that vinyl siding is the way to go, but I would like to use field stone on the outside of the walls.

My question is this; could we use the slipform method and tie into the existing wall with angle brackets? I think a stone house would look absolutely wonderful, and I don't want to mess with replacing the siding that blows off. Please let me know what you think, and



thank you for taking the time to answer.

Karen

Karen,

The foam concrete forms, though pricey, are a really nice way to go, and quite energy efficient. Yes, you can bolt a heavy piece of angle iron to the wall and go up on top of that with a veneer of stonework. You don't need forms for it, just some flat rocks 3 to 4 inches thick, plus some mortar a trowel and a little patience. It is not what I would call real stonework since it is only a veneer attached to the wall. Realistically, the vinyl siding should hold up just as well as the veneer. Not that I would choose vinyl siding for any of my projects, but yes, it is pretty good stuff, and you would be attaching it to a great wall system. Sorry, that probably isn't what you want to hear!

I guess my thought is that when you choose any one element (foam concrete forms and a basement), then it limits your choices for the next element. Hence the vinyl siding might be the better choice than attaching a veneer of stone. In other words, I wouldn't close the door just yet on other approaches besides the foam forms. Try to come at it a bit more holistically, so that you are choosing an entire package, rather than choosing the first step and forcing all subsequent decisions to fit that path. I hope that makes some sense.

If you keep the foam forms, then you might consider a blend of stonework and vinyl. For example, stonework up to the bottom of the first story windows would give the house a nice solid and natural look, while the vinyl the rest of the way up would make the house entirely conventional so that it would fit into any neighborhood.

I hope this helps... please let me know what you come up with.

Sincerely,

Thomas J. Elpel

What can you tell me about traditional Irish stone masonry?

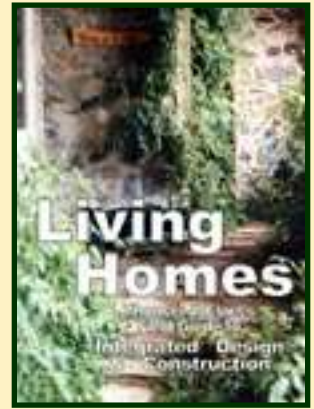
Dear Thomas,

First I would like to thank you regarding your philophy, building knowlege and LOVE of stone masonry.

My sister has given me land in Hillsdale, NY next to her and I would like to build a traditional Irish Stone Cottage/farm house. My nephew Will is to be the Contractor and I will assist (he went to a Traditional Building School/VocTech) as well as a fine crew of

young builders he went to school with.

In Ireland my family has a working Sheep farm (400 acres on the ocean in Goleen, County Cork) which is also an old Irish farm compound. Meaning, once upon a time a couple built a small stone house and then kept adding other sections/houses that are connected, as well as shelter for livestock and then surrounding or connecting stone walls. I miss living in an Irish stone home where the walls are so thick that you feel like you live in a loaf of bread. Well, enough of my home sickness and on to more practical matters.



Here I am, with land and the luck that my sister and brother in law have 80 acres. Now, I know for a fact that nearly all the folks who built stone homes in Ireland did not have money, contractors or Architects! Talk about limited budget, take a look at what remains of the Scalpeens from The Famine!

I will be investigating the slipform method but would like to know if you might suggest any books that cover Traditional Irish Stone masonry methods for home building.

I also will hopefully be having my roof Thatched by Patrick McGee(Master Thatcher from Ireland here in the States. A finely thatched roof has a 75 year life span, is not flammable and just the most beautiful roof a person could have. Anyway, thanks for putting up my tome and I hope we can be in contact. I thank you in advance for answering my query.

Warmest Regards, Phoebe

Phoebe,

I would guess that traditional Irish Stone Masonry was simply stacked very carefully, using shims to fill the voids and level the stones. There was probably a crude mortar between the stones, used more to block air flow through the walls than for strength. The strength of the wall would rest entirely in the skill of laying up the stonework. In other words, I don't really know anything about traditional Irish stone masonry, except that if you needed a house and had rocks but no money, that would be the logical way to proceed.

Insulation in any northern climate would be necessary to minimize or eliminate heating costs. One technique you might consider would be to build the house out of insulation panels, as we did for the little workshop we built, then to rock up the outside without forms. The insulation panels would provide backing for the one side of the wall, while serving as a nice straight guide for the rockwork. You would be able to measure off the insulation panels when placing stones to keep the stonework nice and even. The end effect would be more of a brick-layered effect, like the stonework in our fireplace, shown on the bottom of [this page](#).

Notice how the stonework on that page looks different in that project than in the slipformed walls pictured on the same page. It is a stronger way of doing stonework and uses less concrete. You could still include reinforcing bar too. I realized when building our workshop that with the insulation panels for backing, this formless technique might be just as fast as the slipform method we used. I hope to try it out on a small project sometime soon.

Sincerely,

Thomas J. Elpel

Is there a way to get that "wet-look" to bring out the colors in the stones?

Hello,

I was hoping you could answer a question of mine. We had a natural river stone fireplace built in our house. Is there any way to get that "wet-look" in the stones to bring out that colour that is so obvious when wet?

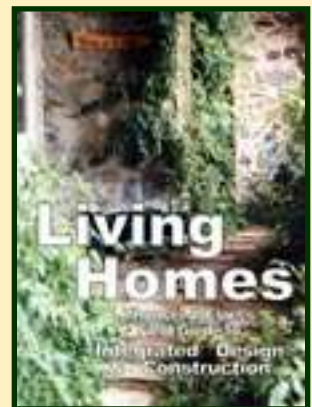
Thanks for your time. Andre

Andre,

I've wondered the same thing. We use an acrylic-based floor sealer on our tile floors, which really brings out the shine, so it seems like it should do the same on stonework. There are many different brand names with different formulas, but all seem to be acrylic-based. (The tile sealer looks like milk when you pour it out then dries clear.) These products are especially intended for porous tiles like terra cotta.

I tried using an acrylic floor finish on some stonework but it turned out disappointingly dull and filmy. So, to better answer your question, I called my local brick, block and tile shop to ask for advice. They suggested the same thing: use an acrylic floor sealer (Brickyards use brand names and may not know what's inside the bottle, but they will describe it as a "water-based sealer.") So that didn't really answer the question. I guess you could try applying some acrylic-based floor finish to a small area of stonework that is not easily visible. I would leave it for a few months to see if it dulls out over time. If it looks shiny and stays shiny, then you could do the whole fireplace.

Otherwise, I am guessing that a polyurethane-based product might be more effective at creating and keeping the wet look. I don't have much firsthand experience with polyurethane, but the woodwork I have seen treated that way seems to stay beautiful



forever. So you might look for a clear polyurethane that could be used on stone or masonry. And again, test a small area out-of-sight before committing to doing the whole fireplace that way.

Good Luck!

Sincerely,

Thomas J. Elpel

Is it feasible to build a three-tiered tower with slipform stone masonry?

Dear Thomas,

I have recently purchased your video and book on slipform masonry. I also have acquired some land in the Mount Shasta area, CA. I have dreamt about building a mountain retreat with an old castle style . . . cheaply. Slipform sounds great and the project of a lifetime!

If you have time, a quick question. I am going to (would like to) build a small home, but much like a tower. I am attaching a picture in a word file of what I am thinking about. I will consult an architect, and an engineer for feasibility but before I do that, I would like to know your opinion . . . can this be done with slipform?

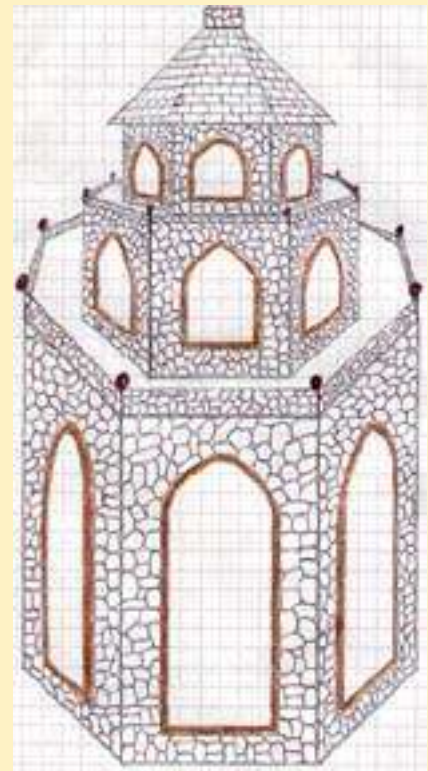
Thank you for your thoughts

-Oliver Davidian

Oliver,

Thanks for writing and sharing a little about your Dream. Unfortunately, there is one serious obstacle to overcome to make this Dream a reality: there doesn't seem to be anything supporting the walls of the upper floors. Even if the roof of the lower levels were poured of concrete and heavily reinforced, you cannot just float the walls of the upper levels out on top of the concrete slab. The weight is immense. The upper walls must be supported all the way to the ground. Of course, the other problem is that if you brought the walls all the way down inside, then there would be no open space left inside the lower levels. Sorry I don't have better news!

Sincerely,



Thomas J. Elpel

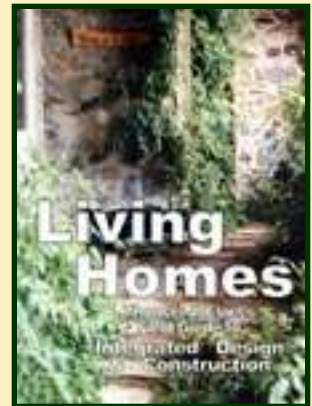
Would it be affordable to build a stone castle?

Hi,

I came across your site just after poking through many other useless ones and thought maybe you would be the one to help me. I don't know if there's a word to describe myself, but, I'm not one for the old box style, typical commercial homes with 2x4's and Aluminum siding.. I like big spaces, large rooms and such that I can explore and such. I know I'd never be a millionaire so to get a big mansion in the richy part of town would be out of the question. However, I have always wondered if I could take natural materials around me and build my own monstrosity somewhere private..

I've always been partial to medieval history... Castles with towers and drawbridges and such.. I live on the east coast of Newfoundland Canada just outside of St. John's, and if you know what it's like here, you'd know that it's sorta close to Ireland or Scotland; geography wise; with endless Rocky cliffs and such stretching along the coast.

What I want to do is probably outrageous.. But, if I could purchase some parcel of land on top of a coastal cliff, could I afford the cost of building a substantially large Stone structure castle?.. Do these projects get costly. Like into the \$500,000 range?



Sorry if this is so vague, I'm writing this at a very late time. I have so many ideas and questions floating around in my head, and I really want to do this project with the least amount of money involved.. I really don't want to hire labours either. I'd rather build on my own, even if it would take the time to study masonry and bricklaying and what ever other course would need to be taken.. And if you know what weather is like here in Newfoundland..

Can you tell me if building a structure like this can really last a long time here?

Cory

Cory,

Sounds ambitious! Our early house plans looked more like a small castle, but it evolved to become much more house-like by the time we started building.

Yes, you can build your own castle, although from your description it sounds like a life-time project. If properly built it would certainly last for centuries and would likely become a

famous landmark, "Cory's Castle".

Cost is mostly a function of design. You can make a structure about as cheap or expensive as you want it to be. That is one of the key points in my book *Living Homes*, designing a building to meet your criteria for cost and energy efficiency.

I hope this helps!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction](#).

See also [Stone Masonry Construction Overview and Books](#)

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Tilt-Up Stone Masonry Questions

with replies by Thomas J. Elpel

Note: My article *A Stone House in Two Weeks* was featured in the January 2003 issue of Fine Homebuilding magazine. An expanded version of the article is available on our website under the title Tilt-Up Stone Masonry: A Technological Lift to the Ancient Art of Stone Work



Questions:

- Is tilt-up construction practical for a novice builder on a limited budget?

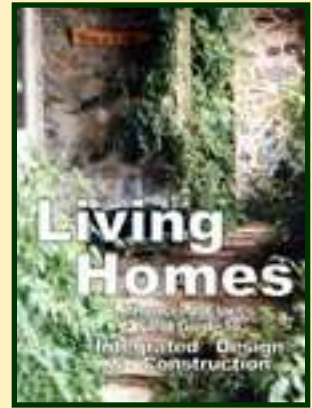
Questions Policy: To avoid re-writing my book Living Homes for every person that comes along, please read the book before you write to me. Then, if you have any questions beyond what is presented in the text, then yes, please do write and ask away! I may be a little slow to answer, since I have more than a few distractions, but I will get back to you in time, and I will answer your question to the best of my abilities. Please let me know if I can post your letter and first name to the website. Thanks!

Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our E-mail Contact Page, and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

Is tilt-up construction practical for a novice builder on a limited budget?

Dear Mr. Elpel,

I really enjoyed your Dec. 2002/Jan 2003 article in 'Fine Homebuilding' entitled "A Stone House In Two Weeks". Ever since my wife showed me that article, I have been somewhat enthralled by the beauty of the tilt-up system. It seems so much simpler than stacking stones one on another, and I am considering this technique for a combination recording studio/home that I will be building this spring and summer. I am wondering if there is any further documentation I might access about Nick's experience, and about Tilt-up construction (small scale) in general.



One particular issue I am wrestling with, is the Stone/Concrete ratio. The land I own came with piles upon piles of field stones, that I would like to put to use, especially If it would save me money on concrete. I am definitely going for a maximum 'bang-for-buck', as I have a very limited budget.

In the article, Nick used his flat Montana stones as a face. My stones are of every shape and size. If I make 7 1/4" thick walls, as Nick did, I am wondering if I should limit the size stones that I use. On the other hand, concrete costs money (though at 7 1/4" not so much) and of course, the stones are free. I am not sure how this would affect the strength of the walls in terms of being able to tilt them up, or how to determine these variables, or how tall/wide it is feasible to make the walls in one piece. The building I am trying to design is 30'x50' and two stories on half of that. If I decide that I can afford to, I may increase the size. I also wonder what sort of problems to expect in obtaining a building permit for this type of structure.

I would like to know more about the house Nick built: how much did it end up costing?; what were the final dimensions?; what is the square footage of the house?; what was the layout like? (it looks like there is a second floor --at least on part); what size crane did he use?; what did that cost? Any information you would provide would be much appreciated. I have called for a copy of Dayton/Richmond's Tilt-up Construction Handbook.

I don't have much building experience, but I have a couple friends who are going to help: one is a carpenter, and the other does concrete work (though he has never done tilt-up work). I guess I thought that if I was dedicated enough to the project, did my research, followed the Tilt-up handbook, asked questions, and if I was careful and calculating, that I could probably make it happen.

I have already arranged for a leave of absence from my job, starting a month from today, and lasting at least until the fall. Building this House/Studio is to be my job for most of this year. My wife and I own the property outright, and live on it in an old mobile home, that we bought for \$2000. We borrowed \$40,000 total, and paid it off over the last 5 years. Our plan was to pay it off at that accelerated pace, and then to build, hopefully making use of our 'many piles of stones'. The mobile home is drafty, and we hope to be out of it one way or another by this winter.

I like your philosophy. It sings to me. I would like to get free of debt (again after building -- we are essentially debt free now --not even a car payment), and then to live simply, making music and money in my studio --though not for 40+ hours a week, unless I'm enjoying myself that much.

Thank you so much for the article. I'm really hoping I can use this technique.

Mark

Mark,

Thanks for writing. For structural purposes during lifting, the tilt-up stone wall should be mostly concrete and rebar, with smaller rocks for stone-facing. The biggest panels in Nick's place were 24 feet wide by about 20 feet tall, but these were not square panels, since the upper story was sloped for the roof. The approximate dimensions of the house are 28 x 38 on the ground floor. (The house is more than 24 feet wide because Nick used conventional concrete forms on the back of the house where it is completely built into the hill.) I'll have to check those measurements some time.

As for time, let me say that the title given to the *Fine Homebuilding* article was misleading, since it took Nick just two weeks to form, set stones, and pour the walls on the ground. It took about three years to build the house, and as yet he hasn't finished the kitchen.

Cost-wise, if you are looking for a cheap way to build, this isn't it. Tilt-up demands a higher concrete-to-stone ratio and more reinforcing bar than slipform stone masonry. Add in the specialized hardware and the high cost of renting a crane, and you could easily add \$10,000 to the project cost, compared to doing a slipform stone wall. Granted, *tilt-up is much faster*, and you might be able to save a comparable amount if you are hiring help. But keep in mind that tilt-up work is potentially very dangerous, and someone could be pancaked if a failure occurred when lifting the panels, so this isn't a project you where you want to skimp on materials.

However, there are additional hidden costs that might not be as obvious when comparing the two types of construction. For example, the tilt-up stone walls required wood frame walls inside the house to accommodate the insulation and to provide a means of attaching sheetrock. Basically, this means building a wood house inside of a stone house.

We demonstrated a way to eliminate the need for this redundancy in our video [**The Art of Slipform Stone Masonry**](#) by building a workshop out of insulated building panels first, without any wood framing. The insulation panels served as forms on the inside of the structure, and holes were drilled into the panels to allow the concrete to grab it with "finger-holds" for a permanent bond. Then we did the stonework up the outside.

Finally, let me emphasize that tilt-up construction is not for beginners. I don't normally recommend it to first-time builders, but in your case, you may be able to pull it off, since you have friends with professional carpentry and concrete experience. I suppose it depends on their ability to accurately measure, build and pour--or to guide you in that respect. Keep in mind that if something goes wrong, you could have some very expensive slabs of concrete and rock sitting there where your house should be.

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction](#).

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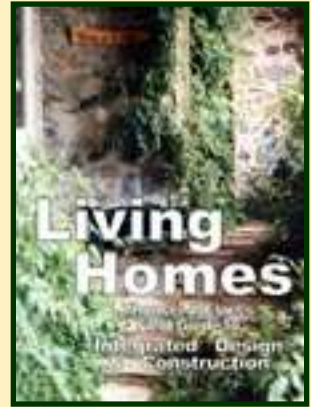
Questions about Fireplaces, Masonry Stoves, and Chimneys

with replies by Thomas J. Elpel

Questions:

- [How do I construct the inside of a chimney?](#)

Questions Policy: To avoid re-writing my book [Living Homes](#) for every person that comes along, please read the book before you write to me. Then, if you have any questions beyond what is presented in the text, then yes, please do write and ask away! I may be a little slow to answer, since I have more than a few distractions, but I will get back to you in time, and I will answer your question to the best of my abilities. Please let me know if I can post your letter and first name to the website. Thanks!



Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our [E-mail Contact Page](#), and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

How do I construct the inside of a chimney?

Tom,

I am building a log cabin fitted with a cobblestone chimney. I don't have any idea of how to construct the inside of the chimney. I know that I will lay stone atop fire brick but what do I need to do to construct the innards of the flue? Do you have any resources for me or any websites that might help me?

Thanks much,

Rob

Rob,

I've built three chimneys by three somewhat different methods, but the construction of the flue is the one thing all of them have in common. The chimney pictured here is the most conventional of the three. We helped my in-laws build this one in their log house. The chimney is nearly forty feet tall from the basement to the top of the chimney above the roof. There is a wood stove in the basement, as well as the stove shown here on the main floor, before construction of the hearth. Each stove should have a separate chimney flue to draft properly, so there are two separate flues built into this chimney.

In a nutshell, the flue of the chimney is made with ceramic flue tile. Ask at your local brickyard for ceramic chimney flue. It is available in several sizes. The ceramic flue tile expands and contracts as it heats and cools, so it should have space around it for that. The air space also helps to protect the rest of the chimney and the house from the heat of a chimney fire caused by soot build-up in the flue.

In a conventional chimney like this one, the chimney is built out of specialized cinderblocks that leave an air gap of about half an inch around the ceramic flue. The cinderblocks are mortared together at the same time as the ceramic flue, so the inside and the outside of the chimney goes up layer by layer. Corrugated metal tabs are mortared between the cinderblocks, such that they stick out of the chimney. Later, when you come back to finish the outside, the metal tabs are mortared into the joints between the stones. This chimney was faced with uncut fieldstones, mortared in place without forms.

One problem with the cinderblock method of chimney construction is that the chimney becomes very large by the time you lay up the ceramic flue tiles, cinderblocks, and the stone facing. A large chimney takes up more space and conducts more heat out of the house through the mortar, even when not in use.

However, you can eliminate the cinderblocks to mortar the stonework right around the flue, as long as you leave some kind of gap around the flue. (Local codes may vary.) One easy way to do that is to wrap the ceramic flue with fiberglass insulation as you go up. Then do your stone work up around that, being careful not to compress the fiberglass insulation too much. It is okay to compress the insulation somewhat, just so there is still some room for the flue to expand. The other two chimneys we built were both done with this technique. The difference between them was that I used slipforms to guide the



stonework on one chimney, while the other one was mortared up with brick-like rocks without forms.

We carry three books that include building your own stone fireplace and chimney. **Building with Stone** by Charles McRaven covers the topic pretty well, but the fireplace designs are not energy efficient. **The Stonebuilder's Primer** by Charles Long covers the same kind of material, but in a completely different way, such that it might take both books to get a comprehensive outline of the process. My book, **Living Homes: Integrated Design & Construction**, barely covers chimney construction, but goes into depth on building energy-efficient masonry fireplaces.

Sincerely,

Thomas J. Elpel



Check out **Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction**.

See also **Strawbale Construction Overview and Books**
and **More Strawbale Construction Books**

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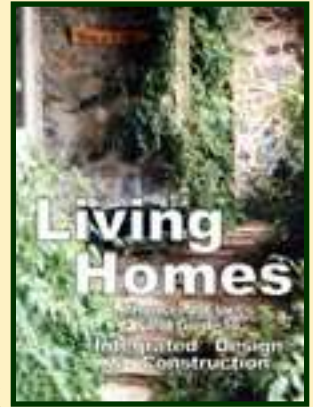
Questions about Log Home Construction

with replies by Thomas J. Elpel

Questions:

- [Can I build a log house out of juniper?](#)

Questions Policy: To avoid re-writing my book [Living Homes](#) for every person that comes along, please read the book before you write to me. Then, if you have any questions beyond what is presented in the text, then yes, please do write and ask away! I may be a little slow to answer, since I have more than a few distractions, but I will get back to you in time, and I will answer your question to the best of my abilities. Please let me know if I can post your letter and first name to the website. Thanks!



Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our [E-mail Contact Page](#), and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

Can I build a log house out of juniper?

Hi,

I have 3 questions I hope that you can answer:

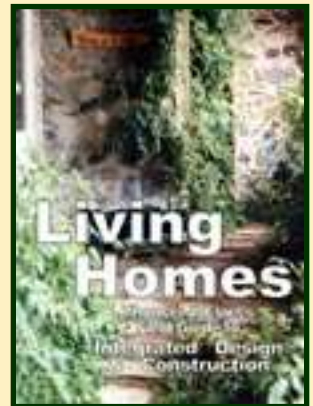
- 1. How easy/hard is it to replace a log that is damaged or decays over time?*
- 2. Is juniper/mountain cedar an acceptable wood/tree?*
- 3. Should green wood been used, or should it be left to dry?*

Stephen

Stephen,

Thanks for your letter. I've never replaced a damaged or decayed log, but I know that it happens a lot, especially on old log cabins with minimal foundations, or in damp environments where the water from the roof splashes off the ground onto the lower logs. I don't think it would be that difficult to do with some car jacks and some careful work.

You ask if juniper/mountain cedar (probably *Juniperus spp.*) would be a good wood to



work with. From a decay-resistant standpoint, the answer is definitely "Yes!". Junipers, cedars and redwoods are all highly resistant to decay. Juniper has often been used for fence posts because it can be placed right in the dirt for an amazingly long time before it rots. On a proper foundation it would seem to last forever.

The challenge would be to find any juniper straight enough and large enough in diameter to work with. And if you find junipers with a big enough base, the tops might taper too much too soon to bother with. You may have to design a house where the longest logs are 8 to 12 feet long.

You might want to research "**cordwood construction**" where the logs are cut into firewood lengths and stacked like firewood, but with mortar to fill the spaces in between, kind of like a stone wall made with logs.

Cordwood construction would also help to emphasize the great beauty of the juniper when cut in cross-section. It would be worthwhile to put a protective sealer on the outside ends of the juniper to prevent the colors from graying over.

Yes, you can use green wood for log home construction, at least for the butt-joint method we use, but it is preferable to let the logs season ("dry") first. You should definitely season the wood fully before building cordwood-style, or the wood will shrink away from the mortar.

I hope this helps!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction](#).

See also [Log Home Construction Overview and Books](#)

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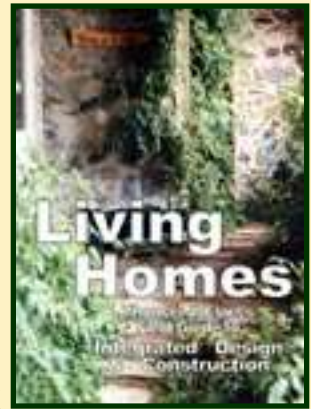
Strawbale Questions

with replies by Thomas J. Elpel

Questions:

- Which is the best strawbale construction book?

Questions Policy: To avoid re-writing my book Living Homes for every person that comes along, please read the book before you write to me. Then, if you have any questions beyond what is presented in the text, then yes, please do write and ask away! I may be a little slow to answer, since I have more than a few distractions, but I will get back to you in time, and I will answer your question to the best of my abilities. Please let me know if I can post your letter and first name to the website. Thanks!

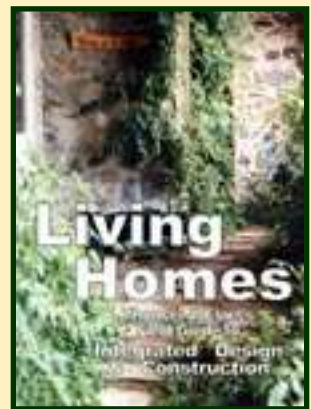


Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our E-mail Contact Page, and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

Which is the best strawbale construction book?

Thomas,

I have read your book called Living homes. It has a lot of good information in it. My question is: in your opinion, which book about Strawbale building has the best information in it to build a Strawbale home, that is non-load bearing. Also, what is your advice about the best (and cheapest) foundation for Strawbale, and would timber framing or lumber framing be cheaper and more economical? I was thinking that a slab on grade would be the best and most affordable choice for the foundation, and timber framing to support the house. The house I'm planning is approximately 1400 square feet on 2 stories.



Thanks,

Aron

Aron,

[Serious Straw Bale](#) is probably the single most comprehensive strawbale construction book on the market. Coverage includes load bearing and non-load bearing structures. There is some mention of timber frame construction for non-load bearing strawbale structures, but the emphasis is primarily on wood-frame buildings with the bales inserted vertically between the studs.

The "best and cheapest" foundation and framing systems for your project depend partly on where you live and what you have available. If you are building near soggy Portland, Oregon as your mailing address suggests, then you probably don't want a basement, and you definitely want to get the bales up off the ground a bit. You might consider a short stemwall of stone (two stone walls with foam insulation sandwiched in the middle, as illustrated in *Living Homes*) to help get the bales up a little higher. Alternatively, a stemwall of cinderblock with insulation sandwiched in the core might be easier and more practical if you are just going to stucco over all of it anyway. To raise the floor up for better drainage, you might consider a "raised slab". Build the foundation/stem wall first, then raise the floor area with gravel before pouring the slab.

The framing system I would use for a non-load bearing strawbale house would be logs pinned together with rebar, much the way it is described in the log construction chapter of *Living Homes*. It is kind of like timber frame construction, but without the precise joinery work, which is a bit beyond my carpentry skills or patience. If you have access to a supply of logs at low cost, then you might seriously consider this approach. Otherwise, building studwalls and putting bales between the walls, as demonstrated in *Serious Straw Bale*, might be a good way to go. Although the wood framing is not cheap, at least it is easy to learn.

Don't take my advice as the best or last word for your project. Hopefully it will give you some more ideas to think about, and maybe you will come up with a system that is even better.

Please keep me informed of your progress!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

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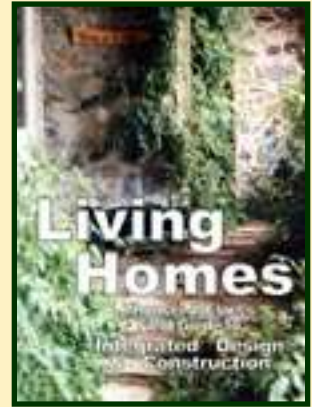
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Home Heating, Insulation & Energy Efficiency Questions

with replies by Thomas J. Elpel

Questions:

- Which heating method should we choose?
- Does thermal mass work for heat storage where limited solar energy is available?



Questions Policy: To avoid re-writing my book Living Homes for every person that comes along, please read the book before you write to me. Then, if you have any questions beyond what is presented in the text, then yes, please do write and ask away! I may be a little slow to answer, since I have more than a few distractions, but I will get back to you in time, and I will answer your question to the best of my abilities. Please let me know if I can post your letter and first name to the website. Thanks!

Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our E-mail Contact Page, and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

Which heating method should we choose?

Hi,

I have a question about heating. In building my home I have been considering the following options to heat it.

- 1) Using radiant slab heating*
- 2) Using a 72,000 BTU/Hr Fuel Oil Furnace (have already)*
- 3) Using a Warm Morning Wood Stove (also have this already).*

The main concern my wife has with the radiant slab is the fact that we cannot have carpeting in the house. The reason I say this is that everything I read about this wonderful heating device requires a "bare floor" of some type. My wife likes to have carpeting if possible.

I have the Fuel oil furnace and the wood stove already and they would heat the home just fine I believe. I can use both if I needed to. I don't have any real house plans drawn up yet, so anything is possible. I am just wondering how the floor would feel and if the carpeting is worth the trade off.

I also hope to have the south side of the house set up to use solar heating if possible. I am sure that this would also mandate the use of no carpeting on the floor as well. So much to consider and plan on.

Thank you for your time.

Steven

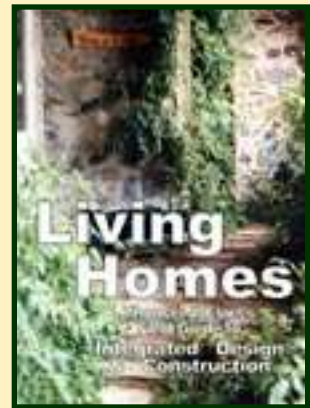
Steven,

The most important part is to make sure the rest of the house is very well insulated. We have an uninsulated slab with masonry tiles in our house (and no radiant tubing). The floor used to be very cold, until we better insulated other parts of the house. Now the floor is still mildly cool, but not bothersome at all. It is kind of like putting a hat on your head to warm your feet. Emphasize the insulation aspect everywhere else, and the floor will take care of itself.

Keep in mind that you wouldn't want carpet in the kitchen and dining areas anyway, so you might install masonry floors there and place these rooms in the house where they would get optimal solar exposure.

As for a heat source, would it be possible to install both the wood stove and the oil furnace? The cost should be low, since you have them both already. If you have access to cheap firewood, then it would be nice to use the stove. But it would also be handy to have the oil furnace for the various occasions when you would not be able to use the woodstove, such as when you are away on vacation, don't have time to get wood, or want to sell the house. You might also need the oil furnace for insurance purposes. Just be sure to install both of them in such a way that they could be replaced with later models if and when the need arises. You might be also be able to install some kind of ducting under the floor for the furnace.

Sincerely,



Thomas J. Elpel

Does thermal mass work for heat storage where limited solar energy is available?

Hello, Tom:

You may recall I wrote you last Fall regarding building a house outside of Helena. As building season approaches I have some fundamental design concerns upon which I would highly value your opinion.

We planned to incorporate a large amount of thermal mass in the form of concrete walls and slab. However, I have heard that such designs are not energy efficient where, as here in Western Montana, there can be very little solar energy available during the heating season. My main concern is whether to insulate the concrete walls on the inside or the outside. Some builders claim that insulating the outside would not be efficient because I would have to generate so much energy to heat the mass. What are your thoughts?

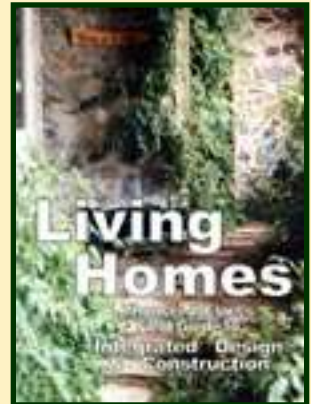
Thank you, Kurt

Kurt,

Thermal mass always helps to store heat, although it definitely works best when there is incoming heat to store. In a cloudy place you wouldn't get much use out of thermal mass for storing sunshine, but it would be helpful in the form of a wood-burning stove to reduce temperature swings (too hot when the fire is going/too cold when the fire is out). Helena, however, is very sunny, though some winters are more cloudy than others. On average, Helena gets a tremendous amount of sunshine in winter, and it would be very worthwhile to capture all that you can in thermal mass.

Even concrete walls without any solar exposure are useful as thermal mass, so yes, I would recommend putting the insulation on the outside of the wall. The walls will absorb heat from the air when it is available in surplus, and gradually discharge it when the air is cooler. A house without any notable thermal mass will only be able to store heat in the air, and that's not very much.

As you may know from reading *Living Homes*, we heat our house with a masonry fireplace about once a week on average through the winter. The thermal mass radiates heat for about three days, and the house gradually cools off over the course of the week. On sunny days we pick up enough solar gain each day to offset the loss of heat during the same 24 hour period. Thus we light the fireplace less than once a week during sunny



spells, but more than once a week during extended cloudy weather.

I hope this helps!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction.](#)

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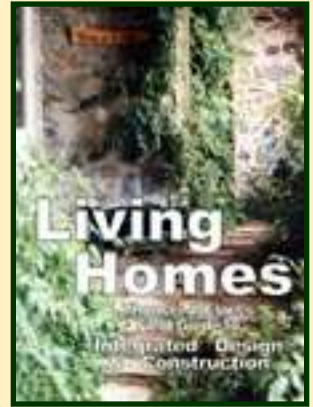
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Questions about Roofing Options with replies by Thomas J. Elpel

Questions:

- Is a living roof worth the extra cost?

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Also, if you have a better answer to a question than I do, or additional useful information, then please send me a note through our E-mail Contact Page, and I'll add your commentary to the web page. Questions and answers on these pages will help guide revisions of future editions of *Living Homes*.

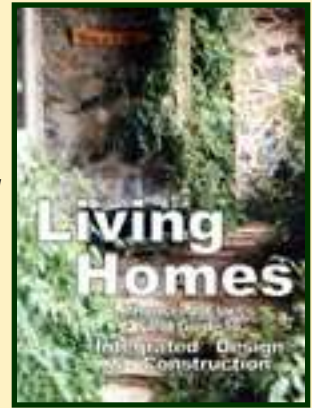
Is a living roof worth the extra cost?

Dear Tom,

I recently purchased your book "Living Homes" after finding your website several weeks ago. I'm really into it. My wife and I have been, on and off, designing our home for the last couple of years, and the knowledge in your book is a great addition. We now plan to use slipform techniques to make a passive solar house, and eventually live off the grid.

I do have one question. We researched the whole concept of underground homes and living roofs some time ago and determined that the extra cost in reinforcement for the roof would probably be beyond our means when the time came to start slinging cement. Recently I have sort of rekindled my interest in the living roof concept and have read some sources which describe a living roof which is not as great in depth as those described in the books published in the early 80s.

I'm still not sure if its a good idea, however. One source quotes that one inch of insulation equals about 25 inches of soil in terms of R value. If I were to construct a living roof I would probably layer insulation under the dirt anyway, so that isn't really an issue. My main question is, 'Are there any real benefits to such a roof?' I have emailed several sources and read up on it, but it seems that I really just find answers from those who would rather promote this mode of building instead of those with a no nonsense delivery. From reading your book, I gather that you may fall into the "no nonsense" category.



So, in your building travels, have you seen any living roofs that where worth the extra cost? I also am interested in learning if such a roof is really feasible in an area with high snow fall. I live in the shadow of the Tug Hill in Northern New York, where we are purported to have the highest snowfall in the east (while shoveling my driveway, I would tend to agree). Some sources may contend that a living roof's thermal mass may tend to lessen the overall snow load on a roof. But I'm not sure if I buy it. Any thoughts on the matter?

Sincerely,

Adam

Adam,

I think that living roofs are awesome and often aesthetically very pleasing, but I don't yet see much practical or economical justification of them. Here in the arid West a living roof would require frequent watering, at least to get some growth established, and thicker soil depth to keep from drying out so fast. A living roof can also be a fire hazard here in this part of the country, because it would exist as a dry field of grass on top of the house for nine or ten months of the year. The greatest advantage to a living roof out here would be to help make a house visually disappear where it would otherwise be an eyesore on the open plains.

Obviously your situation is much different in the Northeast. There is enough moisture to keep a living roof green throughout the growing season, and you don't need a lot of soil to hold the water. I understand that there are thin living roof mats that can be purchased and rolled out into place. (See www.roofmeadow.com for more information.) All you need is water to make them grow. In a high rainfall area it may even be advantageous to use a living roof to utilize more of the rain water, rather than having it flood off the house, when there is already more than enough on the ground. But economically, a living roof is certainly no less expensive than a conventional roof and probably would cost more.

As far as insulation goes, there would be a slight gain in R-value from the dirt and organic matter, but probably not enough to justify the extra expense. However, the added

insulation value of snow should be considered. Most houses, including mine, have fiberglass or cellulose insulation in the roof, with air circulating over the insulation to dry it out. Snow would have a tremendous insulative value on top of an already-insulated building, but the value is lost because of the air gap. In other words, you could have a free, extra layer of insulation on the house every winter when you need it most, just by building a roof with some type of rigid-board insulation that needs no venting. This is the same type of roof system that would usually be used as a base for a living roof anyway.

On the other hand, I would definitely be concerned about the snow load in your area, and either build your house strong enough to support the heaviest possible snow load in, or build with a steep roof pitch and slick metal roofing to get the weight off the house as quickly as possible, directing it away from the driveway and sidewalks, of course.

As for the advantage of using the thermal mass of a living roof to lessen the snowload, there is none. Thermal mass is the ability to absorb heat from the air when the air is warm and to release it when the air is cooler. It would have no impact on the snow load.

I hope this helps!

Sincerely,

Thomas J. Elpel



Check out [Living Homes: Thomas J. Elpel's Field Guide to Integrated Design and Construction](#).

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**Thomas J. Elpel's
Hollowtop Outdoor Primitive School, LLC**

About HOPS

Hollowtop Outdoor Primitive School, LLC (HOPS) is a school of Primitive and Contemporary Living Skills. Humankind has had the same basic needs since the beginning of time for such things as mental and physical well-being, shelter, fire, water, and food. These were our basic needs when we lived as hunter-gatherers in the stone age, and these will continue to be our basic needs even into the future of the space age. Our needs are always the same; it is only our means of meeting those needs that changes.



The purpose of our Primitive Living Skills programs is to provide an opportunity for the individual to step back from this complex culture and get a sense of grounding and perspective. Primitive living is life on a model scale. Living with stone-age knowledge and technologies is a sort of metaphor of living that people can participate in and act out. We all have the same basic needs, and in primitive living we go on an expedition to meet those needs with little more than our bare hands. In our quest we learn to observe, to think, and to reach inside ourselves for new resources for dealing with challenging and unfamiliar situations. The lessons we learn in primitive living helps us to live more resourcefully in contemporary society.

The purpose of our Contemporary Living Skills programs is to help people discover resourceful new ways of meeting their needs in the modern world. Our programs are born, in part, from the necessity of meeting our own

living needs, and in a larger part, from the necessity for ourselves and others to meet those needs by means which are environmentally sound. What we have learned for ourselves and what we now teach is that living in an environmentally sensitive way pays off. Working with and through nature is the path to economic prosperity. We want to help other people to come closer to nature and find their own prosperity and abundance.

Classes at HOPS are taught mostly by Thomas and Renee in subjects ranging from the very primitive, such as ancient tools and skills, to the contemporary, such as stone masonry or strawbale construction methods. In all of our classes we seek to offer a solutions-oriented mind-set, enabling the individual to define and achieve their own goals.

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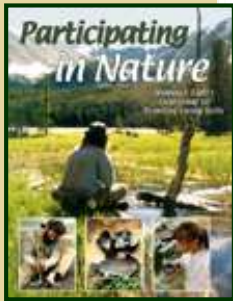
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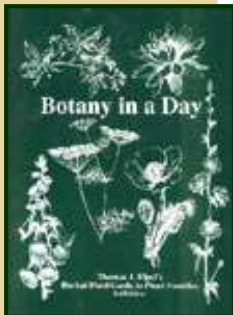
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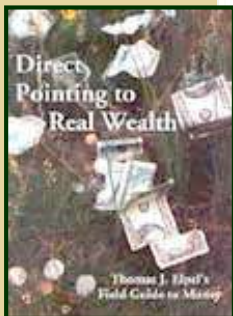
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I want to say thank you for the information on your website and in your books. Coming into contact with your ideas started me off on a path that has radically changed the way I am living my life. I feel that I am at a much better place in my life now than before I was exposed to your thinking. I have spent a lot of time on your website and I own three of your books (Participating in Nature, Botany in a Day, and Living Homes). Thank you very, very much.

*--David J.
Summerville, South Carolina
(used with permission)*

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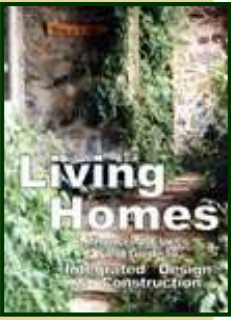
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February, 1999

The Food Insects Newsletter (FINL) is now a bona fide charitable [501(c)(3)] organization according to the U.S.A. Federal Internal Revenue Service (IRS) and a not-for-profit Montana corporation. This provides tax deductibility, both State and Federal, up to the limit of the tax rules for your individual tax situation, for charitable gifts to the FINL for donors living in the U.S.A. Donors living outside the borders of the U.S.A. will have to discover the tax deductibility of donations according to their own situation. Generally, annual subscription fees should not be considered a tax-deductible item.

Florence and I (her husband) now have a very positive outlook for the long-term viability of the FINL as a result of this IRS ruling. We have been through a long and expensive process to achieve this status. We have re-dedicated ourselves to catching up on long overdue work. For example, I have not deposited subscribers checks for more than nine months unless the check was paying for back issues. I will find a number of you in my stack of "to do's" who are waiting for the ordered issues to arrive. I promise all subscribers that I will be "current" by mid-March 1999 and that I will stay current thereafter.

We are also far behind in publications and mailings. The last issue published was Volume 10, Number 2 (July 1997) which has been mailed to subscribers living in the U.S.A. but not to subscribers outside the borders of the U.S.A. (because I have not deposited checks for a while, our current cash balance is low, but that is why I am now depositing all checks I have in-hand). The "non-domestic" mailing of Volume 10, Number 2, will be made by the middle of March 1999.

Because of financial considerations (lawyers' and accountant's fees used up a lot of publication and mailing funds), Florence and I are planning to publish a "mega issue" and have it in the mail by early July (1999!). With this mega issue, we will consider ourselves as being up-to-date and will then return to three annual issues, the first being November 1999. One big boost to the return to financial viability is the promise of a \$1,000 donation by a Foundation in California whose Board members wish the FINL to continue its valuable work. We are very grateful for this financial support.

If you have any questions, any suggestions, or wish to communicate any concerns, please let us know. Please e-mail me at diggs@montana.campuscwix.net or write to or e-

mail Florence at one of the addresses on the top of this page. The FAX number prints a FAX at our home. Thank you all for your patience and support.

Sincerely yours,

Robert E. (Bob) Diggs, Assistant Editor,
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How much is one good idea worth to you?

The Food Insects Newsletter is currently operating on borrowed funds.
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Fried Grasshoppers: For Campouts or at Home

March 1998. Volume 11, Issue #1.

**by Charles Griffith, M.S. Retired Clinical Psychologist; Private Consultant. Ozark,
Arkansas 72949-8810**

Editor's note: The following was sent to us as a Letter to the Editor. We thought many of you would be interested in Mr. Griffith's insights and so are including his entire communication unedited.

Having been an edible wild plant enthusiast for years, my wife and I taught classes on the subject at both Yellowstone Park where we worked for three summers in the mid-eighties and in Colorado. Our most recent classes (three successive summers) have been under the auspices of the Colorado Mountain College Rendezvous (a re-enactment of the trappers' rendezvous that were held in the Rocky Mountains between 1810 and] 840). These events are held each summer in August, usually in one of the National Forests near Fairplay, Colorado, and sponsored by the Colorado Black Powder Association.

Often students want to know if one can survive on wild edible plants alone in an emergency situation. Since I have never attempted a survival experiment, I have not been able to definitively answer that question, but the more I think about the question the more inclined I am to believe that more protein and fat would need to be a part of a survival diet and thus plants alone would probably not be enough--especially in the Rocky Mountain west where even Euell Gibbons found meager pickings. Plants might sustain someone in the short run a few days or a week or two at most, but it seems that some harvest from the animal kingdom would eventually have to be a part of the survival diet mix unless lots of nuts were available (sorry about that, vegetarians).

In almost all of Gibbons' "wild parties" and survival outings, he included items from the "fauna" category such as fish, crayfish and other seafood, frog legs, game fowl, and some outright "varmints," such as an unlucky porcupine he found wandering out in the Colorado wilderness on one of his adventure trips. Although Gibbons never spoke much of hunting game, as such, he certainly seemed to have the knowledge and skill to quickly take advantage of a wandering member of the animal world. Although a porcupine is not a difficult animal to kill, he would probably have to have some knowledge of skinning and dressing the animal.

Recently, we found the recipe in a popular outdoor magazine from the early 1990s. It was a recipe for fried grasshoppers that was so good that we'd like to pass it along. It seems

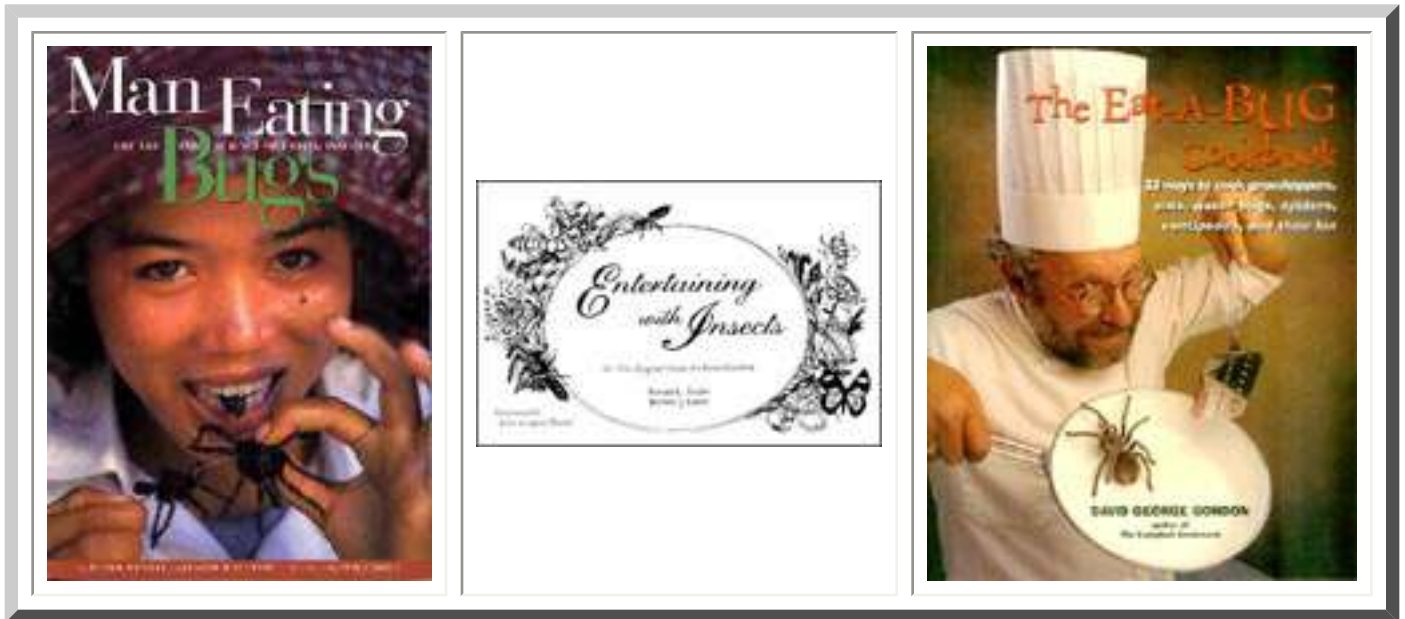
that grasshoppers are plentiful enough that in a pinch, they might be able to provide the protein portion of a survival diet, if a person can get over any "insect as a food" prejudice from which we, too, have been victim. We had been trying to work up to eating an insect for years. Finally, we gave in to grasshoppers. "Pretty good!" And they are certainly plentiful during a large part of the year and fairly easy to catch--another advantage.

First, catch a bunch of grasshoppers and leave them in a jar overnight to purge (if you're finicky). Then boil them for ten minutes, after which you can easily remove the large legs, and wings, too, if they are also large.

Next, in a bowl, beat one or more eggs, depending on how many grasshoppers you have, to which you add the little critters after removing the legs and wings. Then put the beaten-egg-covered "hoppers" in a paper sack or plastic bag which contains some yellow or white cornmeal and shake. Next, place the egg and cornmeal-covered grasshoppers one by-one into a small frying pan with an inch (2.54 cm) of hot cooking oil and fry until golden brown. After cooking, remove the hoppers from the skillet and place them on paper towels - to soak up any excess oil. Our family experimented by eating them plain, and dipped in mustard, catsup, horseradish, or honey. We could have tried lots of other dips, too, I suppose. We liked them best with honey; small wonder, we have heard that the "honey and locusts" that John, the Baptist, ate, was really a mis-translation of "honey and grasshoppers," Can anyone verify that?

Anyway, eating them fried and without any honey or catsup, etc., they tasted something like fried okra. We liked them well enough to have had them several times now. In a survival situation, we suppose one might want to just roast them on a rock next to a fire, unless you have some cookware and oil along. We would be delighted to see more articles or letters about abundant, easy to catch insects, or even more recipes for grasshoppers. We think that in writing "insects as food" articles, it is important to try to describe the taste of the various food items to help people get over their fear of the unknown. Please feel free to contact me: Charles Griffith; 8514 Beulahland Drive, Ozark, AR 72949-8810; phone: 501-667-9820.

Postscript: During this past decade, while the Griffiths were perfecting their fried grasshopper procedures, young son, Joshua was watching his parents. Now, as a 12 year old, Joshua (and his parents) find it quite usual for him and his friends to bring in a handful (or, perhaps, a hat-full) of grasshopper from the prairie where they live, for mom to fry for a tasty snack for them. Yes, many Euro-Americans, contemporaries of Joshua, are growing up with similar attitudes, grasshoppers mean "tasty snack!"



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Man Eating Bugs

The Art and Science of Eating Insects

by Peter Menzel & Faith D'Aluisio

Forward by Tim Cahill



The title *Man Eating Bugs* makes this book sound like a bad movie about over-grown, flesh-eating bugs. The reality, however, is that this is one first-class book documenting the primitive and contemporary traditions of eating insects all around the world.

The color plates featured on every page of this book are simply stunning. With crystal clarity, authors Peter Menzel and Faith D'Aluisio take the reader around the world to witness the bug-eating traditions in places like Peru, Venezuela, South Africa, Botswana, Uganda, Thailand, Cambodia, Indonesia, China, Australia, Japan, Mexico, and even the United States. The text of the book is a narration of the authors' experiences in their world-wide pursuit of entomophagy.

Man Eating Bugs is more like a "coffee table" book than a how-to manual. This text is a tool to alter perceptions and increase awareness about the idea of eating insects as food. Whether the book is intended for yourself, a friend, or a class of students, the reader will be fixated on the photography. You simply cannot open and close this book without broadening your horizons about the world we live in. 1998. 191 pages.

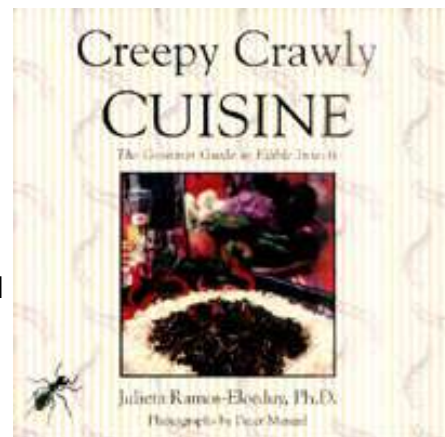
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Creepy Crawly Cuisine

The Gourmet Guide to Edible Insects

by Julieta Ramos-Elorduy, Ph.D.

with photography by Peter Menzel



The most wholesome source of protein on earth cannot be found in any supermarket in the United States, but it can be found right in your backyard! Insects have been a staple of almost every indigenous culture, not only because of their delicious flavor but also because they provide a more complete protein than soy, meat, or fish, and are concentrated sources of calcium, niacin, magnesium, potassium, the B-vitamins, and many other nutrients.

As the world heads for food shortages in the next century, insects can help meet humanity's growing nutritional needs. *Creepy Crawly Cuisine* tells you everything you need to know to make insects a part of your diet. It includes an overview of the use of edible insects by indigenous cultures, information on where to obtain insects and how to store and prepare them, and over 60 gourmet recipes, complete with stunning color photographs, that let you take the cooking of insects to dazzling culinary heights. As practical as it is unique, *Creepy Crawly Cuisine* is the ideal gift for followers of the *Diet for a Small Planet*, adventurous epicures, and cooks who

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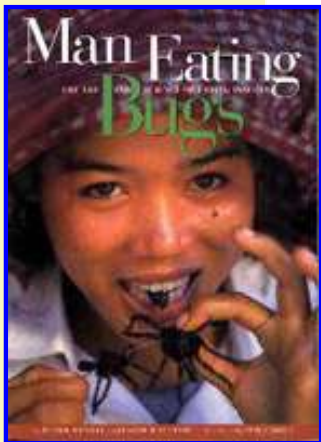
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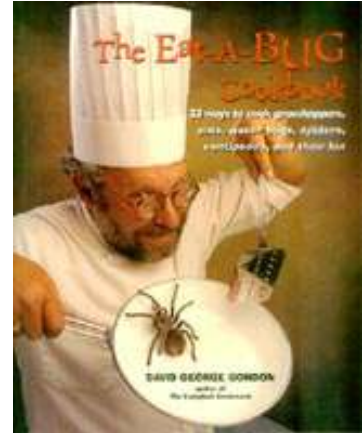
think they have seen it all.. 1998. 150 pages.

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The Eat-A-Bug Cookbook

33 ways to cook grasshoppers, ants, water bugs,
spiders, centipedes, and their kin
by David George Gordon

The *Eat-A-Bug Cookbook* covers a wider range of edible bugs than *Entertaining with Insects* or *Creepy Crawly Cuisine*, including grasshoppers, crickets, ants, termites, cockroaches, water bugs, silkworms, hornworms, spiders, centipedes, dragonflies and moths.



The *Eat-A-Bug Cookbook* also includes current information about where to order all the bugs you could ever eat, plus fascinating trivia some tips on how to harvest your own. On the other hand, the book lacks some of the helpful tips about raising your own bugs, which are included in *Entertaining with Insects*. 1998. 101 pages.

[Order from Amazon.com](#)



Entertaining with Insects

by Ronald L. Taylor & Barbara J. Carter

How do you make lively conversation at a party? Serve insects! *Entertaining with Insects: The Original Guide To Insect Cookery* is the classic book of gourmet insect recipes for every occasion. But more than that, *Entertaining with Insects* includes a directory of commercial sources for edible insects, plus directions on how to raise, clean, and prepare your own. Whether in the city or the country, you can farm your own and impress your friends with tasty treats of **mealworms, crickets, honey bees, wax moths, flour beetles, blow flies, and even earthworms!**

Entertaining with Insects was first published in 1976, but reprinted for the new world of the '90's. 160 pages.

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Questions about the Food Insects Newsletter? Send e-mail to [Robert E. Diggs](#), Assistant Editor.

Comments or problems with the web page? Send e-mail to [Thomas J. Elpel](#), Hollowtop Outdoor Primitive School.

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Food Insect Festivals Of North America

November 1997. Volume 10, Issue #3.

Florence V. Dunkel, Department of Entomology, Montana State University-Bozeman

Who eats insects in the US and Canada? The US Food and Drug Administration (FDA) Approves of Insects in Processed Food up to certain levels. The US Military trains its people to collect wild insects in Survival Situations. Tens of thousands of Americans and Canadians consume insects each year at Insect Festivals.

During the past 10 years, 1988 through 1997, the editors and contributors to The Food Insect Newsletter have chronicled a steadily rising interest in entomophagy in the U.S.A. and Canada. We have noted the increase in space and time devoted to food insects in the newspapers, magazines, radio, and TV. In the past year, we documented a rise in the . publication of books on food insects, photography books, cookbooks, and others for the general public. We have described, in the U.S.A. and Canada, the rise of local insect awareness festivals. The festivals, themselves, are an interesting phenomenon that may lead to a lasting change in Euro-America culture. Often these festivals involve thousands of young people, primary grades through college. Many festivals are associated with Insectaria, insect zoos, and park reserves. Other festivals are associated with Departments of Entomology and national or regional meetings of entomologists. It is the involvement of significant numbers of young people that is, perhaps, the strongest harbinger of "changing times." The present young generation of Euro-Americans is growing up with the idea that some insects are beneficial and some are actually good to eat. Let' s take a walk through offerings at food insect festivals in the U.S.A. and Canada. The following is a representative summary of who i5 doing what at some of these festivals. What environments have spawned these festivals? What is responsible for their extraordinary, largely unpredicted, popularity?

New Orleans, Louisiana, The Audubon Institute.

Zack Lemann, Education Coordinator for the Termite Outreach Program of the Audubon Zoo. Audubon Institute, 6500 Magazine Street 70118 (phone: 504-861-2537 ext. 6170; fax: 504-861 -2426). Insects are clearly an interest of The Audubon Zoo. The Zoo recently closed the butterfly house that ran for five seasons and will soon be adding an Insectarium (2001). The Audubon Zoo is located adjacent to Audubon Park on beautiful, historic St. Charles Avenue, across from the main administrative building of Tulane University. Although the Zoo is centrally located for visits by tourists, school groups, and families, a major part of the Audubon Zoo's education effort is outreach programs which

travel to schools, community groups, festivals and fairs. One of the popular programs is the "Bugmobile" which contains live spiders, millipedes, centipedes, and insects and is sponsored by the US Department of Agriculture (USDA) as part of the public education portion of a large, multifaceted grant dealing with the Formosan subterranean termite.

Food insects, as well as "zoo insects," play an important role in the new "insect focus" of the Audubon Institute. **"Taste of the Wild Side,"** most New Orleans folk will tell you, is a well-publicized event in Spring of each year. New Orleans has a mixture of many cultures, each of which places a strong emphasis on food that is part of distinct cuisines, several of which are quite well-known, e.g., Cajun, Creole. These cuisines use a number of arthropods, such as "crawdads" (crayfish). Mr. Lemann has been expanding the New Orleans culinary repertoire of arthropods in several ways recently and would like to include the use of one of the new and most destructive pests in New Orleans, the Formosan termite. This termite is now threatening the old wooden structures of the French Quarter and the lovely old homes and live oak trees (100 and 200 years old, respectively) along St. Charles Avenue and other famous areas of the city. Mr. Lemann suggests to the city, "Why not eat them?" To introduce the idea of termites as a culinary target to New Orleans cultures, Mr. Lemann would like a more reliable, non-insecticide sprayed source and is hoping some of the Newsletter readers can point him to a good source of edible Formosan termites. It is probably not possible that the Formosan subterranean termite will become so popular for eating that local termite populations decline below the economic injury level.

This has happened with non-pest, food insects in Bali and temporarily, locally, with locusts in Africa. It is an interesting concept, managing pest insects by developing them into a sought-after delicacy.

Food insect festivals are an excellent way to introduce new culinary ideas. Originally, the Audubon Institute organized an annual event called "The Incredible Edible Insect." Over 1,000 people attended each year it was offered (1997 and 1998). The Edible Insect Event was held at the Louisiana Nature Center (operated by the Audubon Institute) located in the eastern area of New Orleans, near Lake Pontchartrain and 10 miles from downtown. These "wild" (not currently raised for food) cookery events were held in June. The first year, 7 insect dishes were offered. The second year, 10 dishes were presented. These included: Jambalaya with crickets and mealworms (with rice, tomato paste, and celery); Toffee Surprise with chopped roasted mealworms; Cricket (roasted) Pancakes (Mr. Lemann calls them fritters); Mealworm Minestrone (from Taylor and Carter's cookbook [Entertaining with Insects](#), 1992, 160 pp.); and chocolate-covered roasted crickets. The first year, Mr. Lemann's crew did "Crawlins," similar to New Orleans pralines (pronounced "prawleens") but with mealworms. This is quite a difficult dish to prepare since the sugar has to be cooked to exactly the right temperature and then simmered until an exact consistency is achieved. For a precise recipe, see this issue of the Newsletter, recipe section.

In 1999, the Edible Insect event was combined with another annual event focused on eating "wild" (not raised for food) vertebrates. It was called "Taste of the Wild Side" and held in March for the first time. Attendance was only 600 this year, but the March date meant that the Wild Side was competing with many other festivals during this period of New Orleans' best weather. This year, there were the usual insect dishes plus wild honey, alligator, nutria, soft shelled crawfish, wild duck, and Louisiana bowfin caviar. Five insect dishes were used this year: chocolate chirp (This is a Zack Lemann name) cookies (house crickets, *Achaeta domestica*); poached waxmoth (*Galleria mellonella*) larvae on plain wheat crackers with honey; banana mealworm (*Tenebrio molitor*) bread; crispy Cajun crickets (*A. domestica*). After oven roasting, Tony Chachere's seasoning was added. A culinary cue gleaned from Zack Lemann is: when making banana bread, chop the oven-roasted mealworms instead of putting them in the batter whole. Chopped mealworms make the slicing of the banana bread smoother. Banana mealworm bread was new this year. For many of the aforementioned recipes, see the recipe section of the next issue (Volume 11, Number 1) of the Newsletter. Note: some humans have mealworm allergies, even those who do not have a reaction to other insects, crabs, shrimp and other arthropods [Frey et al. 1996, Allergy and Asthma Proc. 17:215-219].

New Orleans, Louisiana, The Jonathan Ferrara Gallery. (Note: Because of the late printing of this 1997 issue, we are accurately able to "predict" future events. The art gallery feast is one of these predictions.) Art galleries are an unusual place to encounter an insect feast. In New Orleans, however, this has already occurred at least once. In spring 1999, The Jonathan Ferrara Gallery was showing an exhibit entitled "Carnivale Animale" by a local artist, Alex Beard. The art works were all animal-related. To increase attendance at the exhibit, the Gallery decided to offer an insect dinner. Zack Lemann (of the Audubon Institute) was engaged to plan and orchestrate the feast. Thirty people were served. The main course was angel hair pasta with peas, crickets, and ham in a cream sauce. A side dish served was sautéed mushrooms and mealworms in garlic and butter. For this mealworm dish, Mr. Lemann used the super mealworm, *Zophobas morio*. To the Newsletter Editors, this dinner menu sounded simply delicious. (Note: The Newsletter editors prepared the same mealworm dish, but with the smaller mealworm species, *T. molitor*, for the Entomological Society of America 1999 Pacific Branch, Eugene, Oregon, with rave reviews by many of the 50 entomologists present.) The Ferrara Gallery dinner was Mr. Lemann's first time preparing for a non-public food insect event. Mr. Lemann summarized these two experiences, the public festival and the "sit-down" formal dinner as follows, "For the dinner, 30 people came specifically to eat insects as the main entree for the meal and so it was significantly more special. The guests were specifically invited and it was not a "taste-if-you-dare thing." All but one were first time insect eaters, but it was a serious, dignified event. The five members of the Board of Directors of the Newsletter have each also had similar experiences contrasting the public festival and the formal dinner experience. They would underscore Mr. Lemann's statement. We would all agree that there is an important place for both types of events. Hopefully, we will begin to see

more of the serious dinner events in the future.

Los Angeles, California, Natural History Museum of Los Angeles County, Ralph M. Parsons Insect Zoo, 900 Exposition Boulevard, Los Angeles, CA 90007. **Arthur Evans, Insect Zoo Director** (phone 213-763-3558; fax: 213-744-1042; e-mail; aevans@usc.edu; WWW.NHM.ORG). The Insect Fair is an annual event hosted by the Ralph M. Parsons Insect Zoo. The Insect Fair began in 1987. The attendance began at 4,000 and by 1997 reached 7,000. Over the years, several vendors sold a variety of food insects at the Fair, usually in the form of candy. (Because of the late printing of this 1997 issue, we are accurately able to "predict" future events. This food insect demonstration is one of these predictions.) By 1999, the two-day event was attended by over 8,000 people. 1999 marked the first year actual food insect dishes were prepared. Zack Lemann (see preceding paragraphs) of The Audubon Institute, New Orleans, Louisiana, served as chef for this introductory event. There was considerable local media coverage (CBS, NBC, FOX) for the 2-day event. On Saturday and Sunday 15 and 16 May 1999, Mr. Lemann gave two half-hour presentations (combined slide show and cooking demonstration) each day. An average of 250 people attended each of the four sessions. For these presentations, Mr. Lemann prepared crispy Cajun crickets and poached wax moth larvae appetizers (see the recipe section of the next issue of the Newsletter, Volume 11, Number 1). One day before the event was to begin, the Los Angeles County Health Department decided to require all persons preparing food to have Health Department Certification. This was impossible on such short notice, so the only people who were allowed to taste the insect dishes were employees of the Natural History Museum. The audience could only watch. In spite of these constraints, all went very well. At the end of the presentations, commercially-available flavored (barbecue, cheese, and Cajun) mealworms were distributed. Three hundred packages were set aside for distribution at the end of each presentation and they disappeared almost immediately. Art Evans indicated, when asked about the future, "The next time we pursue a food insect event, we will probably contract a licensed kitchen to prepare the insects off site, thereby alleviating bureaucratic health concerns." Note: in a future issue of the Newsletter, we will address health clearance issues for large insect feasts. Part of the difficulty is that prior to preparation, insects are considered meat and under the jurisdiction of the US Department of Agriculture (USDA) and when the insects are prepared as processed food, it is the US Food and Drug Administration (FDA) that makes the rules. In this issue, we did review a book chapter on U.S. regulation of food insects. There seems to be a widespread lack of information on whose permission to ask for and when to ask. In Canada, the process for obtaining health clearance seems to be more clear.

Prior to and after the event, there were news segments that included the food insect portion on 3 of the 4 major networks. According to Art Evans, "Food insects serve to add to the "bizarre" and exotic image of insects at insect events, hence our marketing department has a lot of interest in promoting food insects as a "hook" at the LA Insect Fair."

West Lafayette, Indiana, Purdue University, "The Bug Bowl." For more information contact Jenny Franklin, administrative assistant for student services, Dept. of Entomology (phone; 765-494-9061; e-mail; jenny_franklin@entm.purdue.edu). This festival, was founded by Dr. Tom Turpin (phone; 765-494-4568; fax 765-494 2152; e-mail; tom_turpin@entm.purdue.edu) in 1990. This event actually started as a class project, part of an insects and society course entitled "Insects: Friend and Foe" (Entomology 105). Public involvement, according to Dr. Turpin, was a nice surprise. The first public event occurred in 1990. That year, on the day news reporters had come to campus to interview Dr. Turpin about corn insects, his research/extension specialty, Dr. Turpin's undergraduate students were preparing for their class cockroach e~ent. During the corn insect interview, Dr. Turpin's students interrupted him numerous times to get assistance in marking their cockroaches for the annual Entomology 105 Roach Races. Somehow, the pending races made the local news, and that evening, 100 people arrived to watch the students race their cockroaches. It was the public response to this announcement that led to the idea of an insect-based, on campus festival. So the next year, 1991, a weekend was set aside for the event. This event was conceived as a family occasion and although school groups attended, no special invitations were sent to schools. At the 1991 event, food insects were presented as a demonstration. Specifically, spice cakes, prepared earlier, were given to the public for a taste test. In one cake, 1/4th of the flour was substituted with ground mealworms, larvae of *Tenebrio molitor*. Participants could not distinguish the mealworm cake from the cake without mealworms. In fact, in a more formal evaluation of the spice cakes, Home Economics professors at Purdue University preferred the mealworm cake to the spice cake without mealworms, because of the moister and coarser texture of the mealworm spice cake. Chocolate Chirpy Cookies were distributed to participants and other interested folks. From then on, students took over operation of the Food Insects Booth.

In 1992, The Bug Bowl was held in conjunction with the Horticultural Show. The kick-off event for 1992 was a gourmet insect dinner for the highest officials representing "town and gown" or community and University leadership. The mayors of Lafayette and West Lafayette, the Dean and vice-president for Academic affairs and other community and University leaders attended the dinner. Preparing the dinner for these dignitaries was Chef Hubert Schmeider, the chair of the Purdue University Department of Restaurant, Hotel, Institutional, and Tourism Management (School of Consumer and Family Sciences). Head waiter was Dr. Chris Oseto, Chair of the Department of Entomology, Purdue University. Pure beeswax candles contributed to the ambiance. There were other special "kick-off" events to open the festival in later years. At least 2 of the 9 years of the festival, Chef Schmeider, and several other chefs from the University Union facility organized a food insect cook-off the night before the Bug Bowl opened. Entomologists were involved, but the judging was done by professional chefs from the community.

After 1992, the combined events of the Entomology and Horticulture Departments were billed as "Spring Fest." Food insects are now served continuously during the fair at one of

the stations in the food booth, located on State Street in front of the Agriculture Administration Building. Items at the Food Booth are free and servings are designed just for tasting not for satisfying large appetites. The Bug Bowl now receives national and international coverage through the Cable News Network (CNN) and International wire services. (See also Vol. 10, No. 1. page 7.)

Because of the late printing of this issue, we are able to predict the following: In 1999, 11,000 people attended the Bug Bowl, even though the weather provided 2 cold and rainy spring days [April 17- 18] . For this event, the Purdue group served Chex mix with wax moth larvae, chocolate chirpy cookies with dry-roasted crickets, Chinese stir fry with mealworms, *Tenebrio molitor*, in soufflŽ cups. Fest organizers estimated that about one-third of the crowd stopped by the food insect booth. Faculty and students participated in this booth. Insects were obtained from Rainbow Mealworms and standard Health Service Procedures were followed. Apparently the same rules for handling hot-dogs at an outdoor festival apply to handling food insects. Recipes are handed out at the booth. Chinese stir fry was made in the food booth as an informal cooking demonstration. Cookies and the Chex mix were prepared prior to the festivities. New persons involved with putting on the Bug Bowl were amazed at the large number of people who tried the food insect items and that there always seemed to be a line at the booth. The booth was open continuously throughout the event. In addition to the free items at the Food Insect Booth, students in entomology (The Thomas Say Society) sell chocolate crickets as a fund raiser. Students use dry-roasted crickets and dip them in chocolate. In 1998 and 1999, this project netted \$1,000 per year.

Raleigh, North Carolina, North Carolina Museum of Natural History is the site of a festival called "**The Bug Fest.**" The first of these annual events was held in 1995. At the second annual such event, one impressionable guest, David George Gordon, was so moved that he later wrote The [The Eat-A-Bug Cookbook](#) (see book review Volume 11, Number 2, July 1998).- The Department of Entomology at **North Carolina State University** also assists in the event. For the involvement of the University, contact Dr. Ron Kuhr phone: 919-515-2745; e-mail: ron_kuhr@NCSU.edu or the Department of Entomology phone 919-515-7746 The Museum has had elaborate food insect dishes for the last few years. At "The Bug Fest," participants can buy meals rather than just taste a small sample as in the Purdue Bug Bowl.

Montreal, Canada, The Insectarium, Insectarium de Montreal, 4S81 rue Sherbrooke est, Montreal, HIX 2B2 Canada. Marjolaine Giroux is the Coordinator of the Insect Tasting Event and an Entomologist with the Educational Service of the Insectarium, phone: 514-872 0663; fax: 514-872-0662; e-mail: insectarium@ville.montreal.qc.ca The Insectarium, largest in North America, was the first North American Institution whose food insects festivals, called "Insect Tastings," achieved 5 digit attendance numbers on an annual basis. This festival has occurred every year since its inauguration in 1993. Until 1997, the festival was three weekends (six days

total) and attendance was over 20,000 per year (for additional information see the Newsletter Vol. 9, No. 1, 1996, pp. 1-2). In 1997, the attendance increased to a record of 25,000 people at Insect Tastings. Because of the late printing of this issue, we are also able to predict the following: In 1998, the attendance was again 25,000 people. Part of this phenomenal attendance may have been due to the Festival being expanded to sixteen days, two weeks and three weekends. The incredible Valentine's Day Gala opening event of previous years had been abandoned by 1999. "Insect Tastings" of 1999 was advertised as an Oriental feast with mealworm imperial rolls, Szechuan scorpions, glazed cake with black ants and many other dishes. Chef Nicole-Anne Gagnon presided during the 16-day festival and on Saturdays and Sundays provided cooking demonstrations for guests at the Insectarium. Cooperating with Chef Gagnon was Jean-Louis Themis (co-author with the Insectarium of *Des Insectes a Croquer: Guide de decouvertes 1997* les Editions de l'Homme (see review this Newsletter issue p.8) and a team of students from the Institut de tourisme et d'hotellerie du Quebec. In conjunction with the gustatory event, the film *Banquet in Bangkok* was shown as well as clips from the film *Giant Tarantulas* in which the Piaroa Native Americans in Venezuela catch, cook and eat the world's largest tarantula. Perhaps the amazing number of attendees at the 1999 (27,000 people) festival was due to the advertising. Flyers to announce the event stated, "Our Insect Tastings are the perfect way to enjoy a new taste sensation, and to discover a protein-rich source of food valued in many African, Asian and South American countries. Step out of our North American culinary straitjacket and dare to try some Oriental style morsels at this year's Insect Tastings." Admission was not charged for the event, only for admission to the Insectarium and Botanical Gardens: (in Canadian dollars) adults, \$6.75; seniors and students, \$5.25; and children, \$3.50. Summer fees are slightly more expensive. This is the admission fee whether or not there is an Insect Tasting Event in progress.

In 2000, the Food Insect Festival will be open for school groups by appointment only from February 21 -25. Reservations can be made for 9:30 a.m., 10:30 a.m., 1 p.m., and 2 p.m. The public will be welcome February 19-20 and February 26 to March 5, 2000 from 1 to 4 pm. Chef Nicole Anne Gagnon will again be creating the dishes. For the food insect festival in 2000, only 7 items will be chosen. Planning for each event takes an entire year. These 7 dishes for the year 2000 festival will also include some non-insect arthropods, such as scorpions from China as well as ants prepared according to Chinese culinary tradition. There will be a dish with phasmids (walking sticks), and other dishes with the more "traditional USA and Canadian standbys," wax moth larvae, *Galleria mellanella*; house crickets, *Acheta domestica*; and mealworms. The mealworms, in 2000, however, will also be somewhat innovative. *Tenebrio molitor* is the standby species and larvae are the "standby form" in Canadian and U.S.A. insect culinary tradition. In 2000, the Insectarium will use the super mealworm, *Zoophobas morio*, and the pupal stage only. It is possible that this item will become a new U.S.A./Canadian standby since it overcomes small size and heavy sclerotization (chitin) problems.

The seventh dish that will make the final selection will be either locusts or African caterpillars, the mopane. The choice will depend on availability. In the past, migratory locusts, *Locusta migratoria*, were an outstanding favorite of the public. The Insectarium obtained the locusts as a byproduct of scientific research in Ontario, but with changing research priorities, these are no longer available. Large quantities of mass-reared food insects is a perennial problem in the USA and Canada. In this second decade of existence, a new function of the Newsletter may be to serve as a clearing house for commercial insect suppliers and directors of large events such as the Montreal festival. The Insectarium has served mopane twice in the past, each time they were brought to Montreal in a dried form from Africa by an entomologist. It is really only possible if someone hand carries them into Canada (or the USA). The Chef for the Insectarium event served them both re-hydrated and dry. Re-hydrated, it was soft and somewhat juicy in the interior. When dry, some people thought it tasted like wood. Some people really liked them re-hydrated, some specifically preferred it dry, and some people did not like it. It sounds as if mopane are like any specialty food such as escargot, oysters, mussels, and scallops. Some people like them very much and some do not.

Finding appropriate insects for such a large festival can be a monumental problem. Those involved with planning the Montreal food insect festival always need new insects for their tasting event. For several years, the Nepalese dish, Bacuti was served. Bee brood (=the larvae and pupae of bees still in the comb), which this Asian dish requires was difficult to work with but the bee keeper of the Insectarium staff had developed a method of squeezing the comb (extracting the brood), packaging it and freezing it. Now, however, this labor intensive method is too expensive. Wax moth larvae are used by the Insectarium when dry, actually dry roasted in oven just like crickets. According to Ms. Giroux, "Just eat it, it tastes like bacon; Salty." Termites would be an excellent addition to the offerings of the Insectarium . Apparently they are a lot of work, and, perhaps, difficult to obtain.

Insects served at the Montreal Insectarium are prepared with care by The Institut de Tourisme et d'Hotellerie du Quebec (ITHQ) in keeping with specific quality standards set by the Quebec Department of Agriculture, Fisheries and Food (MAPAQ). Every year, visitors consume an average of 100,000 mealworms, 60,000 crickets, 10,000 locusts, 10,000 honeybees, and 5,000 silkworm pupae at the Insect Tastings.

Cleveland, Ohio, Metro Park, "Bugfest" was first held in August 1997 (See also Vol. 10, No. 1, p.6) in the Garfield Park Nature Center in Garfield Park Reservation. Entomologists served chocolate chirp cookies, mealworm spice cake and hot bug-and jalapeno dip. Cleveland MetroParks was the sponsor. For additional information contact John Stinson, Cleveland Metro Park, 4101 Fulton Parkway, Cleveland, Ohio 44144, telephone: 216-351 -6300 ext. 274.

Edmonton, Alberta, Provincial Museum of Alberta. The first food insect festival was held in October 1996 in conjunction with "Bug World," an exhibit of giant robotic insects.

One thousand marinated crickets wrapped in bacon as well as cookies with cricket and mealworm flour were served (see Volume 9, No. 3, pp. 9 and 11).

Washington DC, Smithsonian Museum of Natural History also holds a "Bugfest." One of our new members alerted us to the event held on the mall. The Cajun fried crickets and mealworm caramels were outstanding we were told (see Volume 11, Number 1, Letters to the Editor).

Philadelphia, Pennsylvania, The Insectarium, Jennifer Bush, Director (Phone 215-338-3000) has an annual food insect festival in January. The festival usually consists of three consecutive weekends. Items such as pizza and Chex mix are prepared, but due to Pennsylvania restrictions on any food prepared at a fair concession or restaurant, these items can only be demonstrated and not served to the public. To serve these items to the public, the same regulations that a restaurant meets has to be met by any group serving food insects to the public. The interesting item about this Insectarium that holds the food insect events is that it is housed and supported by an exterminating company.

Ames, Iowa, Iowa State University has had a food insect festival run entirely by the students.

Champaign-Urbana, Illinois, University of Illinois, Dr. May Berenbaum (phone: 217-333-7784; fax: 217-244-3499; e-mail: maybe@uiuc.edu). Predating all of these food insect festivals of North America was the Fear Film Festival, an insect horror movie festival with the usual munchable treats, peanuts and popcorn, in addition to food insects. It is possible that this festival was initiated in 1984-1985, the first of all the North American (Euro-American, that is) that featured food insects. This festival has now expanded to include cockroach races as well.

The Entomological Society of America (ESA), (phone: 301 -731 -4535; fax: 301-731-4538; e-mail: esa@entsoc.org; and <http://www.entsoc.org>). What more appropriate gatherings at which to serve food insects than assemblies of members of the ESA! The first major food insect event that the Editor recalls at ESA meetings was the Purdue University Mixer at the National meetings in 1990 held in Indianapolis, Indiana. This event featured cricket hor d'ouerves of all kinds, including some cheese puff items whose unique taste and texture I still remember. Orchestrating the event was the Director of the Restaurant, Hotel, Institutional, and Tourism Department at Purdue University, Mr. Hubert Schmeider, who prepared the dishes in the hotel kitchen with his staff from the University. Also involved was Dr. Tom Turpin, Professor of Entomology, Purdue University and the then immediate past President of the ESA.

The next food insect event I recall at national meetings was a presentation I gave in the Formal Conference on Teaching (Reno, Nevada 1991). The presentation was at 8:30 a.m. so I chose a fruit-based dish that I developed, entitled "Curried Grasshoppers." The shredded coconut and raisins were a new taste with the excellent Bozeman-reared

grasshoppers, *Melanopus sanguinipes*. About 250 people were present and a San Francisco TV station did a news segment on it, filmed on location (copies of this newscast are available for educational purposes from the Food Insect Newsletter). The next food insect feed of which I am aware was an address I gave for the Formal Conference on International Affairs (Nashville, TN, December 1997). The main objective of the presentation was to explore the dangers of not incorporating food insect issues into integrated pest management programs in countries where there is a food insect tradition (which is everywhere except the Euro American portion of the US and other European-based cultures). This symposium was attended by about 150 entomologists and we served grasshopper stir fry. The following day, I did a live cooking demonstration for Opryland Radio that aired during rush hour that day.

After each National ESA meeting for the past 5 years or so, there has been an "Insect Expo." This event, basically a one-day fair, generally draws 30004,000 students bussed in with their teachers from local elementary and secondary schools. Since the national ESA meetings rotate to each region of the USA, it is a new community almost every year. Usually a food insect booth is part of the Fair. Thus, this event alone exposes thousands of different teachers and young students to entomophagy each year.

Regional meetings of the ESA have also had their share of food insect events. For the 1995 keynote address at the ESA Southeastern Branch in Charleston, South Carolina, I gave a general introduction to food insects around the world while some of the students at Clemson University prepared insects for the ca. 250 entomologists at the opening ceremonies. The "chef" of that event was Mr. David Jenkins (who later became my graduate student and following his M.S. in Entomology became a Board Member of the Newsletter. Mr. Jenkins and his colleagues served waxmoth larvae (*Galleria melonella*) creole and grasshopper (*Melanoplus sanguinipes*) stir fry. This year, the organizer of the 1995 event, Dr. Joseph Culin, organized a food insect session, including a cooking demonstration, for a mini-insect expo for teachers following the Southeastern Branch ESA meetings (1999) held in Florida. David Jenkins, now a Ph.D. student at University of Georgia was also involved in this presentation.

Invertebrates in Captivity (Robin Roche, organizer of food insect portion of meetings, phone: 602-621-1153) is an organization of professionals who raise insects, generally for zoo exhibits, insectaria, park reserve exhibits, and butterfly houses and who meet annually for information exchange. Also appropriate at these annual meetings is the cooking and serving of food insects. In 1997, Robin Roche organized both a pre-conference workshop in a professional kitchen for the preparation of insect appetizers (see Vol. 10, no. 1 . p. 6) and a formal symposium on food insects. Conference attendees were then able to sample the results of the workshop at the opening event of the conference . Newsletter patron, Dr. Mitsuhashi, was featured guest speaker.

Editors Postscript: In 1999, the Education Symposium of the Pacific Branch ESA held in Eugene, Oregon, had both the Editor and Associate Editor of the Newsletter involved in

the Food Insect presentation. I gave a slide presentation and Robert Diggs was the "chef," assisted by students from the Department of Entomology, Oregon State University. We served bachuti (a Nepalese dish) for hor d'oeuvres. Dr. Lynn Royce, organizer and moderator of the event supplied the bee brood (a frame of wax chambers containing larvae and pupae of the honey bee, *Apis mellifera*). Under Dr. Royce's guidance the bee brood was carefully cooked (similar to preparing scrambled eggs). The bee brood was served on crackers with various garnishes including olives, parsley, and pimento. Mealworm tacos were the main entre. (The Associate Editor's success at preparation of this dish was discovered by fellow faculty at the Montana State University College of Business and so he did a "command performance" for one of their Fourth of July social events, thus illustrating the impact of these festivals and public social food insect events on informal cultural practices.) Dessert was Chocolate Chirpy Cookies (the house cricket, *Acheta domestica*, was the "chirpy") which I prepared the evening prior to leaving for the meetings.

In December of 2000, the Entomological Societies of Canada and America are meeting jointly in Montreal. The possibility is being discussed of having food insects the opening night of the meetings. Marjolaine Giroux, Entomologist with the Educational Service of the Insectarium at the Montreal Insectarium and member of the ESA local arrangements committee, will keep us informed of the specifics of this event. Visits to the Insectarium will be arranged for attendees and possibly some symposium presentations will address issues raised in this article about food insects, e.g., governmental inspection, reliable availability of large quantities through mass rearing, and the rapidly increasing interest of the public in Canada and the United States in consumption of food insects. Members are encouraged to contribute posters and papers related to food insects in the regular contributed sessions.



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Raising Mealworms

March 1996. Volume 9, Issue #1.

(This article is adapted from a leaflet prepared by the Insectarium of Montreal for the public. The leaflet contains several illustrations and photos and is available free in French and English. It is a much-needed contribution and an excellent start in making food insects more of a possibility for the general public in North America. The leaflet contains exactly the kinds of information for which many of our U.S.A. and Canadian Newsletter readers have been asking. Another leaflet is now available on crickets and will be featured in the next Newsletter with appropriate recipes. What is needed next is a similar efforts on how to rear and serve home-grown waxmoth larvae. To request a copy of the mealworm leaflet, write to: Ms. Marjolaine Giroux, Insectarium de Montreal, 4581 Sherbrooke Street East, Montreal, Quebec HIX 2B2, Canada. Tel.: [514]872-0663.)

Partial text of the leaflet: Eating insects is a long-standing tradition in many cultures. People in some countries of southern Africa, for example, consume great quantities of different species of caterpillars. In Mexico, 'ahauhutle,' the eggs of water bugs, and 'escamoles,' black ant larvae, are traditional Indian dishes. Some species of ants are very popular with the inhabitants of southwestern China and in Southeast Asia, the giant water bug, *Lethocerus indicus*, is considered a true delicacy.

For many in the Western world, insects are viewed as a culinary curiosity, and are most often considered the last resort of people in other parts of the world who have nothing else to eat. It is true that in some cases people eat insects out of necessity. Generally speaking, however, it is the abundance, accessibility, nutritional value, and taste that makes insects popular as food. Insects contain proteins, lipids, minerals (mostly zinc, copper, and iron), vitamins (in particular, riboflavin and thiamine), and water. Chitin, the polymer which forms insect exoskeletons, is not easily digested by humans and thus thought to be a source of dietary fiber.

Quality Insects

Eating insects is becoming more and more popular in Western cultures. However, there is little information available on edible insects available in areas where these Western cultures are located. Since one cannot know under what conditions any insects one may capture in the wild developed, it is best not to eat them. They may have been exposed to pesticides, fed on and accumulated plant toxins, or contain parasites or bacteria. [Ed. If insects are thoroughly cooked, like pork or wild game, the meat will not transmit

parasites, bacteria or viruses].

Although it is still not possible to dash to the supermarket to obtain that unique, entomologic addition to your menu, it is possible to raise your own. If you wish to add insects to your daily menu, or, even to have on hand for those special parties, the best approach is to raise them on a small scale at home. This will allow you to control the conditions under which they develop and reproduce.

Mealworms are one of the easiest insects to raise at home in the kitchen area. Raising your own mealworms means that they are available, year-round, at no significant cost, and ready to use at the last minute, even as the guests are arriving. Yellow mealworms, *Tenebrio molitor* (Family: Tenebrionidae), are well suited to this type of 'insect farming.' These beetles are small, reproduce quickly and are resistant to disease and parasites. In addition, they are simple to handle and require little space and maintenance. There are four stages in its life cycle. The egg is 1.8 mm; the larva grows from ca. 2 to 30 mm; the pupa is ca. 16 mm; and the adults are 16 mm.

How to Raise Mealworms

Equipment

Acquire at least 3 containers, preferably plastic. To provide proper air circulation and prevent condensation, punch holes in the lid and cover the lid with mosquito netting or cheesecloth. Suggested dimensions for this rearing container is 41 cm x 28 cm x 15 cm.

Feed the mealworms mixed grains such as: oat or wheat kernels (10 parts), rolled oats (oatmeal) or whole wheat flour (10 parts); wheat germ or powdered milk (1 part); and brewer's yeast (1 part). Brewer's yeast can be obtained at health food stores. This is an important ingredient, because it provides proteins and trace elements essential to the insects' growth.

To supply the water that these insects need to develop, provide bits of vegetables (cabbage, carrots, potatoes, lettuce, etc.) or fruit (mainly apple). Monitor this item daily to watch for visible mold growth. Immediately replace the water supply when mold growth appears.

When all is in readiness, obtain the mealworm larvae starter culture. This can be bought from pet shops where they are used as food for reptiles and amphibians. Bait shops may also have these available. If there is no such source in your area, national suppliers will fly the mealworm starter culture to you where ever you are. Some of these North American suppliers are: Rainbow Mealworms, PO Box 4525, Compton California; Yarbrough Bit Distributors, Route 2 Box 202, Heidelberg, Mississippi 39439; and Sure-Fire Fresh Bait RR 6? Calgary, Alberta, Canada. You will need about sixty larvae to start your 'farm.'

Culture Management

In one of the culture containers, place about 2.5 cm of the grain mixture, the mealworm larvae, and bits of vegetables and/or fruit (=the water source). As soon as the first pupae appear (this is a non-feeding and non-ambulating stage), transfer them to another container, an empty box. This will prevent the larvae from eating the pupae. For the same reason, the adults must be separated from the pupae as soon as they emerge from the pupal 'skin' (exuviae). Transfer the adults into a third box, also containing 2.5 cm of the grain mixture and chunks of vegetables or fruit.

The males and females of the mealworm are indistinguishable. They mate 2-5 days after emerging, and the female lays up to 40 eggs a day. The eggs take 12 days, on average, to hatch. The larvae molt several times over a period of about 10 months, until they reach 25-30 cm in length. It takes about 12 days for the pupa to complete metamorphosis into an adult. The adult lives, generally, only 2 months. All in all, at temperatures from 18°C to 25°C, the insect's life cycle is about one year.

Culture Maintenance

Replace the pieces of fruit or vegetables when they dry out, and remove any dead insects. Stir the grain mixture from time to time to incorporate the larval skins, so that they will also be consumed by the larvae. Change the mixture when it begins to look sandy. You will have to remove the insects one by one or separate them using a sieve.

Helpful Hints

Clean the containers thoroughly before using them. To speed up the insects' development, keep your 'farm' at a temperature of from 25°C to 30°C. Above 30°C there are negative effects on growth and development. Avoid placing the containers in bright sunlight. Keep the cultures in a dimly lit, dry, and well ventilated place. Keep the mixture as dry as possible to avoid mold and other undesirable organisms. Keep your insects in a number of different containers to minimize losses due to contamination or any other problem.

When to Begin Harvesting the Larvae

Since you are developing a stock culture and it is the larval form of this insect that is eaten, you would want to wait for the first generation after the parents to harvest any larvae. In concrete terms, this means that you must feed the larvae that you obtain from a commercial source until they become adults, allow them to reproduce, and then 'harvest' the larvae of the new generation. Make sure, of course, that you leave enough of the larvae to keep your farm running!

Preparing the Insects for Use

Before you begin whipping up delicious insect meals, you must take some precautions: Always kill the larvae by freezing them alive. About 48 hours is sufficient. You can keep them in the freezer for a few months if they are properly wrapped in airtight bags or containers.

Insects can deteriorate quickly, just like meat that is left out on a counter. Always keep them in the freezer until you are ready to use them. It is also a good idea to rinse them in running water before you cook them.

Never eat any insects of doubtful quality (rotten smell, unusual color, etc.). If in doubt, DON'T.

Start the Ovens

Dried mealworm larvae can be used in place of nuts, raisins, and chocolate chips in many cookies, bread, and dessert recipes. In powdered form, mealworm larvae can also replace part of the flour in cakes or pie crusts. If they are just barely thawed, whole, or ground, they can be added to sauces or used to make delicious spreads.

Mealworm Recipes

We suggest these starters to try out your new culinary raw material. The following recipe was developed by the *Food Insects Newsletter* Editor and taste-tested by undergraduate and graduate students at Montana State University and various dinner guests at the Dunkel/Diggs home:

Hot Mealworm Appetizers

Ingredients:

5 ml (1 tsp.) cayenne

2.5 ml (1/2 tsp.) black pepper

85 ml (1/3 cup) mealworm larvae, slightly thawed

30 ml (2 Tbsp) butter or margarine

Place all ingredients together into a sauce pan. SautŽ, stirring constantly, until the mealworms are golden brown. Drain and serve. Or, these may be added to a hot bridge mix available in many grocery stores. Or, one may add them to 'Party Mix' made from cold cereal squares, pretzels and nuts. The combination made at home to which one could add the mealworms for extra nutrition, fiber, and interesting texture is as follows: Melt 1/4 cup margarine in roasting pan in preheated 250jF oven. Stir in 5 tsp. Worcestershire sauce, 1-1/4 tsp. seasoned salt, 1/4 tsp. garlic powder. Gradually add: cereals (2-2/3 cup corn squares, 2-2/3 cup rice squares, 2-2/3 cup wheat squares); 1 cup nuts and 1 cup pretzels. Stir to coat evenly. Bake 1 hour, stirring every 15 minutes. Spread on absorbent paper to cool. Store in airtight container. Makes 10 cups.

The following recipes are from: [Entertaining with Insects: The Original Guide to Insect Cookery](#)
By Ronald L. Taylor and Barbara J. Carter. 1992. Salutek Publ. Co. Yorba Linda. 160 pages.

Mealworm Cookies

Ingredients:

550 ml (1-1/4 cups?) all-purpose flour
5 ml (1 tsp.) baking soda
5 ml (1 tsp.) salt
250 ml (1 cup) softened butter
175 ml (3/4 cup) white sugar
125 ml (1/2 cup) crumbled dried mealworms
175 ml (3/4 cup) firmly packed brown sugar
5 ml (1 tsp.) vanilla
2 eggs
360 grams (1-1/2 cups) chocolate chips

Place the cleaned and prepared insects on a cookie sheet and dry in the oven for 1 -2 hours at 100°C (200°F). Preheat oven to 190°C (375°F). In a bowl, mix the flour, baking soda and salt. In another bowl, cream butter, white sugar, brown sugar, and vanilla. Stir in eggs. Gradually add the flour mixture. Stir in chocolate chips and mealworms. Drop by teaspoonfuls onto a cookie sheet, and bake 8- 10 minutes.

Mealworm Canapés

Ingredients:

85 ml (1/3 cup) mealworm larvae, slightly thawed
2 garlic cloves, finely chopped
5 ml (1 tsp.) tomato paste
15 ml (1 Tbsp) olive oil
5 ml (1 tsp.) lemon juice
5 ml (1 tsp.) red wine vinegar
plus: red wine vinegar, freshly ground pepper, loaf of French bread (baguette), finely chopped
fresh parsley

With a mortar and pestle or in a blender, mash the mealworms, garlic and tomato paste into a puree. Stirring constantly (or with the blender running), add the oil, a few drops at a time. Add the lemon juice, wine vinegar and pepper. Cut the baguette into 1.5 cm slices. Under the broiler, toast one side of the bread slices, and spread the untoasted side with the mixture. Place the canapés on a baking sheet and bake at 200°C (400°F) for 10 minutes. Sprinkle with parsley.

Siu Mai

Ingredients:

250 ml (1 cup) mealworms
4 water chestnuts

60 ml (4 Tbsp) green onions, sliced
125 ml (1/2 cup) bamboo shoots
1 egg
5 ml (1 tsp.) salt
23 ml (1 - 1/2 Tbsp) soy sauce
30 ml (2 Tbsp) sherry
5 ml (1 tsp.) sugar
23 ml (1 1/2 tsp.) cornstarch
1 ml (1/4 tsp.) pepper
plus: wonton wrappers, dipping sauce (see below), vegetable oil

Place mealworms in blender, and grind until paste-like. Chop water chestnuts and add mealworm paste, green onions, bamboo shoots, egg, salt, soy sauce, sherry, sugar, cornstarch and pepper. Mix well. Fill center of won ton wrapper with 30 ml (2 tsp.) of mixture. Fold won ton in shape of a triangle. Moisten finger tips, and seal edges. Fold creased corners backward and secure the ends with more water. (They should now be shaped as a bishop's cap.) Place in skillet containing oil heated to about 350 degrees Fahrenheit. Fry for about 5 minutes. Serve with Dipping Sauce.

Dipping Sauce:

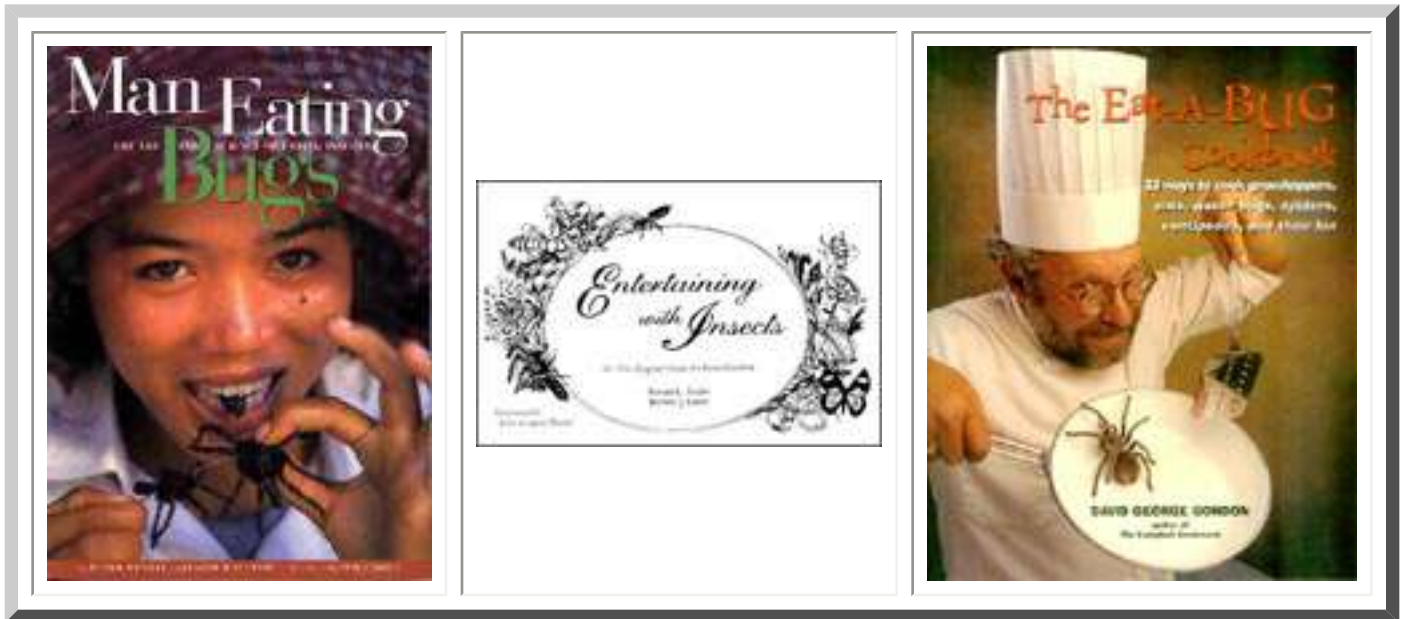
15 ml (1 tsp.) boiling water
15 ml (1 tsp.) mustard
15 ml (1 tsp.) vinegar
30 ml (2 tsp.) soy sauce
Add boiling water to mustard and mix well. Add vinegar and soy sauce. Stir well.

A Word About Leftovers

If you simply ordered too many mealworms for that special event, or your kitchen production unit has become too prolific, you can turn those leftovers into planovers. Place late instar larvae (older larvae, about to pupate) in plastic containers with small holes punched in lid. Cover larvae with wheat bran and place in the refrigerator. We have kept larvae up to one month in this manner, arrested at just the right stage for using in cooking.

Fast Snack Mealworm Alternative

If the recipes sound good, but you would just like a taste and not the initial effort of developing your own culture, you can order a new product from Hotlix (791 Dolliver, Pismo Beach, California 93449 USA phone (805)773-1942). Larvets, the original Worm Snax™, are mealworm larvae, now being sold roasted with barbecue, cheddar cheese, or Mexican spice flavors.



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Allergies Related to Food Insect Production and Consumption

July 1995. Volume 8, Issue #2.

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Editor's Note: This is the third in a series of invited articles on potential hazards that could be posed by indiscriminate or careless consumption or handling of insects. We are grateful to the authors for generously agreeing to prepare the article under severe time constraints.

The cultural practice of entomophagy is old and well-established especially in non-industrialized regions of the world. Thanks to this newsletter, along with occasional anecdotes in the electronic and print media, human consumption of insects is a growing novelty in the U.S. and other nations not usually associated with the custom. Latter-day food insect devotees may simply want to sample species considered delicacies in other cultures, or they may be interested in the reputed nutritional or medicinal qualities of certain food insects. Regardless of motivation, initiates must first overcome the wide spread cultural taboo against the practice, that is, the idea that consuming insects is generally unhealthy. Proper methods of selection and preparation can largely nullify the health concerns associated with eating food insects. However, one matter will continue to nag the practice, and that is the possibility of allergies to insect derived foods. Virtually any food item can be allergenic. Yet, other arthropods such as shellfish (i.e., shrimp, lobster, crayfish) are particularly well-known for their ability to induce mild to severe allergic reactions in susceptible individuals. Thus, the risk can not be taken lightly. The following is a brief review of the potential health risks associated with the production and consumption of food insects.

The popular image of insect allergies is that associated with the bites and stings of venomous species like bees, ants, and wasps (injectant allergens). Over one-hundred deaths per year in the U.S. are attributed to fatal reactions to arthropod venoms. These accounts make hot news, although the vast majority of victims suffer little more than short-term itching, burning and swelling. More common allergic reactions attributable to insects include those caused by contacting body parts or waste products (contactant allergens) or inhaling microscopic dust particles composed of pulverized carcasses, cast skins and excreta (inhalant allergens). Allergies caused by contacting or inhaling insect material can

have significant health consequences in the home or work environment with symptoms ranging from eczema and dermatitis, to rhinitis, congestion and bronchial asthma. In severe cases, sensitivity to insect material is heightened to the extent that the victim can experience anaphylactic shock, a potentially life-threatening condition often involving rapid swelling, acute respiratory distress, and collapse of circulation. If possible, it is incumbent upon the sufferer to recognize and avoid insect allergens long before the onset of extreme sensitivity.

Since most insect allergies are of the contactant and inhalant type, it would be reasonable to assume that the greatest health risk associated with food insects would be to workers involved in their production. Owing to the small and obscure nature of the food insects industry, especially in the U.S., virtually nothing is known of such problems. However, there are many records of insect-induced allergies among workers in other enterprises. Workers shelling and cleaning walnuts in Bulgaria developed eczema, dermatitis and intense itching of the skin associated with exposure to the larvae and excreta of the Indianmeal moth. Although they are not insects, mites that infest cheese, bran, dried fruits, jams and sugars are known to cause transient dermatitis among workers when body fluids are released upon crushing. Records of inhalant allergies in the workplace make up the majority of case histories. In a NIOSH survey of USDA labs that rear insects, nine orders of insects plus mites and spiders were named as sources of the inhalant allergens. In his 1980 survey of insectary workers, Wirtz found that 67% of his respondents linked their allergy symptoms to direct or airborne exposure to lepidopteran (moth and butterfly) scales with emphasis on respiratory problems. Two labs had 53% and 75% of their personnel develop allergies to scales despite the use of exhaust hoods and protective masks and clothing. Case histories of asthma among Lepidoptera workers are numerous.

Reactions to Orthoptera (grasshoppers, crickets, locusts, cock roaches, etc.) are also common. In 1969 LeClercq reported that workers rearing locusts suffered rhinitis, itching skin, bronchitis and ultimately asthma in general sequence. Wirtz recounted one study of migratory locusts where all of the workers became allergic to the insect. The authors know of a researcher who suffered dyspnea (labored breathing) during a prolonged session of grinding crickets into meal to supplement chicken feed. Ominously, the three cases of anaphylactic shock reported by Wirtz involved orthopterans.

Workers exposed to the obligate beetle and weevil (Coleoptera) pests of stored grains and milled products have also been affected. Reports of skin itching, hives, rhinitis, dyspnea, and bronchial asthma are numerous and well-documented. Flies and midges (Diptera) as well as mayflies (Ephemeroptera) and caddisflies (Trichoptera) have likewise been implicated as allergenic hazards in the workplace. The above reports as well as others too numerous to mention in this article highlight the fact that insects and related arthropods pose a very real occupational health threat to workers repeatedly exposed to them. Coping with this problem can be an annoying inconvenience that has both economic and health consequences for the worker and employer. Although good

ventilation, protective clothing, gloves and masks are common sense preventive measures (as well as being mandated by OSHA), reassignment of the sensitized victim to a non-threatening work environment is often the only viable remedy to the problem.

This brings us to the topic of ingestant allergens, that is, eating or unintentionally swallowing allergenic insect material. Since we are not a nation accustomed to dining on "bugs", direct evidence for allergies to food insects is practically nonexistent. Nonetheless, entomologists are sometimes treated to nebulous accounts of people getting sick after deliberately eating insects. Since most everyone can name at least one food that turns their stomach, it is not clear what role, if any, psychological factors may have played in these illnesses. We can, however, gain some insight from controlled experiments on human subjects done with preparations of common food-infesting insects. A classic study by Bernton and Brown in 1967 utilized dialized extracts of seven of these insects in skin sensitivity tests of subjects with and without known allergies. Test extracts included those of the rice weevil (*Sitophilus oryzae*), fruit fly (*Drosophila melanogaster*), Indianmeal moth (*Plodia interpunctella*), sawtoothed grain beetle (*Oryzaephilus surinamensis*), red flour beetle larvae and adults (*Tribolium castaneum*), confused flour beetle (*Tribolium confusum*), and lesser grain borer (*Rhyzopertha dominica*). Of the 230 allergic patients, 68 (29.6%) reacted positively to one or more of the dialized insect extracts. Surprisingly, of the 194 non-allergic subjects, 50 (25.8%) showed sensitivity to at least one extract. A total of 333 positive reactions were observed. The degree of overall sensitivity was practically the same for both groups, with the Indianmeal moth extract eliciting the most positive reactions followed by the extracts of red flour beetle larvae, red flour beetle adults, rice weevils, fruit flies, confused flour beetles, sawtoothed grain beetles, and lesser grain borers.

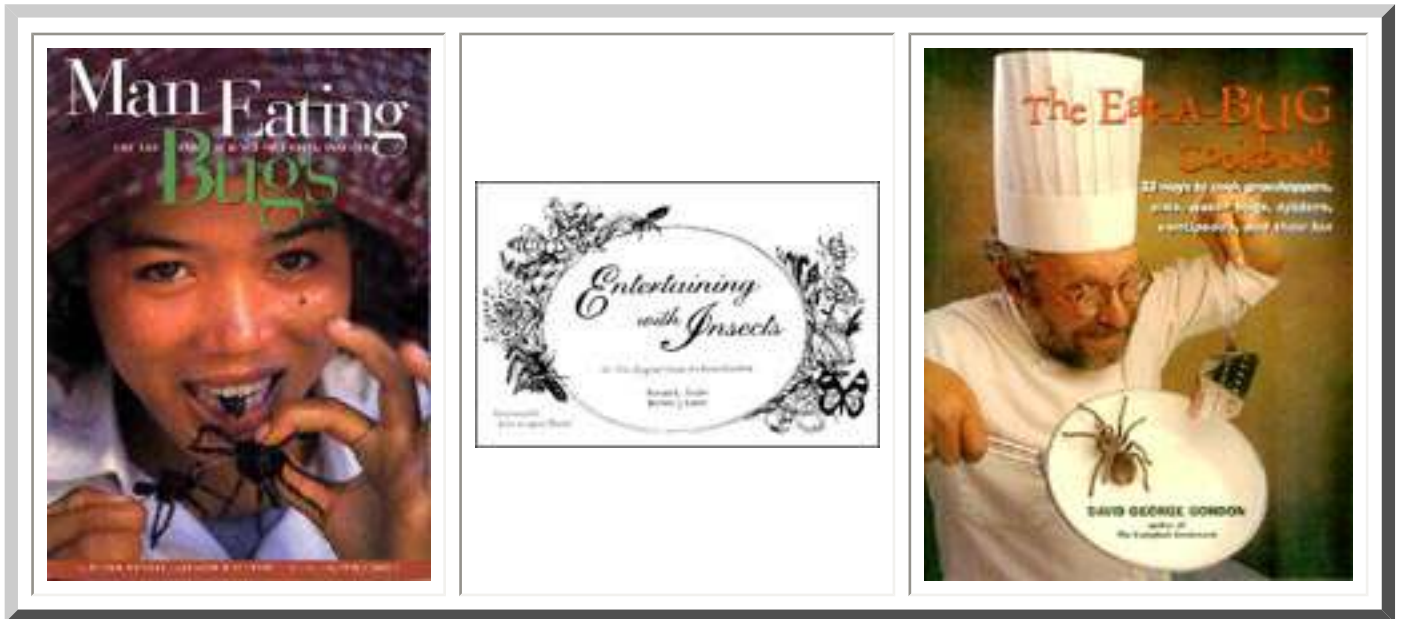
The question arises as to where upwards of 25% of the general population might have acquired sensitivity to these insects. At one time or another, most people have had to clean out their cupboard as a result of an infestation by one or more stored-food pests. If the problem is bad enough (and recurrent), sensitivity could be related to inhalant or contactant allergens of insect origin. More likely, however, these allergies are the result of ingesting small quantities of insect material in food over a lifetime. Despite proficient methods of production and storage, trace amounts of insect material are going to find their way into our food. The Indianmeal moth and its relatives, for example, can be persistent and notorious pests wherever candy is manufactured or stored. Stored-product moths will also attack flour, pasta and dried fruit. Grain beetles and weevils are a constant threat to stored whole grain, and who hasn't opened a box of cake mix or cornmeal only to discover flour beetles infesting the contents. We are not inclined to eat food showing obvious signs of insect contamination, but we are more than likely getting occasional small doses of insect material in food we consider wholesome. For most people this level of exposure is medically inconsequential. For people with known allergies, especially those of the food and insect varieties, the matter becomes problematic. In the case of food insects, does the sensitized person exercise strict avoidance of this novel cuisine or take his or her chances?

Perhaps there are processes that largely diminish the potential threat of food allergies. One school of thought suggests that insect allergens in food are deactivated by cooking, yet, when five of the aforementioned insect extracts were heated at 100°C for one hour, positive skin reactions were again observed, although they were deemed less vigorous than those of the unheated treatments. In a 1964 study, Bernton and Brown heat-treated the extracts of cock roaches at 100°C for one hour and found that these allergens likewise resisted deactivation. The idea that insect allergens are deactivated in the highly acidic environment of the stomach is also appealing until one considers the number of normally eaten foods that have been identified as potentially allergenic and whose allergens obviously survive digestion and cooking.

For most people, working with or eating food insects would pose little if any health risk, especially if they have no history of allergy to insects or other arthropods. Nonetheless, since sensitivity can be acquired with repeated exposure to an allergen, a measure of vigilance is in order. The person with known insect or arthropod allergies would be wise to exercise some caution. Cross-reactivity among related as well as taxonomically dispersed groups of insects has been established. There is also evidence for cross-reactivity among distantly related members of the Arthropoda suggesting the existence of common allergens within the phylum. So, if you are allergic to shellfish, you might want to reconsider the urge to "down " a plate of fried meal worms. As with anything, a little knowledge and common sense should keep you out of trouble.

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Some Insect Foods of the American Indians: And How the Early Whites Reacted to Them

November 1994. Volume 7, Issue #3.

There is a small fly (*Hydropyrus hians*), belonging to the group known as "shore flies" (Diptera: Ephydridae), that formerly bred in vast numbers in the alkaline waters of Mono Lake and other alkaline lakes in the California-Nevada border region. It was called kutsavi (or variations thereof) by the Paiute and other tribes. The fly pupae washed ashore in long windrows. J. Ross Browne¹, who visited Mono Lake in about 1865, told of encountering a deposit of pupae about two feet deep and three or four feet wide that extended "like a vast rim" around the lake:

"I saw no end to it during a walk of several miles along the beach It would appear that the worms [read fly pupae], as soon as they attain locomotion, creep up from the water, or are deposited on the beach by the waves during some of those violent gales which prevail in this region. The Mono Indians derive from them a fruitful source of subsistence. By drying them in the sun and mixing them with acorns, berries, grass-seeds, and other articles of food gathered up in the mountains, they make a conglomerate called cuchaba, which they use as a kind of bread. I am told it is very nutritious and not at all unpalatable. The worms are also eaten in their natural condition. It is considered a delicacy to fry them in their own grease. When properly prepared by a skillful cook they resemble pork 'cracklings.' I was not hungry enough to require one of these dishes during my sojourn, but would recommend any friend who may visit the lake to eat a pound or two and let me know the result at his earliest convenience There must be hundreds, perhaps thousands of tons of these oleaginous insects cast up on the beach every year. There is no danger of starvation on the shores of Mono. The inhabitants may be snowed in, flooded out, or cut off by aboriginal hordes, but they can always rely upon the beach for fat meat."

William Brewer², a professor of agriculture, had sampled kutsavi during a visit to Mono Lake in 1863. Noting that hundreds of bushels could be collected, he wrote:

"The Indians come far and near to gather them . The worms are dried in the sun, the shell rubbed off, when a yellowish kernal remains, like a small yellow grain of rice. This is oily, very nutritious, and not unpleasant to the taste, and under the name of koo-chah-bee forms a very important article of food. The Indians gave me some; it does not taste bad, and if one were ignorant of its origin, it would make fine soup. Gulls, ducks, snipe, frogs, and Indians fatten on it."

Somewhat earlier, in 1845, Captain John C. Fremont³ was impressed with a windrow of kutsavi which he described as 10-20 feet in breadth and 7- 12 inches deep. Fremont related an experience told to him by an old hunter, Mr. Joseph Walker. Walker and his men had surprised a party of several Indian families encamped near a small lake who had abandoned their lodges at his approach, leaving everything behind them:

"Being in a starving condition, they were delighted to find in the abandoned lodges a number of skin bags, containing a quantity of what appeared to be fish, dried and pounded. On this they made a hearty supper; and were gathering around an abundant breakfast the next morning, when Mr. Walker discovered that it was with these, or a similar worm, that the bags had been filled. The stomachs of the stout trappers were not proof against their prejudices, and the repulsive food was suddenly rejected."

The Mormon cricket, *Anabrus simplex* (Orthoptera: Tettigoniidae), was another important insect food of the Indians, all over the West. It is not really a cricket, being more closely related to katydids. It is a large insect, about two inches in length, wingless, and it travels in large, dense bands. Bands may be more than a mile wide and several miles long, and with 20-30 or more crickets per square yard. It is sometimes damaging to crops or range vegetation and has been a pest target of the U.S. Department of Agriculture since before the turn of the century. Major Howard Egan⁴ described, in his delightful first-person style, a Mormon cricket drive that took place in about 1850. The procedure was basically to dig a series of trenches, each about 30 to 40 feet long and in the shape of a new moon, cover the trenches with a thin layer of stiff wheat grass straw, drive the crickets into the grass covering the trenches, and then set fire to the grass. As the drive began, Egan thought the Indians were going to a great deal of trouble for a few crickets: "We followed them on horseback and I noticed that there were but very few crickets left behind. As they went down, the line of crickets grew thicker and thicker till the ground ahead of the drivers [men, women and children] was black as coal with the excited, tumbling mass of crickets." After the grass had been fired, Egan observed that in some places the trenches were more than half full of dead crickets: "I went down below the trenches and I venture to say there were not one out of a thousand crickets that passed those trenches."

Once the drive was over, the men and children had done their part and were sitting around while the women gathered the catch into large baskets which could be carried on their backs. We should remember that this was long before the days of the women's' movement, as Egan says, in obvious admiration:

"Now here is what I saw a squaw doing that had a small baby strapped to a board or a willow frame, which she carried on her back with a strap over her forehead: When at work she would stand or lay the frame and kid where she could see it at any time. She soon had a large basket as full as she could crowd with crickets. Laying it down near the kid, she took a smaller basket and filled it. I should judge she had over four bushels of the catch. But wait, the Indians were leaving for their camp about three or four miles away.

This squaw sat down beside the larger basket, put the band over her shoulders, got on her feet with it, then took the strapped kid and placed him on top, face up, picked up the other basket and followed her lord and master, who tramped ahead with nothing to carry except his own lazy carcass. There were bushels of crickets left in the trenches, which I suppose they would gather later in the day."

Egan learned that the crickets were used to make a bread that was very dark in color. They were dried, then ground on the same mill used to grind pine nuts or grass seed, "making a fine flour that will keep a long time, if kept dry" (this was often referred to as "desert fruitcake" by early settlers). Egan's Indian companion told him "the crickets make the bread good, the same as sugar used by the white woman in her cakes."

There were other efficient methods of harvesting Mormon crickets. One of them was to drive the crickets into a stream, circa 1864. as described in the journal of Perter Gottfredson⁵: "The squaws [placed] baskets in the ditch for the crickets to float into. The male Indians with long willows strung along about twenty feet apart whipping the ground behind the crickets driving them towards the ditch [The crickets] tumbled into the ditch and floated down into the baskets They got more than 50 bushels." In this instance, service berries and wild currants were mixed with the crickets to form the loaves of bread. In a similar account of floating the crickets into baskets, John Young states that they were caught by the tons.

Another method was to simply scoop up the crickets by the bushel when they were clustered under vegetation and too cold to be active. Beatrice Whiting⁶ wrote of the Paiute: "The women went out early in the morning and caught them, were back by sunrise, and spent the rest of the day roasting, drying, and pounding them and putting them in bags to be cached for the winter."

There are few first-hand assessments of the flavor of Mormon crickets by early whites, for reasons that are apparent from the following excerpt from the reminiscences of Captain Joseph Aram⁷ who was in the Humboldt Sink in 1846: "We came to an Indian village, they came out in strong force but finding us friendly, they treated us kindly. They were digging roots on a creek bottom. They looked like a small red carrot. They gave us some that were cooked, they tasted like a sweet potato. They also offered us some dried crickets but those were declined, thinking they would not relish well with us." According to a modern account of the Honey Lake Paiute (Lassen County, California) by F. A. Riddell⁸, when Mormon crickets were made into a soup, the flavor was somewhat like that of dried deer meat.

A certain species of aphid even provided the Indians with sugar--in the form of the sweet honeydew it secreted. In the early Mission records of California, Pere Picola wrote in 1702: "In the months of April, May and June there falls with the dew a kind of manna, which solidifies and hardens on the leaves of reeds from which it is collected. I have tasted some. It is a little less white than sugar, but has all the sweetness of it." Some of the

Fathers considered this "manna" a dispensation from Heaven.

John Bidwell⁹, a pioneer in the Humboldt Sink area in 1841, looked at the "manna" with a more discerning eye: "We saw many Indians on the Humboldt, especially towards the sink. There were many Tule marshes. The tule is a rush, large, but here not very tall. It was generally completely covered with honeydew, and this in turn was wholly covered with a pediculous-looking [louse-like] insect which fed upon it. The Indians gathered quantities of the honey and pressed it into balls about the size of one's fist, having the appearance of wet bran. At first we greatly relished this Indian food, but when we saw what it was made of--that the insects pressed into the mass were the main ingredient--we lost our appetites and bought no more of it."

It wasn't until 1945 that the scientific identity of the aphid was determined. Volney Jones¹⁰ established its identity as *Hyalopterus pruni*, which is called the mealy plum aphid because it spends its winter phase on plum trees and other species of *Prunus*. In the spring and early summer it migrates to summer hosts, primarily the reed grass, *Phragmites communis*, where it produces the honeydew. The gathering of the honeydew seems to have been one of the annual seasonal rounds of activity of the Indians of the Great Basin. A family or band might camp for a short time near a stream or lake when the honeydew was ready. By piecing together various accounts of the manner of collection, Jones gives the following picture: "The collection seems to have been primarily the work of women and children. The reeds were cut and carried away from the water Cutting was done just after sunrise, and the reeds were spread out to dry during the warmer part of the day to dry the honey dew and make it brittle. During the afternoon the reeds were held over a hide and beaten with a stick to dislodge the deposits of honey dew which fell on the hide and could be collected The honey dew was rolled into balls, wrapped in leaves, and stored in baskets until needed."

Many other insects contributed on a regular basis to the Indian diet, among them grasshoppers, cicadas, ants and ant pupae, wasp pupae and prepupae, certain beetle larvae and several kinds of caterpillars. Edible insect harvest was a part of the annual rounds of food procurement. The Indians knew exactly where to go, and when, to find the desired insects, and large numbers of people and considerable planning, travel and effort were often involved in harvesting them (Sutton¹⁰). Some insects such as the Mormon cricket, grass hoppers and pandora moth caterpillars yielded a very high energy return for the energy expended in their harvest, often much higher than return rates from seeds or other plant food resources. And, when dried, the insects were storable for use as winter food.

In several localities, pandora moth caterpillars (*Coloradiapandora*) are still harvested by elderly Paiute. Called piuga by the Indians, the caterpillars feed primarily on the needles of the Jeffrey pine and when fully grown descend the tree trunk to pupate in the soil. They sometimes occurred in great numbers and were collected in trenches dug around the bases of the trees. They were then roasted by mixing them with hot sand. Piuga is

regarded by the Paiute as "a tasty, nutritious food that is especially good for sick people, much like our chicken soup," according to Elizabeth Blake and Michael Wagner¹², two researchers at the University of Northern Arizona. In former times, according to the late E. O. Essig¹³ (formerly an entomologist at the University of California-Berkeley), hungry whites who tasted piuga claimed that boarding with the early Californians "on the American plan was not so good."

Finally, among the insect foods of the western Indian tribes, none were more widely harvested than grasshoppers. They were most often collected by using what hunters call a "surround." H. M. Chittenden and A. D. Richardson¹⁴, in their account of the life and travels of the French missionary, Father Pierre-Jean De Smet, described the "surround" used in a Shoshoco grasshopper hunt (circa 1850): "They begin by digging a hole, ten or twelve feet in diameter by four or five deep; then, armed with long branches of artemisia, they surround a field of four or five acres, more or less, according to the number of persons who are engaged in it. They stand about twenty feet apart, and their whole work is to beat the ground, so as to frighten up the grasshoppers and make them bound forward. They chase them toward the centre by degrees--that is, into the hole prepared for their reception., Their number is so consider able that frequently three or four acres furnish grasshoppers sufficient to fill the reservoir or hole."

A variation of the Shoshoco procedure was to build a fire covering 20 to 30 feet square. The people then formed a large circle around it and drove the grasshoppers onto the hot coals. Sometimes a field was simply set afire, and the scorched grasshoppers were picked up afterward. Or as in the case of Mormon crickets. grasshoppers could be collected by hand in the early morning while they were too cold to be active.

Edwin Bryant¹⁵ (circa 1848) provided one of the few assessments of grasshopper palatability by a white. following an encounter with Utah Indians, an occasion when three women appeared, "bringing baskets containing a substance, which, upon examination, we ascertained to be service-berries, crushed to a jam and mixed with pulverized grasshoppers. This composition being dried in the sun until it becomes hard, is what may be called the 'fruitcake' of these poor children of the desert. No doubt these women regarded it as one of the most acceptable offerings they could make to us. We purchased all they brought with them, paying them in darning needles and other small articles, with which they were much pleased. The prejudice against the grasshopper 'fruitcake' was strong at first, but it soon wore off, and none of the delicacy was thrown away or lost After being killed, they [the grasshoppers] are baked before the fire or dried in the sun, and then pulverized between smooth stones. Prejudice aside, I have tasted what are called delicacies, less agree able to the palate."

Nutritionally, insects are high in protein, fat (and thus energy) and many of the important vitamins and minerals. They have served as traditional foods in most cultures of non-European origin and have played an important role in the history of human nutrition not only in western North America, but in Africa, Asia and Latin America. As might be

expected from our European cultural heritage, some early American whites looked with open disgust at the insect foods of the American Indians. It is interesting, though, that so often, as shown by the above examples, these cross-cultural encounters relative to food seemed dominated by feelings of mutual tolerance, curiosity and respect and were described with a sense of humor.

Gene R. DeFoliart, Editor

(Ed.: This article was originally written two or three years ago at the invitation of a travel and outdoor magazine published in California. When the magazine went on a reduced publication schedule, we got our manuscript back. Nobody likes to throw away a manuscript that's already written, so we decided that Newsletter readers might enjoy it.)

Addendum: This wasn't included in the original manuscript, but I think the second of the two paragraphs below quoting Father Kino (as found in Bolton 1919⁶) is one of the more humorous passages (because of Kino's religious candor) that I have encountered in the older North American literature. Kino labored in California, Arizona and Sonora. In the first paragraph, he is talking about aphid honeydew. The second paragraph is more on spiritual matters, and from Father Kino's account it seems questionable as to who was converting who:

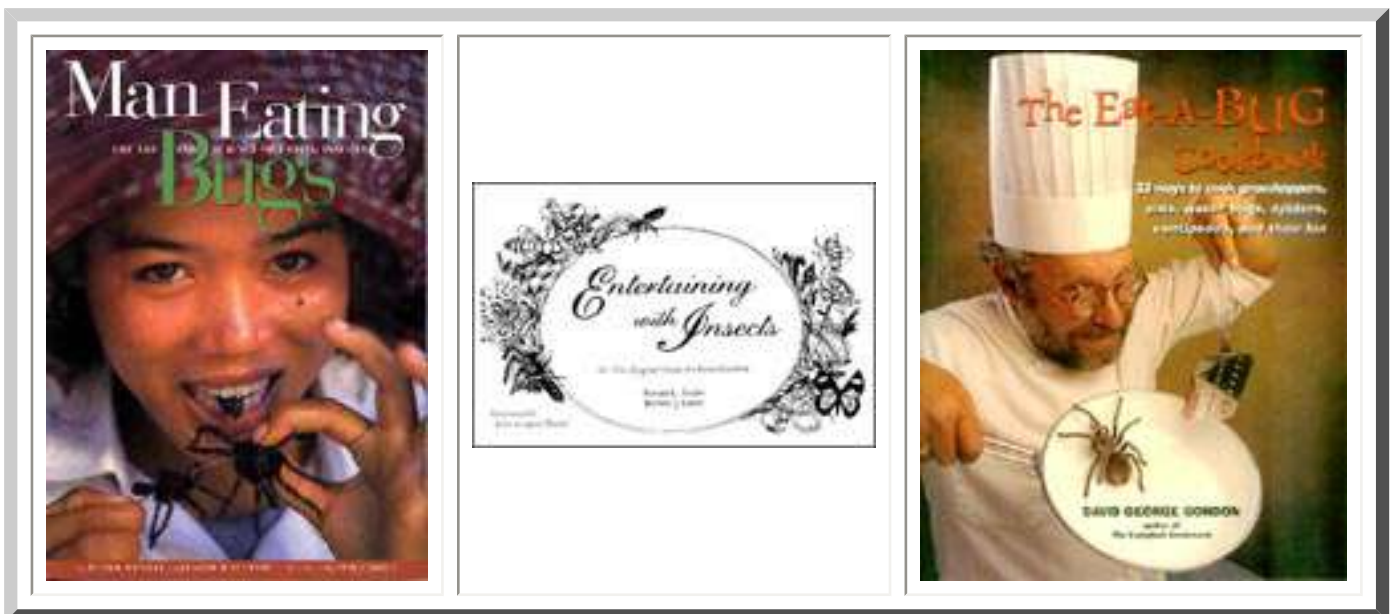
"In order that sugar, which with so great artifice and toil is made over here, may not be lacking to the Californians, heaven provides them with it in abundance in the months of April, May, and June, in the dew which at that time falls upon the broad leaves, where it hardens and coagulates. They gather large quantities of it, and I have seen and eaten it. It is as sweet as sugar to the taste, and differs only in the refraction, which makes it dark." (II:56).

"All this fertility and wealth God placed in California only to be unappreciated by the natives, because they are of a race who live satisfied with merely eating By nature they are very lively and alert, qualities which they show, among other ways, by ridiculing any barbarism in their language, as they did with us when we were preaching to them. When they have been domesticated they come after preaching to correct any slip in the use of their language. If one preaches to them any mysteries contrary to their ancient errors, the sermon ended, they come to the father. call him to account for what he has said to them, and argue and discuss with him in favor of their error with considerable plausibility; but through reason they submit with all docility." (II:58-60)

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Food Conversion Efficiencies of Insect Herbivores

March 1993. Volume 6, Issue #1.

**By Richard L. Lindroth
University of Wisconsin
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In his classic children's book, *The Very Hungry Caterpillar*, Eric Carle describes the development of an increasingly voracious caterpillar, from egg hatch to metamorphosis into a beautiful butterfly. In addition to the character appeal of the larva and aesthetic quality of the illustrations, the book teaches some valuable lessons about the nutritional ecology of insect herbivores. The caterpillar hatched on Sunday: on Monday he ate through one apple, on Tuesday two pears . . . and on Saturday "he ate through one piece of chocolate cake, one ice cream cone, one pickle, one slice of Swiss cheese, one slice of salami, one lollipop, one piece of cherry pie, one sausage, one cupcake, and one slice of watermelon. That night he had a stomachache!"

What are the lessons we can learn? First, the older (and bigger) the insect is, the faster it eats. Indeed, consumption and growth rates increase exponentially with insect age. For example, leaf consumption by the forest tent caterpillar (*Malacosoma dissiria*) is approximately 0.05, 0.2, 0.8, 2.9 and 18.0 square inches for instars 1-5, respectively. Second, the older an insect is, the more diversified its diet may become. Most herbivorous insects are specialists, feeding on only one or a few related species for their entire life span. But some insects are generalists; notable among these is the gypsy moth (*Lymantria dispar*), which feeds on over 300 species of woody plants. For these generalist feeders, diets typically become increasingly diversified as maturity affords both greater mobility and increased capacity to detoxify the chemical defenses of plants. Third, for caterpillars, as for humans, some foods or combinations thereof may bring considerable discomfort.

These are basic principles of the discipline of nutritional ecology, which, in short, addresses what insects eat, why they eat what they do, and how efficient they are in doing it. The latter theme will be introduced in this paper. Several excellent reviews have been published on the topic and can be consulted for additional information (see References).

Insects, like all living organisms, require energy and nutrients to survive, grow and reproduce. The nutritional components (e.g., protein, carbohydrates, fats, vitamins,

minerals) of ingested food may or may not be digested and absorbed. The proportion of ingested food that is actually digested is denoted by AD, the assimilation efficiency (also called "approximate digestibility"). Of the nutrients absorbed, portions are expended in the processes of respiration and work. The proportion of digested food that is actually transformed into net insect biomass is denoted by ECD, the efficiency of conversion of digested food. A parallel parameter, ECI, indicates the efficiency of conversion of ingested food ($ECI = AD \times ECD$). In short, AD indicates how digestible a food is, whereas ECD and ECI indicate how efficient a herbivore is in converting that food into biomass. These efficiency values may be calculated for specific dietary nutrients as well as for the bulk diet. For instance, nitrogen use efficiencies are informative because levels of plant nitrogen (an index of protein) are often times limiting to insect performance.

Food conversion efficiencies may vary considerably within a species. One cause of such variation involves homeostatic adjustment of consumption rates and efficiency parameters such that an insect can approach its "ideal" growth rate even with foods of different quality in various environments. For example, insects that experience reduced ECDs due to increased respiratory costs may be able to compensate by increasing consumption rates or digestion efficiencies (ADs). Not all changes are homeostatic, however. For instance, many insects increase food consumption rates in response to low concentrations of critical nutrients such as protein. Increased consumption will accelerate passage of food through the gut and thereby reduce ADs. In our work with the gypsy moth we found that larvae reared on a protein deficient diet increased consumption rates by 3-4-fold, but overall ADs declined by nearly as much. Other nonhomeostatic changes in efficiency values may occur in response to plant allelochemicals. For example, compensatory feeding to increase intake of a limiting nutrient may simultaneously increase exposure to plant toxins, which in turn may reduce ECDs. In practice, however, it can be quite difficult to ascertain "cause" and "effect" responses with efficiency parameters. Does the insect eat more because digestibility is low, or is digestibility low because the insect is eating more? Efficiency parameters are so closely physiologically related that determination of "cause" and "effect" is not a trivial matter.

Intraspecific variation in food conversion efficiencies may also be related to insect development. ADs generally decrease, whereas ECDs increase, from early to late instars. In other words older larvae digest their food less completely, but that which they do digest is more efficiently utilized for growth. One study showed that values for AD and ECD change from 46% to 27% and 38% to 60%, respectively, for early and late instars of the desert locust (*Schistocerca gregaria*). Factors contributing to such changes are still largely unknown, but may include shifts in food selection, digestive physiology, metabolic rates, and body composition.

Food conversion efficiencies also vary greatly among species, and this variation is more closely related to feeding guilds than to taxonomic affinity. Insects that feed on nitrogen-rich foliage generally have higher consumption rates and assimilation efficiencies than do insects that feed on nitrogen-poor foliage, and as a consequence grow and develop much

faster. The classic example here is the difference between forb- and tree-feeders. Forb leaves typically have high levels of nitrogen and water, whereas tree leaves have lower levels of those constituents and higher levels of poorly digestible compounds such as cellulose, lignin and tannins. Accordingly, insects that feed on mature tree leaves exhibit growth rates half or less than those insects that feed on forbs. The relatively poor nutritional quality of tree foliage has had important consequences for insect life histories. In temperate regions forb feeders often have many more generations per year than do tree feeders. Among tree-feeders, numerous species have adapted to emerge and feed only on the especially nutritious early spring foliage, and thus have only one generation per year.

Other examples that demonstrate how the various efficiencies are strongly influenced by food quality include wood- and seed-feeding insects. Wood is tough and nutritionally poor. Thus wood-chewers have slow rates of consumption and digestion (much of which is accomplished by symbiotic microbes). The combination of these factors precludes all but slow growth rates in wood-feeders. In contrast, seeds are high in readily digestible carbohydrates and protein and low in fibrous material. Thus seed-feeders exhibit high ADs. Growth rates are nonetheless only low to moderate, due to low consumption rates and low ECDs. Low ECDs may result from a requirement of these insects to metabolize digested food in order to produce water.

Understanding of these basic principles of nutritional ecology can enhance our appreciation of insects as a food resource. Environmentalists and others concerned about nutrition and world food resources have long decried the reliance of some people on large animal protein (e.g., beef) as a dietary staple. The reasoning is that production of such high-quality protein is very inefficient; more food would be available if people ate the grain instead. This debate is complex and beyond the scope of this paper. Suffice it to say, however, that a major reason that large animals are inefficient in transforming plant biomass into animal biomass is that they have very high maintenance costs (i.e., low ECDs). Large amounts of energy and nutrients are used to maintain constant body temperatures. Insects, being "cold-blooded," are more efficient in transforming plant biomass into animal biomass.

Understanding of basic nutritional ecology may also improve selection of insect and plant species for large-scale insect production. For example, production will be more rapid with forb feeders than with tree-feeders and with leaf-feeders than with wood-feeders, other environmental factors equal. Want to know what plant/insect characteristics may be limiting production? Some simple input/output and growth measurements will tell whether production is limited by low consumption, poor digestibility, or inefficient conversion of assimilated food into body mass. Different corrective measures may be available for each situation.

Acknowledgment

This article benefited greatly from the content and inspiration of excellent reviews by Frank Slansky and Mark Scriber.

Further Reading

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A Follow-up Interview with Dr. Lindroth

The Newsletter has never used this journalistic technique before, but it seems a good way of getting the most out of our invited experts while we have their attention. We'll designate the questioner as The FIN(The Food Insects Newsletter). It's too bad we're not in the fish business because it would make a great acronym.

The FIN: First, thank you Dr. Lindroth for accepting our invitation to set forth some basic principles of insect food conversion efficiency in the Newsletter and for taking additional time to respond to some questions. The food conversion efficiency of edible insects has important ecological and environmental implications. First question. Remembering that edible insects furnish not only protein, but fats, vitamins, and minerals, and, as a very high proportion of growth occurs in the last two larval or nymphal instars (about 95% in lepidopterous larvae as shown with your example, *M. disstria*), can we assume that the combined ECI for the last two instars is a valid (and the simplest) statistic for comparing food conversion efficiency (let's shorten it to FCE) between or within species in different situations? A second, related question. Do ecologists have any "rule-of-thumb" ECI level that is considered good, or is everything comparative and dependent on the quality of the food source?

Dr. Lindroth: If I had to select only one efficiency measure, ECI would be a good candidate, as it represents efficiencies of both digestion and how well digested food is converted to biomass. Bear in mind though, that insects can compensate for low ECIs to some degree simply by increasing their feeding rates. Thus two insects could have the same growth rate; one achieves it by eating less but being very efficient with what it eats, the other by eating more but being less efficient. Because so much of an insect's feeding and growth occurs in its last few instars, FCEs from that period are a very useful comparative measure. Another caution here is that dietary characteristics (nutrient deficiencies or toxins) may affect younger instars more than older instars, and if the impact is great enough, you'll never see those insects as older instars.

I'm reluctant to suggest what ECI values may be "good" or "bad"; they're really more useful in a comparative sense. What is "good" for one insect feeding on one substrate may or may not be "good" for another insect feeding on another substrate. What is most valuable is to compare different species (or races) feeding on the same food, or individuals of one species feeding on different foods .

The FIN: You pointed out that forb-feeders show higher FCEs than tree leaf-feeders because forbs are higher in nitrogen and water and lower in such hard-to-digest compounds as cellulose and lignin. I've seen combined ECI data (Scriber's) on only one forb-feeding edible insect, *Spodoptera eridania* (the southern armyworm). When tested on 10 varieties of alfalfa, combined ECIs ranged below 15% on six varieties, from 15.5-20.3% on three others, and showed an incredible 29.8% on Vernal alfalfa. Two questions. Do you know of any vertebrate meat animal that can come anywhere close to 29.8%? And secondly, how do you explain such great ECI differences at the plant varietal level?

Dr. Lindroth: Yes. As you'll see below, poultry can attain this level of efficiency. But their food source is grain, which is even richer than alfalfa.

Considerable variation in ECIs at the plant varietal level has not been well-studied, but may not be as unusual as one might expect. For example, in a study with gypsy moth larvae feeding on individual aspen trees from a common habitat, we found ECI values that ranged from 6% to 16%. In our case among-tree variation in levels of phenolic toxins greatly influenced ECI's and subsequent larval growth rates. I'm not at all surprised that differences of the magnitude you describe exist among plant varieties. Those differences probably result from differences in chemical or physical attributes of the varieties.

The FIN: In scanning ECI data, one can dream up some wild schemes. For example, Scriber also tested *S. eridania* on five kinds of clover and trefoil. The highest combined ECI was on *Trifolium agrarium* (yellow blossom sweet clover), 23 .6%. Now, commercial pond fish producers are looking for good sources of long-chain w3 polyunsaturated fatty acids, and lepidopterous larvae, in general, would be a rich source if they could be feasibly exploited. Yellow blossom sweet clover must do very well on poor soils, because it's along roadsides all over the country. And *S. eridania* has multiple generations per year. Maybe it would pay the fish growers to hire a young entomologist (or maybe put some research money into your lab) to look into the possibilities. Maybe the armyworms should be harvested at the end of the penultimate (second to last) instar. Scriber's data showed an incredible ECI of 56.9% for that instar on YBSC (it was even higher, 58.3%, on Vernal alfalfa.)

Dr. Lindroth: You're right, the possibilities are great. As you know better than I, a minor shift in one's thinking about insects as food can open up many new avenues of research and application.

The FIN: Unfortunately, many more of the major edible insect groups seem to feed on trees and grasses, or even wood, than feed on forbs. Tests on two species of edible grasshoppers, *Locustana migratoria* and a species of *Melanoplus*, fed on several kinds of grasses showed combined ECIs in the range of 10-15% and 8-11%, respectively. Two questions. How do ECIs in the range of 10-15% compare with other grass-caters such as cattle? (I believe there is a rule-of-thumb in cattle husbandry that 15 lbs of hay puts on a pound of gain). As grasshoppers are generalists, if they were reared on forbs, should we expect higher ECIs?

Dr. Lindroth: As I alluded to in the article, FECs are generally higher for insects than for vertebrates. One must be careful in making such comparisons, however. One problem is that insect values are reported on the basis of dry weights, whereas livestock values are reported as "gain" which typically includes 70% water. After adjusting for water weight, ballpark figures for efficiency of gain are seen below. Clearly, the insects are superior to mammals when fed the same food. FCEs of vertebrates can approach or even surpass those of insects when they are fed especially nutritious and digestible food such as grain.

Chicken (grain) 30%

Pigs (grain) 11 %

Beef (grain) 5%

Beef (grass) 3%

About rearing grasshoppers on forbs: I would expect higher ECIs than when reared on grass.

The FIN: Larvae of the giant silk moths (Family Saturniidae) are a major food insect group, especially in Africa. Most of these are tree-feeders, and as you indicated in general for tree-feeders, most have only one generation per year. I don't know of any ECI data on African species, but data by Scriber and Feeney on nine North American species on 21 host species showed combined ECIs ranging from 7.1 to 15.8 (ECIs above 10 on nine of the 21 larva/host combinations). Doesn't it seem that, even with ECIs at the relatively low range of 10-15%, if the forest was properly managed for caterpillar (and termite) preservation (as has been recommended in several instances by researchers in Africa), it would be about as productive for animal agriculture as grassland? Is there a short answer for this complex question, or is the question not as complex as it seems?

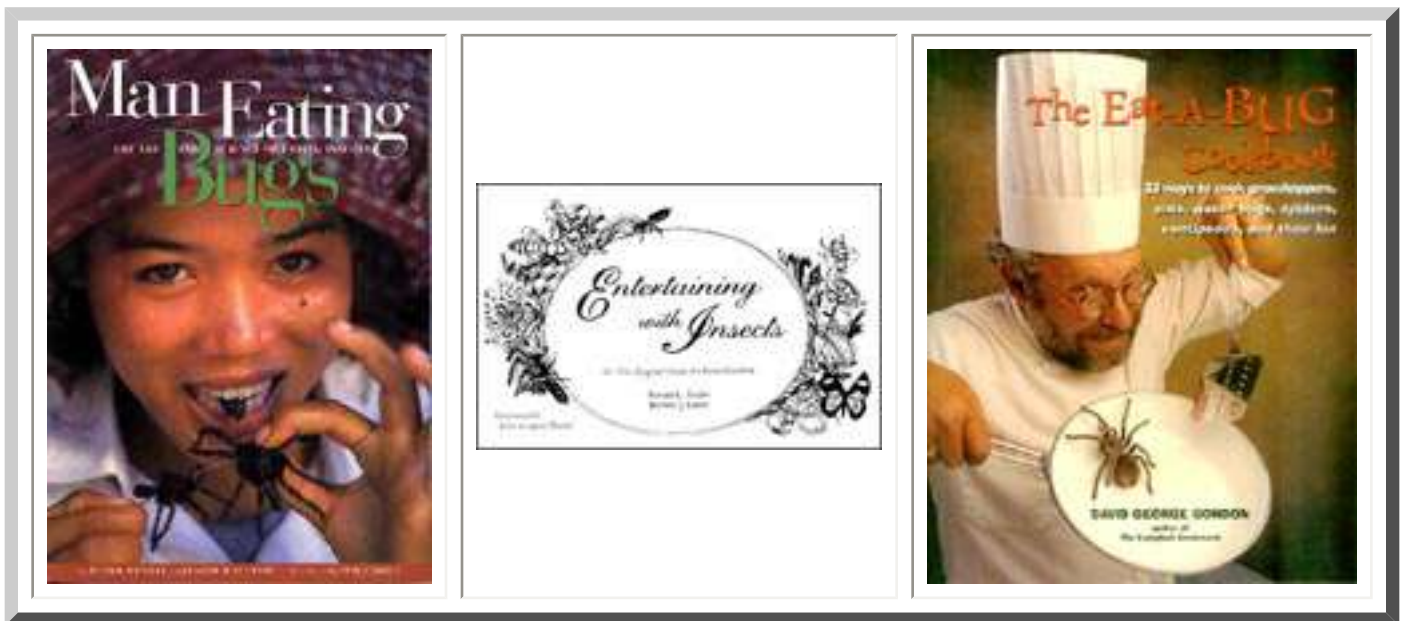
Dr. Lindroth: On the surface the reasoning seems sound. But a number of complicating factors come to mind; the answer really is complex. For example, because grasslands have coevolved with large grazing mammals grasses can recover remarkably well from extensive grazing. Remove the same percentage of green foliage from a forest habitat and you'll not have the forest for long. And then there are the practical matters of harvest, etc. It is probably much easier to harvest 1000 lbs of large animal biomass from a grassland than an equivalent amount of insect biomass from a forest! This is not to say that management of forests for insect production should not be considered, just that the comparison with grassland systems is fraught with problems.

The FIN: Several important food insect groups develop in wood, including decaying or rotten logs. As would be expected, most have long life cycles, one or more years, for example in the beetle families, Buprestidae and Cerambycidae. Palm weevils of the genus *Rhynchophorus* (Family Curculionidac). however, complete development in only two or three months in palm logs. Is this an exception to the "feeding guilds" principle that you mentioned (feeding guilds more important than taxonomic affinity in determining food conversion efficiency), or what would explain such relatively fast development on such poor food?

Dr. Lindroth: This is an interesting example. I don't know the answer, but I can hazard a guess. Most trees are dicotyledons and the woody tissue of these species is loaded with lignins, tannins, etc. Palm trees are monocotyledons: they are more closely related to Kentucky bluegrass than to oaks or maples. I know next to nothing about the chemical composition of palm logs, but would suggest that they have higher levels of particular nutrients (e.g., nitrogen, sugars) and/or lower levels of lignins and tannins than occur in the wood of dicots.

The FIN: Thanks again, Rick, and a final question. Are forbs and herbs the same thing?

Dr. Lindroth: Not quite. Herbs are non-woody plants, including both monocots and dicots. In temperate regions they "die back" to ground level at the end of the growing season. Forbs are herbs that are not grasses (dicots).



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Large-scale Feed Production from Animal Manures

with a Non-Pest Native Fly

July 1992. Volume 5, Issue #2.

By D. C. Sheppard, Ph.D.

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The black soldier fly, *Hermetia illucens* (L.), is an attractive manure management agent that can produce large quantities of high-quality animal feedstuff, control house flies and reduce manure residue by half. Based on a 480 hen pilot scale test (Sheppard et al 1992) a modest-sized 20,000 hen caged layer facility could collect over 13 tons of larvae from June through December. Sixty thousand hens per house is now the preferred size and farms usually have multiple houses. This 13 ton production estimate from a small commercial unit is probably low. Future systems will be managed better than this first trial. Early season collections were not measured, and a late summer manure clean-out lowered production. Deeper manure basins in future systems should allow utilization of manure collected during the winter.

Prepupal soldier flies were self-collected as they sought pupation sites and crawled out of the manure basin. A 40° slope on one wall of the basin directed these mature larvae. They crawled into a 2 inch slit in a 6-inch diameter PVC pipe at the top of this slope. Then they continued to crawl to a container at the end of the pipe. In the experimental facility they easily negotiated a 40-foot length of pipe. The masses of exiting prepupae sometimes clogged a 4-inch pipe, which was used at first, but the 6-inch pipe worked well. The opposing 12-inch wall was vertical and kept the masses of larvae off of the house's central walkway. If not contained, these masses of larvae can cause aesthetic problems.

Newton et al (1977) found that manually collected soldier fly larvae contained 42% crude protein and 35% fat. Self-collected prepupae should be of higher feed value since they average larger, have emptied their gut and have more stored fat. Tests are underway to determine the feed value of the self-collected prepupae. Manually collected larvae have been studied, and show promise as a feed ingredient for swine (Newton et al 1977), poultry (Hale 1973) and fish (Bondari and Sheppard 1981). Swine relish the fresh larvae.

Little is known about adult biology. The only adults commonly seen are newly emerged

adults and ovipositing females. Eggs are laid in batches of about 500 in dry cracks or crevices above the chosen larval media. Other adults apparently live in a wild environment and their habits are largely unknown. They do not try to enter houses and are usually not a problem. In 15 years of investigating this insect, I can remember only one complaint about adults entering a residence.

Besides offering a potential feed source, soldier fly larvae provide two other significant benefits: house fly control and about a 50% reduction in manure volume (Sheppard 1983). The larvae repel ovipositing female house flies (Bradley and Sheppard 1984) and house fly larvae that do attempt to compete with dense populations of soldier fly larvae usually die. In the pilot scale manure management test mentioned earlier no house fly breeding occurred from June to December. Many Georgia egg producers use this insect for house fly control without any management to contain the soldier fly larvae.

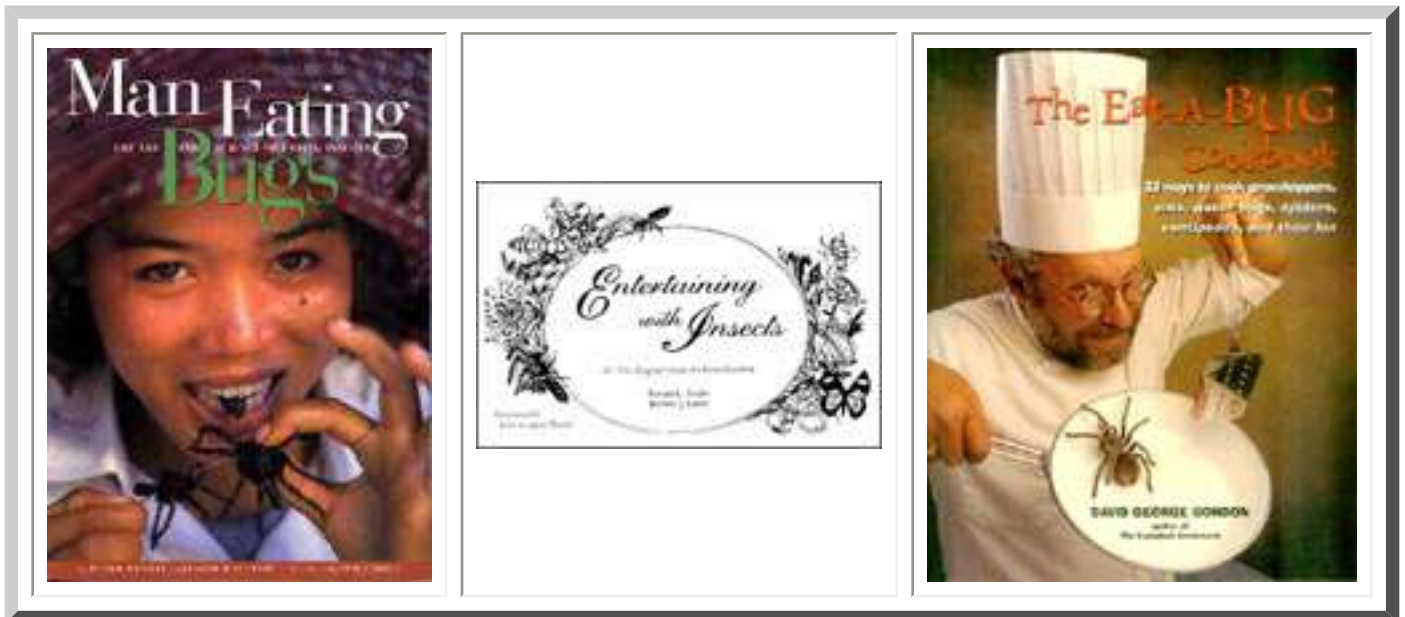
The economics of this manure management system are attractive. Construction costs should be less than the currently popular flush systems and resource recovery is greater.

The only insecticide able to approach the level of control achievable with this system is Larvadex, when house flies are susceptible. With low levels of Larvadex resistance, soldier fly larvae provide house fly control superior to Larvadex (Sheppard et al 1989). Larvadex costs an egg producer 10 cents per hen if used for 6 months. Thus a conservative value to place on house fly control with this soldier fly system is 10 cents per hen per year. Manure removal and surface application costs 65 cents per hen, per year in shallow pit houses (Ritter 1992). Assuming 50% reduction in manure build-up through soldier fly activity (Sheppard 1983) for half the year gives a 25% reduction on an annual basis. Actual reduction may be much more if manure basins deeper than 12 inches are used, and soldier fly larvae can digest manure from the previous winter. At any rate, the conservative 25% reduction estimate produces an economic benefit of $0.25 \times 65 \text{ cents} = 16.2 \text{ cents per hen per year}$. This assumes the manure is a liability, which it generally is in high production areas. Value of the dried larval feedstuff has been estimated at \$340-400 per ton. At 44% dry matter, the fresh larvae are worth about \$160 per ton or 8 cents per pound. So, the 1.32 pounds of larvae produced per hen per year are worth 10.6 cents. Adding the easily measured economic benefits of this system yields a total value of 36.8 cents per hen per year. This would net our small hypothetical 20,000 hen egg producer an extra \$7,360. This system should easily adapt to swine waste management, and a trial is currently underway. Soldier flies could be used to degrade many other organic wastes. They have even been found breeding in ketchup and formalin preserved tuna (May 1961), and can eliminate house fly breeding in privies (Kilpatrick and Schoof 1959).

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They Ate What?

(Catching up on the magazines)

November 1991. Volume 4, Issue #3.

By Gene R. DeFoliart

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The above is the title of an article published in the Cuisine Section of American Way, the official mag of American Airlines. I found it on my desk one day last spring. Dr. Jane Homan, who has flown to just about everywhere in her travels for the UW Office of International Agricultural Programs, had attached a note: "When this starts showing up in airline magazines it must be getting 'chic'! !

Author Dick Reavis, a contributing editor of American Way, certainly makes it sound so, with "creepy creatures" now considered by some as the height of haute cuisine. According to Reavis; "It's in style: Now that Mexican restaurants are popular from Bangor to San Diego, the cognoscenti of real Mexican food are seeking out restaurants that serve unadulterated, un-Europeanized food from Central America and Mexico. Pre-Hispanic or pre-Columbian food it's called, the kinds of dishes Mexicans ate before the region was subdued by the Spanish. Worms [read insect larvae], cooked or live, are a big part of pre-Hispanic cuisine, and eating them has become a rite of passage for those who would be intimate with the Mexican past."

One restaurant providing this kind of fare is Don Chon's, near the historic La Merced market in Mexico City, "a back-street landmark for rustics and adventurous connoisseurs." It's unpretentious, "but diplomats, ambassadors, and the theater crowd flock there at lunchtimes." The owner of Don Chon's, Leopoldo Ortega, notes that back in the fifties, the restaurant was mainly patronized by the vendors who came to La Merced from the countryside. Because pre Hispanic food has become relatively expensive, tourists and people with bohemian tastes now outnumber the country folk, who, Ortega says, have "become our sellers more than our customers." A hint of how expensive is given by Reavis who ordered a plate of red agave worms [larvae of the moth, *Xyleutes redtenbachi*]; price, 30,000 pesos or about \$11, nearly two times the daily wage of most Mexicans. (Reavis also tried a side dish of live worms and describes the indelicate maneuvers required to remove one when it bit him.)

Reavis concludes his article with the following paragraph: "In my opinion, the finest pre-Hispanic delicacy at Don Chon's (and also sometimes served at the highbrow Prendez restaurant downtown on 16 de Septiembre Street, a place not known for pre-Hispanic food; that it even offers such a dish proves the trend) is escamoles in green sauce, sprinkled with diced onion and bits of cilantro. Escamoles are the larvae of black ants. When boiled, they look like cottage cheese. Rank amateurs scoop them up with a spoon, and ordinary Mexicans with a corn tortilla. But the blase know, and the bold quickly see, that a torta de ahuatli - a wafer made of batter and the eggs of a swamp fly [read Mexican caviar, eggs of several species of aquatic Hemiptera, or true bugs] - does the trick in higher style. The season for escamoles is in the spring. By then, Don Chon's will also be serving white worms as big as your fingers. I don't know if they bite, but take my advice: They're tasty when toasted, but I wouldn't eat them alive."

- If we are looking for glamour, however, we needn't settle for the airline magazines. How about the 1989 25th Anniversary Swimsuit Issue of Sports Illustrated! Now we're talking sun and surf and the Pacific Coast of Mexico. But, according to the author, it is the worst place in the world to be a grasshopper. A recipe is offered (page 260) for a small species sometimes served for lunch in Oaxaca:

Ingredients

About 1000 grasshoppers (the younger the better)
 1/2 cup chili sauce
 pinch of salt
 garlic
 onion
 1 lemon
 1 cup guacamole
 6 tortillas

Directions: Soak the grasshoppers in clean water for 24 hours. Boil them, then let dry. Fry in a pan with garlic, onion, salt and lemon. Roll up in tortillas with chili sauce and guacamole. According to the author, "Serves six if you can fund six."

- If one prefers not glamour but a more sedate and intellectual approach, one can consult Natural History magazine, specifically food historian Raymond Sokolov's column, "A Matter of Taste." Three times in the past two years, Sokolov has dipped into things entomophagous. The first was in the August 1989 issue in an article titled, "Before the Conquest" and subtitled "Thousands of Mexican dishes could not have existed before Cortes." Sokolov notes that Mexico offers a better opportunity than most cultures do for precisely tracing the evolution of a national cuisine. The evidence comes from many sources; the Aztecs, who wrote about their own civilization; from pre-Columbian and colonial Mexican an; from ethnographic documents produced at the direction of the

Spaniards soon after the conquest; and from survival of ancient foodways that are still abundantly practiced in Mexico today.

The single most important work was the monumental General History of the Things of New Spain (*Historia general de las cosas de Nueva Espana*), by the Franciscan friar Bernardino de Sahagun. From Sahagun it is known that the Aztec diet was based on corn and tortillas, tamales and plenty of chilies in many varieties. Sokolov describes how this diet was influenced by the importation of European-style foods that began with Cortes, and states that it is a wonder "that so much of what Mexico ate before Cortes is still available today and popularly consumed, from cactus paddles to chilies, from tadpoles to various worms and bugs."

The article concludes with a recipe for Salsa de Jumilies (Mountain chinch sauce) taken from Adela Fernandez's book, *La Tradicional Cocina Mexicana y sus Mejores Recetas*, Panorama Editorial, Mexico, 1989. We have not reprinted this recipe because we doubt that very many Americans are yet ready for it. Jumilies belong to the "stink bug" family, Pentatomidae, Order Hemiptera.

- In the September 1989 issue of *Natural History*, Sokolov follows up on the previous month with an article titled "Insects, Worms, and Other Tidbits" and subtitled "The Mexican diet, before Cortes, obtained high-quality protein from lowly sources." He emphasizes that "authentic" cuisine "virtually everywhere" is not the immobile tradition that traditionalists wish it to be," and furnishes an impressive list of foods contributed by the New World to the Old, including potato, tomato, corn, chocolate, squashes, beans and many others. Some of these New World foods have had great nutritional impact, for example, the sweet potato, peanut and the chili pepper in China, and manioc, corn, peanuts and pumpkins in Africa.

Relative to Mexico when Cortes appeared Sokolov notes that the country " was a major world civilization with a vigorous culture that continues to challenge imported European culture today. [Enough native Mexicans have survived] to carry on local food traditions in tandem with the new ideas and foods from Spain and the Spanish Empire." Insects of many species are a prominent part of these local food traditions, but Sokolov devotes the most space to the maguey worm, larvae of the giant skipper butterfly, *Aegiale hesperiaris*, which are also called palomillas del maguey (maguey squabs), champolocos, meccuilines and pecahs. Sokolov paraphrases the account of these larvae in Teresa Castello Yterbide's *Presencia de la Comida Prehspanica* (Banamex, 1986), as follows: "Larvae harvesters poke about among the maguey's lower leaves, looking for the telltale tunnels at the base of the leaves near the outer edges. Working very carefully with a machete, so as not to disembowel the larvae unwittingly, they cut open the leaf. To extract the larvae whole, they use hooks formed by cutting thin strips from the edge of a maguey leaf. Then they remove all its spines except for one at the end of the strip. This they form into the hook they use to catch the larvae by the head. To store the larvae, they make pouches with the skin of a tender new maguey leaf, which is called mixiote (it gives its name,

synecdochically, to a dish made of chunks of marinated meat wrapped in mixiote pouches and steamed).

To cook the larvae, people sometimes just put a whole gusano (larvae)-filled mixiote over coals or hot ashes, or they might just put the larvae directly on a bakestone until they swell and stiffen, turning golden brown and crunchy. And this is not some quaint account of a long-forgotten practice. Castello Yturbide nonchalantly mentions that maguey larvae can be obtained in April in the market of San Juan in Mexico City or in Actopan and Ixmiquilpan (two villages of the state of Hidalgo) or in farm hamlets around Mexico City.

Relative to other insects, Sokolov notes that the eggs of water bugs (moscos de pajaro) (Hemiptera) are still harvested in the same manner described by Sahagun. Today, they are toasted, ground up and made into little cakes held together with turkey egg. In the late 18th Century, they were apparently a garnish for the festive dish called revoltijo, served on Christmas Eve and at the vigil of Thursday night of Holy Week. Other insects still eaten include locusts, available year-round at markets in Oaxaco and Atlixco, toasted and eaten with tortillas and a sauce of chili pasilla; mountain chinch bugs, eaten toasted or living; oak-boring beetles which are popular as snacks among Mixtec peasants; ant larvae and pupae (called ant eggs); and in Jungapeo, Michoacan, wasps. Two excellent photographs (one of maguey worms) accompany the article. (Ed.: It can be noted that Dr. Julieta Ramos-Elorduy, who has done extensive research on entomophagy in Mexico, has reported that more than 200 species of insects are still eaten in Mexico [personal communication, 1986]).

Raymond Sokolov's third venture into entomophagous topics occurred in the July 1991 issue of Natural History when he drew the difficult assignment of trying to write a food column relevant to the remainder of the July issue, which was devoted entirely to mosquitoes. In this one, he draws some material from past issues of The Food Insects Newsletter, particularly on bakuti (made from brood of the giant honey bee in Nepal, as described by Professor Michael Burgeu in the November 1990 issue). In the process, Mr. Sokolov makes some nice comments about the Newsletter, which immediately stamped him as my favorite food author. But, if you are wondering about the mosquito connection, even a gifted writer like Mr. Sokolov encounters some difficulty. After flowery dissertation at some length about the joys of fly-tying, the beauty of mountain streams, and other interesting diversions, he finally settles for the basic fact that trout eat mosquitoes and we eat trout.

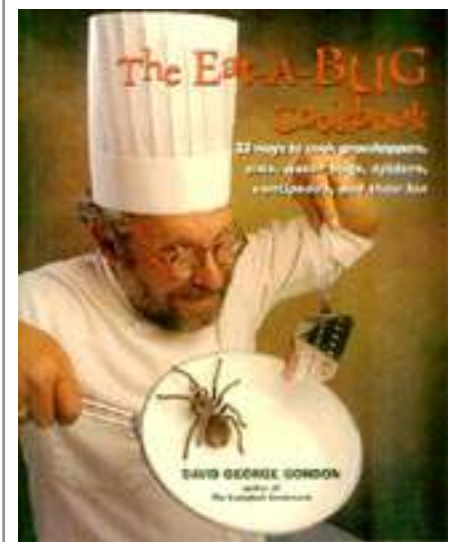
- Marge Knorr, a free-lance (primarily travel) writer from Reno, Nevada, had an article called "Food for Thought: Are Mormon crickets pests or protein?" in the May/June 1991 issue of Nevada magazine. At the end of the article, Ms. Knorr identifies herself as "a loyal subscriber to The Food Insects Newsletter," making her another favorite author. Inspiration for her article was the 1990 banner year for Mormon crickets in Nevada, but she describes interviews with a number of entomologists and anthropologists on a variety of edible insects. Diverse insights emerged. Catharine Fowler, an anthropology

professor at the University of Nevada Reno, described pandora moth [*Coloradia pandoral*] caterpillars as "very good - like a scrambled egg omelet with mushrooms." About 10 years ago, Fowler mediated a dispute between the Paiute Indians and the U.S. Forest Service in California as to whether the caterpillars (a traditional food of the Paiute) would be harvested or sprayed. This time the Paiute won. On the other hand, an assistant professor of nutrition at the UNR said, "I'd never eat insects. I'm too deeply immersed in my own culture."

- Finally, to be right up-to-date, there is an article called "Zaire River: Lifeline for a Nation," by Robert Caputo in the current issue (November 1991) of *National Geographic*. It is accompanied by an interesting photograph (page 26) captioned: Caterpillars and palm grubs fresh off the riverboat cover a table in Kinshasa's central market.

- The pre-Hispanic insect foods of Mexico seem to get the lion's share of attention from the popular press in the United States. Don Chon's, in particular, has been featured or at least mentioned in several magazines and newspapers, lately, and by now it must be one of the best known restaurants in Mexico. Makes you wonder if some enterprising restaurateur in the U.S. might reap a million dollars' worth of publicity free by offering some of the grasshoppers, harvester ants, yellowjacket larvae/pupae, etc. that were such an important part of the food of our Indian forebears on this continent.

The foregoing is not by any means a complete inventory. There are no doubt many articles that we have not seen, and only one (of many) in which this editor has been involved as an interviewee is included. It would be hard to believe that the kind of media bombardment that has been occurring isn't increasing public awareness that edible insects are respectable players on the world stage. GRD



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Collecting Ant Pupae for Food

November 1990. Volume 3, Issue #3.

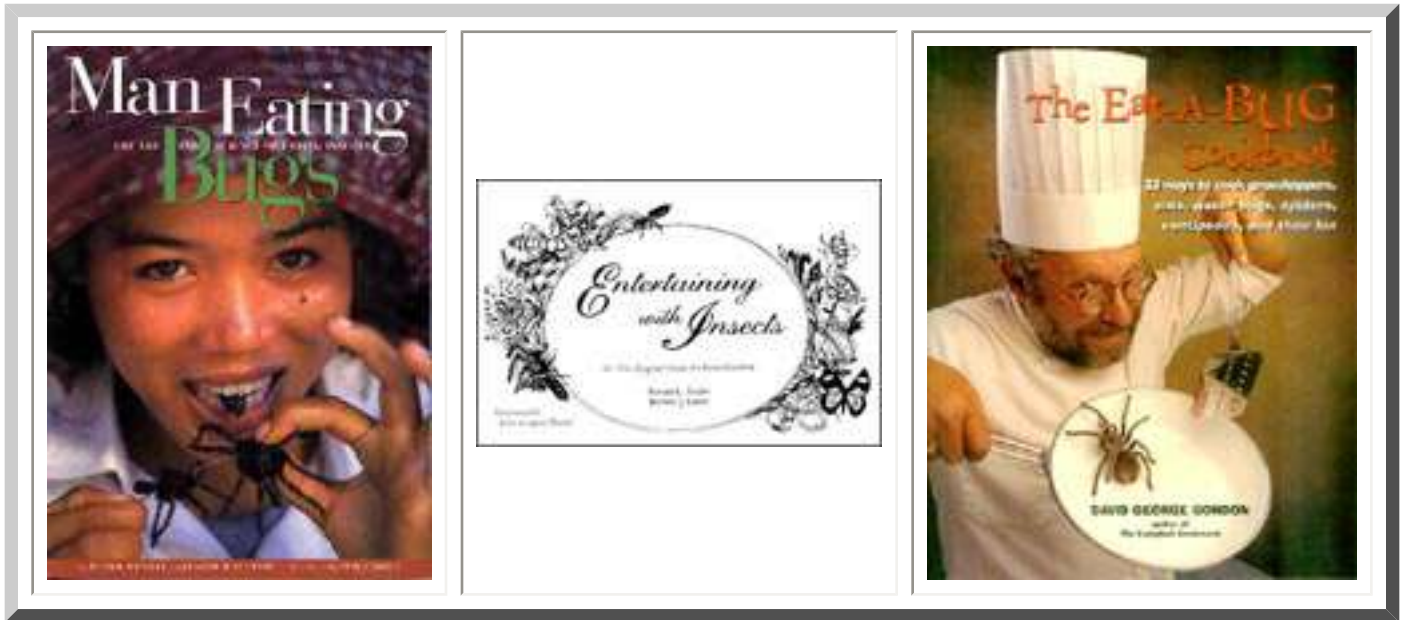
By Gregg Henderson

I've been fascinated with social insects since my early childhood. I have watched ants in their natural habitat and constructed artificial nests to observe them in the fall and winter. This experience was influential in my future career choices. I received a Ph.D. in entomology from the University of Wisconsin in 1989 and will soon be moving to Louisiana State University to be their resident urban entomologist. Dr. DeFoliart asked if I would relate some of my knowledge on collecting ant pupae for the readers of this newsletter.

I'll deal only with the mound-building ant species in the genus *Formica*, since this ant group I know best. *Formica* is known for its spraying of formic acid as a defense mechanism. The large gland reserve appropriated for this purpose makes eating adults a distasteful experience. Even an ant with a full load of sweet honeydew in its crop tastes extremely acidic. The pupae on the other hand, do not have this acid flavor and are, if I must admit it, quite tasty.

Having dug into so many mounds to document the colony cycle of *Formica*, I learned that the brood cycle is very predictable for a given species in any one region. Regular checking of a single mound will quickly reveal when the pupae can be harvested from all the mounds. Ant workers take meticulous care of their young. The smallest larvae are kept in moist areas of the mound. The pupae however need dry and warm conditions and are kept separate from the rest of the brood. The mound-builders make it particularly easy for pupae collection because the workers move them to the highest reaches of the mound where the sun can warm them. *Formica* adults will even remove the paper-like cocoon from the pupae several weeks before they have sclerotized, sort of like shelling peanuts.

The best time to go pupae collecting is one hour after the sun has hit the mound in the morning. The pupae can be collected just under the surface of the mound at this time. Later in the day the pupae will be moved deeper into the mound to avoid excessive heat. After collecting the pupae, replace the soil and thatch to its original place. By collecting in this way the colony itself will be little affected by the harvest and will quickly rebound from the loss. This is particularly important since ants (especially *Formica*) are one of our most beneficial insects in the world and must be respected as such.



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Hunter-gatherers were sometimes very labor-efficient

A Grasshopper in Every Pot

July 1989. Volume 2, Issue #2.

By David B. Madsen

originally published in Natural History (New York). July 1989. pp. 22-25.

In the spring of 1985, "millions" of grasshoppers (the migratory grasshopper, *Melanoplus sanguinipes*) were found lying along the eastern shore of the Great Salt Lake. Madsen, state archaeologist in the Antiquities Section of Utah's Division of State History, says, "enormous numbers of the insects had flown or been blown into the salt water and had subsequently been washed up, leaving neat rows of salted and sun-dried grasshoppers stretched for miles along the beach." The hoppers, coated with a thin veneer of sand, were in as many as five rows in some places, with the widest rows ranging up to more than six feet in width and nine inches thick and containing up to 10,000 grasshoppers per foot.

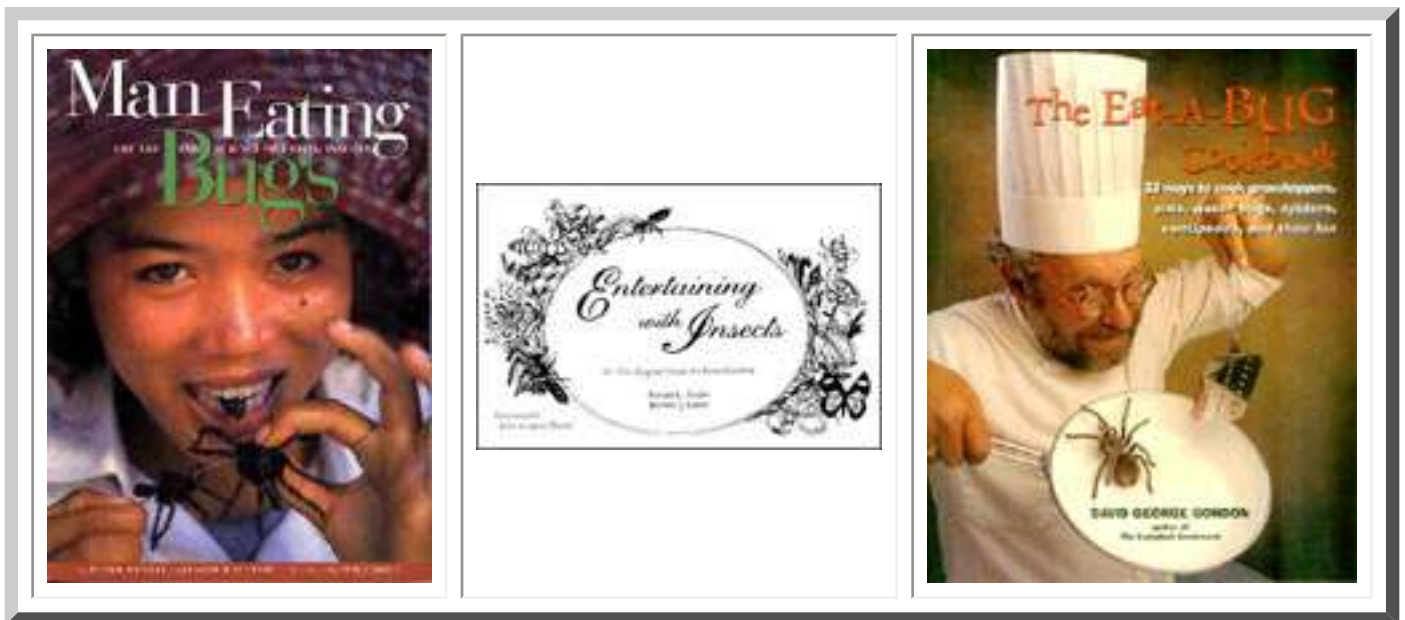
A year earlier, while digging in Lakeside Cave which is at the western edge of the Great Salt Lake, Madsen and co-workers had discovered thousands (and estimated millions) of grasshopper fragments in the various strata of the cave floor. The hopper fragments, in a matrix of sand, were also found in the majority of samples of dried human feces found in the cave. The connection between beach and cave was obvious. Lakeside Cave has been visited by Great Basin hunter-gatherers intermittently for the past 5,000 years. It served only as a temporary base because it is far from fresh water. Obviously, the cave was used as a winnowing site for removing sand from the grasshoppers which were scooped up at the beach and most of which were then hauled elsewhere.

Madsen and colleagues found that one person could collect an average of 200 pounds of the sun-dried grasshoppers per hour. At 1,365 calories per pound (compared with about 1,240 calories per pound of cooked medium-fat beef and about 1,590 calories per pound of wheat flour), this amounted to an average return of 273,000 calories per hour of effort invested. According to Madsen, "Even when we took a tenth of this figure, to be conservative, we found this to be the highest rate of return of any local resource. It is far higher than the 300 to 1,000 calories per hour rate produced by collecting most seeds (such as sunflower seeds and pine nuts) and higher even than the estimated 25,000 calories per hour for large game animals such as deer or antelope."

Madsen also investigated the rate of return per unit of effort expended in collecting

Mormon crickets (*Anabrus simplex*), another food of early Native Americans. Crickets were collected from bushes, grass, etc., at rates of 600 to 1,452 per hour, an average of nearly two and one-third pounds or, at 1,270 calories per pound, an average of 2,959 calories per hour. The crickets often reach greatest densities along the margins of streams or other bodies of water which lie in their line of march and which they will attempt to cross. In two such situations, they were collected at the rates of 5,652 and 9,876 per hour, an average of nearly 18 1/2 pounds of crickets or 23,479 calories per hour. The first number (2,959 calories per hour) surpasses the return rate from all local resources except small and large game animals, while the latter compares favorably even with deer and other large game.

Madsen places cricket collecting in a modern context by saying, "One person collecting crickets from the water margin for one hour, yielding eighteen and one-half pounds, therefore, accomplishes as much as one collecting 87 chili dogs, 49 slices of pizza, or 43 Big Macs." He concludes, "Our findings thus showed that the use of insects as a food resource made a great deal of economic sense."



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A Query:

**Are processed insect food products still commercially available in the United
States?**

November 1988. Volume 1, Issue #2.

By Gene R. DeFoliart
University of Wisconsin
Madison, WI

Marston Bates, the eminent zoologist, wrote in 1960 in *The American Scholar* (29:43-52): "In our household, I am left in complete command of one department - the things to eat with drinks. In the store where I do most of the buying, there is a wonderful assortment of temptations: fish eggs of many kinds other than the authentic but impossibly expensive caviar; fish themselves of many species, prepared in many ways; a wide variety of cheeses and sausages, of crispy fried things, of olives and nuts and minced clams and smoked oysters. Lately several kinds of insects have appeared on the shelves - canned ants and silkworm pupae from Japan, maguey worms from Mexico, fried grasshoppers - the can doesn't say where they are from. Insects are an important element in human diet in many parts of the world, but they have long been taboo in European civilizations. It is possible that they will get back into the Western diet by way of the cocktail hour."

Bates continued: "The maguey worms [larvae of the giant skipper butterfly, *Aegiale hesperiaris*] have been canned for the local market in Mexico for some time, and now they are being imported into the United States by the stores that specialize in fancy foods. The canned worms are best if eaten hot; they have a pleasant, nutty flavor, which blends as well with a martini as with mescal, the potent drink that the Mexicans distill from the fermented pulque. In my home we have been trying these worms on cocktail guests. As yet we haven't found anyone who disliked them, although our guests have shown considerable variation in the degree of their enthusiasm. The worms at least provide a topic of conversation."

In concluding this particular bit of discussion, Bates said, "From these experiments of ours with guests, I get the idea that while Americans may be prejudiced, they are far from being proud of their prejudices."

Lucy Clausen of Columbia University and the American Museum of Natural History, and author of *Insect Fact and Folklore* (1963), also mentioned maguey worms but by another name, saying that people in the United States are eating fried "gusanos" [=maguey

worms] with relish. "Close to the Mexican border, 'gusanos' are served as thirst-producers at cocktail parties. In recent years Mexico has been canning and exporting 'gusanos' and they may now be purchased in the better delicatessen and department stores of our larger cities. They are advertised as 'delicious delicacies, especially with cocktails.'"

In 1960, Hocking and Matsumura, of the University of Alberta noted that a product canned in Japan under the name "Baby Bees" (fried bee pupae with soy sauce) had been available for some time on the Canadian market at a price of \$2.20 per 2 ounces (Bee World 41: 113- 120).

James Trager, in *The Food Book* (1972), after discussing several insects that are classed as delicacies in other countries, stated: "But the only insects in American supermarkets, at least the only kinds offered for sale [*italics added*], are fried grasshoppers, Japanese ants, bees and silkworm pupae, and Mexican maguey worms.... All are sold in cans, ostensibly as cocktail snacks but basically for their entertainment value. Americans' propensity for 'impulse purchases' is prodigious." Trager's book, by the way, was formerly titled, "The Enriched, Fortified, Concentrated, Country-fresh, Lip-smacking, Finger-licking, International, Unexpurgated Foodbook."

Finally, Ronald Taylor devoted 14 pages in his book, *Butterflies in My Stomach* (1975; pp. 83-96), to a description of 19 processed, mostly canned, insect foods available in the American marketplace. Most of these products (11 of them) were offered by Reese Finer Foods, Inc., who imported them from Japan. They were sold primarily as novelty items with highest sales around the New Year.

In view of the above, we were surprised to find a couple of years ago that imported insect products could not be found in specialty food shops here in Madison, Wisconsin. A number of long-time residents to whom we mentioned this were also surprised, saying that such products were formerly available. A more superficial search in Minneapolis-St. Paul was also unsuccessful. A letter to Reese, Inc., brought the information that they no longer import these products. We heard from a Chicagoan that, until recently at least, the Marshall Field Company catalog listed several insect food products, but the Madison store knew nothing about this.

I should say that our question results more from curiosity than from any sense of urgent need. Taylor (*loc. cit.*), an avowed advocate of the palatability of insects, states: "Personally, I find most canned insects unpleasant tasting - some worse than others - or, at the very least, insipid. If, however, you want to eat a canned insect, my suggestion is that you begin with the agave worm [yet another name for the maguey worm]." Taylor, the author (with Barbara Carter) of [Entertaining with Insects: The Original Guide to Insect Cookery](#) [to be reviewed in the next Newsletter] states, "It is unfortunate that there aren't better prepared insect foods on the American market, and at reasonable prices." Similarly, Bates (*loc. cit.*) mentions that, "The Japanese now export canned fried ants to this country, but these canned ants seem to be quite tasteless, lacking the crisp, toasted

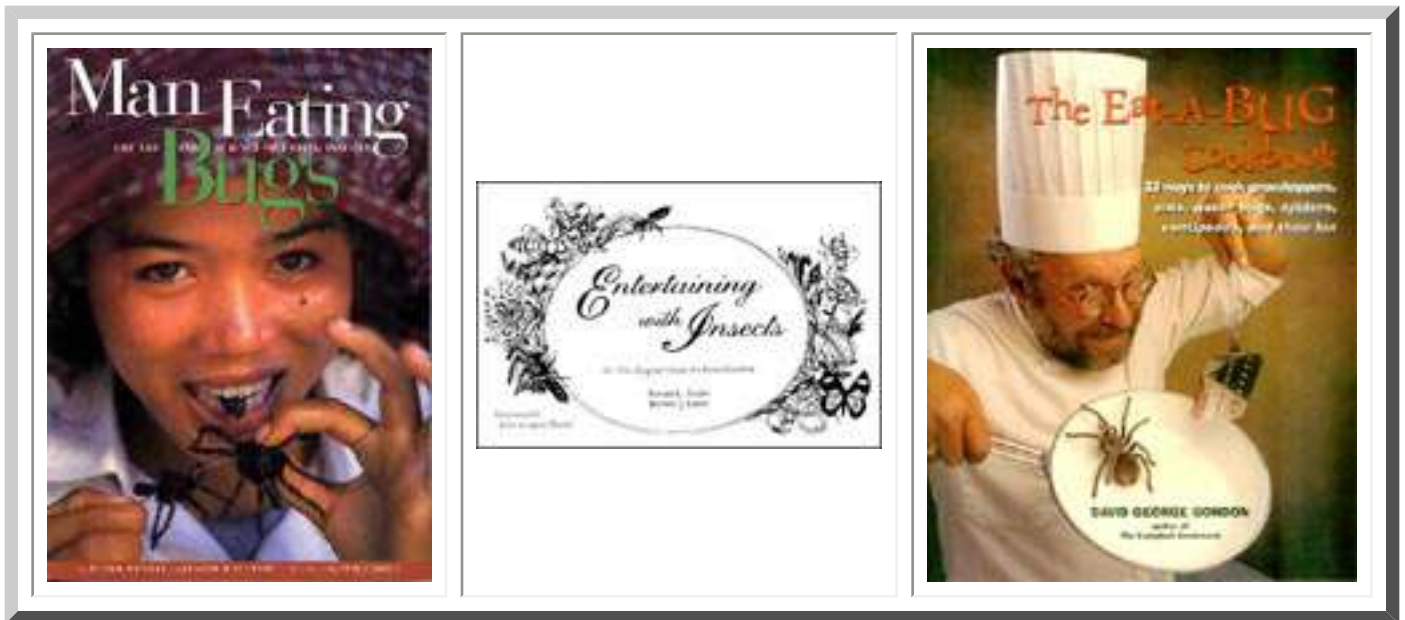
quality that I remember from my South American experience." Bates was referring to the winged sexual forms of the leaf-cutter ants (*Atta* spp.) which are sold in movie theaters in Colombia and serve the same function as popcorn.

Certainly, there is an abundance of testimonials expounding the palatability of various insects when properly prepared. I will mention only one here. Hocking and Matsumura (1960) subjected bee brood, prepared by shallow frying in butter or deep-fat frying in vegetable cooking fat, to an informal taste panel in Canada and reported: "Most reactions were favourable and some were eulogistic; initial prejudice proved easier to overcome than we had expected. When the tasters were asked to compare the material to some more familiar food, those most commonly mentioned were walnuts, pork crackling, sunflower seeds, and rice crispies." Joseph Alsop, in a Saturday Evening Post review of a Tokyo restaurant, mentioned that he very much enjoyed the appetizer of fried bees, the flavor being "halfway between pork crackling and wild honey."

The intent here is not to make or remake the case for promoting greater use of insects as food in the United States, Canada and Europe. Scores of respected western writers, both scientists and others, from the ancient Greeks onward have come down on the affirmative side of this question. Aristotle himself partook of cicadas and wrote (3rd century BC) that it is the last-instar nymph that "tastes best." One can partly agree and partly disagree with the statement by C. H. Curran in 1939 (*Natural History* 43:84-89): "During the past few years there have been a number of people who have suggested that we should eat insects. They are probably seeking notoriety or being facetious. Some of them have gone so far as to publish menus. There is no 'should' or 'should not' about the advisability of people eating insects. If they wish to do so there is no reason why they should not, since there are hundreds of different kinds that are perfectly edible. However, it is absurd to urge upon a people blessed with a super abundance of good, delectable food, the advantage of eating something which is likely to prove less agreeable to the palate than the things to which we are now accustomed."

Curran was not personally squeamish about eating insects, in fact, he liked to point out, and sometimes demonstrate, that we unknowingly eat many of them with our regular food. He was aware of the wide use of insects as food in cultures of non-European origin and was, presumably, personally willing to honor the preferences of their palates just as he wanted his own preferences honored. On the other hand, times change. With the earth's increasingly apparent vulnerability to ecological abuse, much of it committed in the name of agriculture, we can increasingly recognize the validity of predictions such as one by the late Professor Brian Hocking, "We have about 50 more years of steaks and then perhaps we'll have to explore other sources of animal protein" (quoted by Catherine Philip, *Amer. Bee Jour.* 100:444, 1960). Although there is indeed a feverish pitch of activity by food and agricultural scientists aimed at increasing the quantity and quality of food supplies, insects are as studiously ignored today as they were in Hocking's time. That should change - for more reasons than we have space to discuss here.

To recognize the preferences of different national palates, borrowing from Curran's line of thinking, we can note that the giant water-bug *Lethocerus indicus*, a favorite food throughout southeast Asia from eastern India and Burma to Vietnam and southern China is now imported and sold (as whole bugs, paste, or alcohol extract known as "Mangdana essence") in southeast Asian community foodshops in San Francisco, Oakland, and Berkeley (Pemberton, Pan-Pac. Entomologist 64:81-82, 1988). Such products from many lands might become an important new dimension in international trade if we Americans can learn to recognize and appreciate insects as the food resource that they deserve to be. They might also serve to create a whole new class of alternative crops for our hard-pressed small farms, alternative crops that are completely compatible with the principles of sustain able agriculture. Secondary benefits of a more relaxed attitude by Americans might include a reduced zealousness in the cosmetic use of pesticides on our food crops. But these are other stories. In the meantime, any information that this article may elicit on the present availability of commercial food insect products in the western world will be printed in the next issue of the Newsletter.



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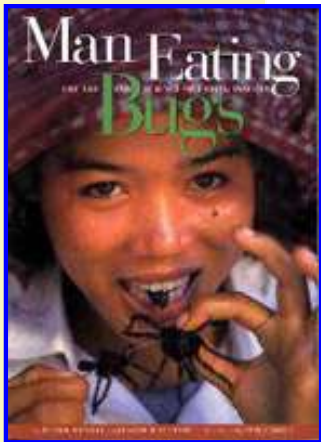
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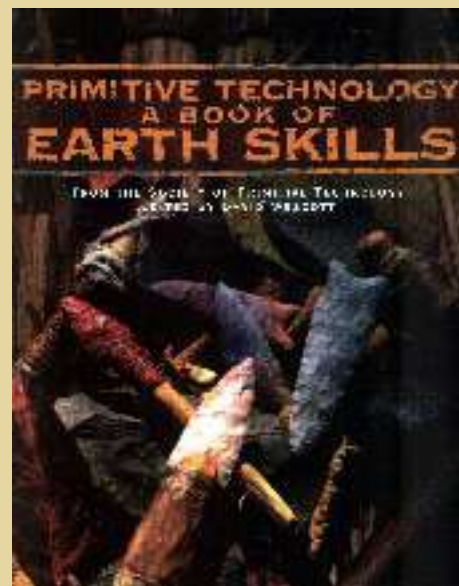
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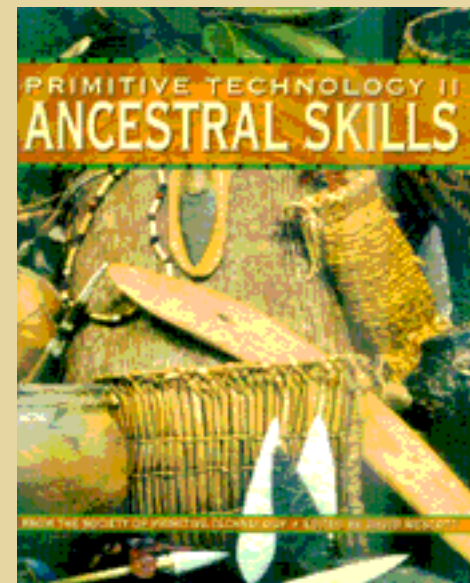
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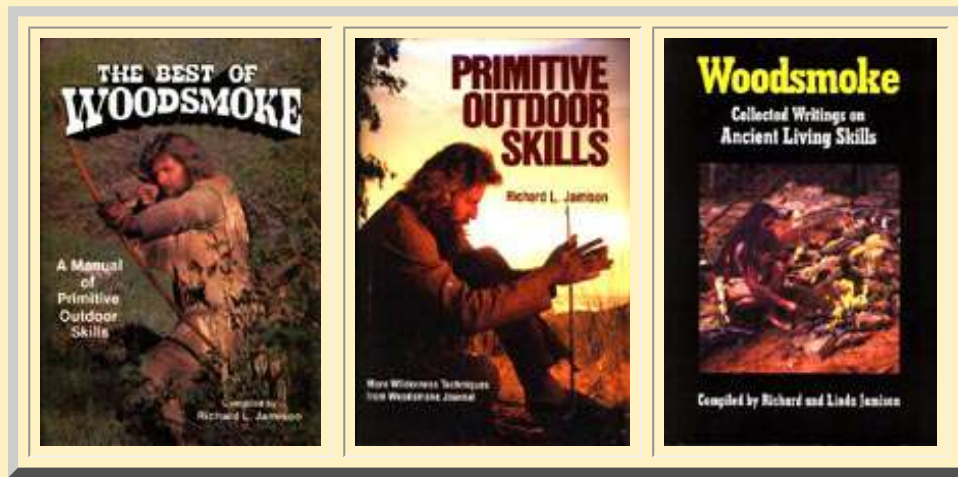
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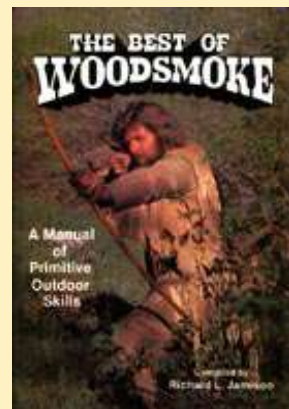
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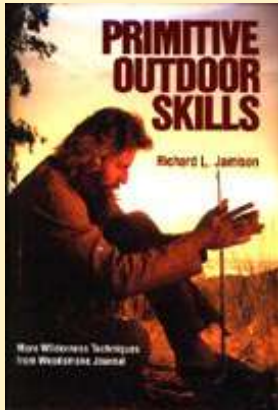
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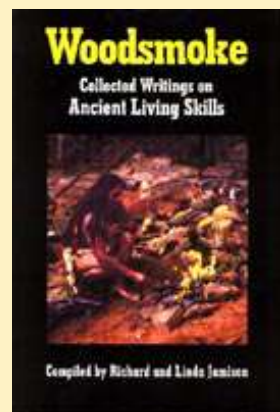
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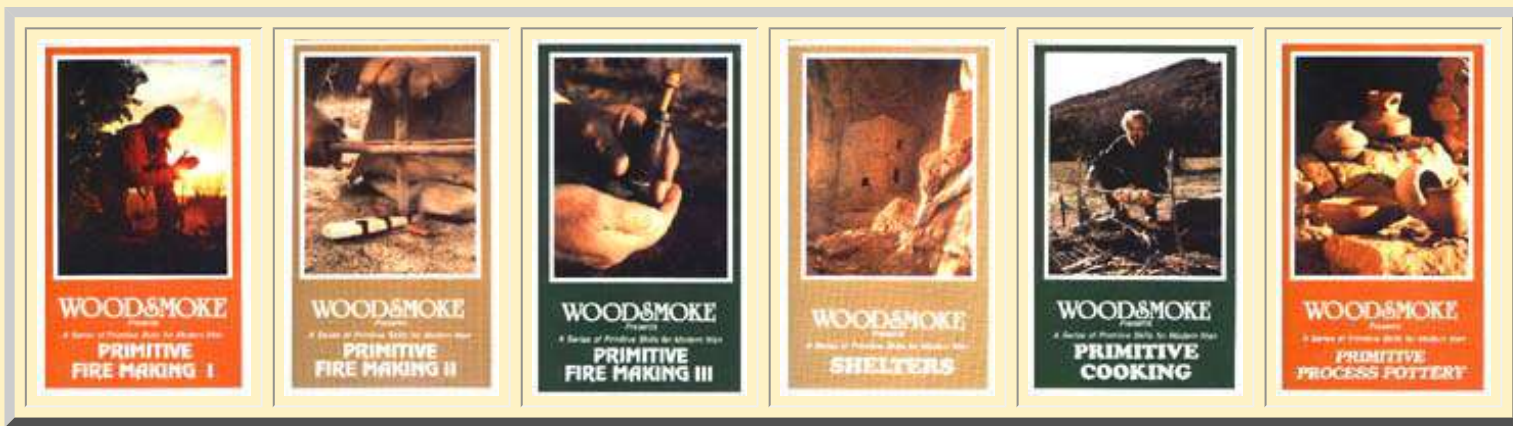
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Woodsmoke Videos

Produced by Richard and Linda Jamison

The quality of primitive skills instructional videos varies widely. Some videos have really good information, but they would almost kill you with boredom. Other videos are fun to watch, but not terribly informative. There are relatively few videos that are both educational and stimulating to watch. We have scored each of the videos we carry for information content and the presentation quality. Five *'s in each category is the highest score. We scored the videos conservatively to leave room at the top for the newer and better videos that we expect to become available in the coming years.

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. For our European customers we may be able to special order PAL format. Please send an e-mail to us through our [E-mail Contact Page](#) to inquire.

Title	Information	Presentation	Cost	Quantity
Woodsmoke: Fire I, The Handdrill	***	***	\$25.00	
Woodsmoke: Fire II, The Bowdrill	***	***	\$25.00	
Woodsmoke: Fire III, The Fire Piston, etc	***	****	\$25.00	
Woodsmoke: Shelter	*	***	\$25.00	
Woodsmoke: Primitive Cooking	****	****	\$25.00	
Woodsmoke: Primitive Pottery	****	****	\$35.00	
All Six Woodsmoke Videos		(Save \$15)	\$145.00	

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Dear Tom and Renee Elpel,

Imagine my surprise and pleasure on ariving home last night to find a large Jiffy bag postmarked USA on my floor. (I ordered the Woodsmoke books last week.) Having resigned myself to several weeks wait it was a surprise, do you have a time warp there? Your books have arrived safe and well.

Evening meal rushed, chores undone, I sat in a favourite place waiting for the seabreeze to reassert itself and take the heat out of the day, dipping in and out of the books; a paragraph here a picture there. Sometimes disappearing into memories of friends and the wilder places I have been. There are many more hours of reading and learning in there, I look forward to the quieter moments in the winter to sit and absorb more.

I particularly liked the Red Foxes on the stamps, they now make a fine bookmark.

Many thanks.

Yours,

*Nigel Brown
United Kingdom
(used with permission)*

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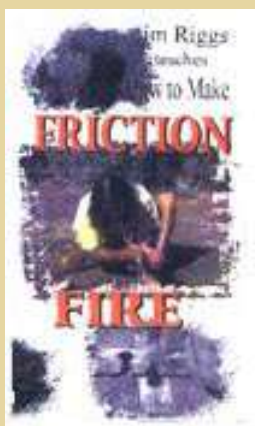


Northwestern Video Productions Primitive Skills Videos

Northwestern Video Productions has produced some of the highest quality primitive skills videos on the market. When we heard that Northwestern was going out-of-business (retiring), we eagerly bought the rights to the videos through our publishing company, HOPS Press, LLC. We are in the process of remastering them as HOPS Press, LLC titles. So far we have remastered *Friction Fire* and *Plant Fiber Cordage*, as described below. The other videos are still available from their original masters.

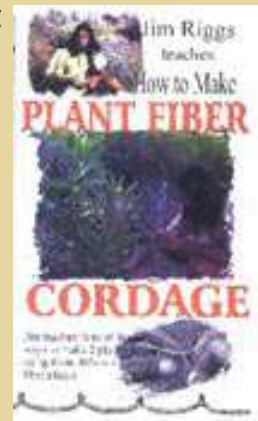
Friction Fire Instructional Video

I have watched many, many primitive skills instructional videos, and *Friction Fire* by Jim Riggs is clearly the best one available on starting fire-by-friction with the bowdrill and handdrill. It is extremely educational and also enjoyable to watch. (The video covers how to make and use bowdrill and handdrill fire sets, so you will find it useful alone, or with our high-quality sets.)



Jim Riggs has been a leader in experimental archeology since the 1970's, actively using primitive skills to learn and teach about our past. He taught ethnobotany and aboriginal life skills at Oregon's Pacific University's Malheur Field Station. Jim Riggs was also a primitive skills advisor for the movie *Clan of the Cave Bear*.

Friction Fire was originally produced by Northwestern Video Productions, now part of HOPS Press, LLC. The video degraded some over time, but we digitally remastered it, combining the better quality sound from the production master with the better quality video from the edit master. (That took some work to properly lip-sync the video!)



In addition, we are combining *Friction Fire* with Jim Rigg's other excellent video *Plant Fiber Cordage*, so you get two great videos for the price of one! *Friction Fire* and *Plant Fiber*

Cordage are currently on two separate tapes. We will ship them as two separate tapes until we run out of stock. Then we will combine both videos onto a single tape and release it with a new cover.

Recorded on certified quality recycled VHS tapes for an environmentally friendly product!

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. Sorry, this video is not available in PAL format.

Friction Fire & Plant Fiber Cordage (2 videos) \$30.00

Quantity:

-Please scroll down the page for the "Add to Order" button.-

Title	Information	Presentation	Cost	Quantity
Friction Fire and Plant Fiber Cordage with Jim Riggs	*****	****	\$30.00	
Arrows from the Stone Age with Brian James	*****	****	\$30.00	
Primitive Life Skills with Robert Earthworm	****	***	\$30.00	
Tanning Buckskin with Robert Earthworm	*****	***	\$30.00	

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Hoods Woods "Woodsmaster Videos"

Produced by Ron & Karen Hood

The quality of primitive skills instructional videos varies widely. Some videos have really good information, but they would almost kill you with boredom. Other videos are fun to watch, but not terribly informative. There are relatively few videos that are both educational and stimulating to watch. The Hoods Woods videos are very well produced, and most of them are reasonably informative. **Our favorite video of the series for both information content and the quality of presentation is Hoods Woods Volume 9: Primitive Knife-Making.**

Ron and Karen Hood present a mix of primitive and modern survival skills and woodlore. We have scored each of the videos we carry for information content and the presentation quality. Five *'s in each category is the highest score. We score all videos conservatively to leave room at the top for the always newer and better videos as they become available.

-Please scroll down the page for ordering information.-

Volume 1 - Spark Based Fire Starting

The Firebow! Now you can learn how to make fire by friction! Learn how to use Flint and Steel, the Metal Match, and a Flashlight Fire! This tape covers materials selection and amazing special tips. This is essential information for any woodsperson. (70 minutes)



Volume 2 - Survival Shelter Selection

Learn the survival priorities and how to meet them! What is the rule of threes? You learn the heat loss mechanisms, site selection, pine log shelters, the Firebed, and more incredible **Woodsmaster** Tips, Lore and Techniques. (80 minutes)

Volume 3 - Making and Using your Outdoor Survival Kit

What goes into a Survival kit, How to carry it. Discover how to make and use the amazing **Mini Kit**, it's so small it almost disappears in your pocket! The Maxi Kit, It's **still** small but it gives you so much to work with. Learn Wire Snares, Fishing tricks. A bee and a bird trap with a coffee can, animal hooks, the **Delbow Pocket bow and arrow**, the twitch up snare, tube tent tricks, a snare wire compass. Discover INNOVATION, and a bunch of special Woodsmaster tricks and techniques. This information can save your life! (a whopping 95 minutes)

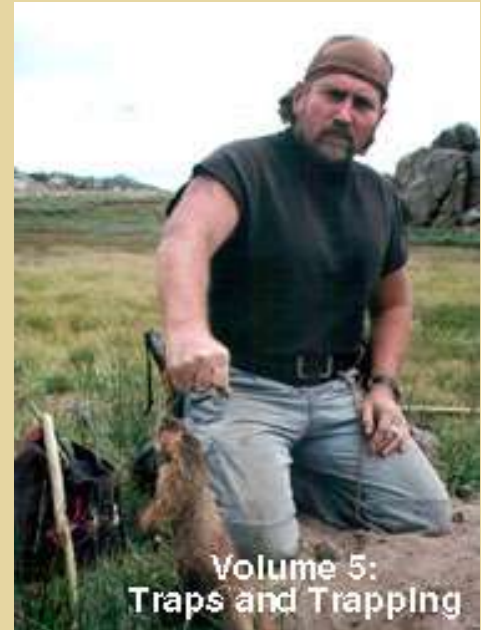
Volume 4 - Primitive Navigation and Wilderness Travel Techniques

You'll learn the Ottomani pocket Sun compass. Night navigation, Shadow stick tricks, "Self Tracking", The Vietnamese Montegnards "bu cat" walking stick technique, the Plainsman stride and lock step, more techniques for telling direction, distance and height, trail travel energy saving

techniques, hydration information and a ton more... Including the beginnings of the Lithic arts (Stone tool making)! (84 minutes of navigation wisdom)

Volume 5 - Traps and Trapping

Trapping is one of the **most important** wilderness skills! After shelter and water, **food** is the key to survival living in the wilderness. This video covers the basic "engines" of machine type traps, techniques for setting and using snares, and much more. If you can't feed yourself after watching this video... you need a supermarket! (88 minutes)



Volume 6 - Primitive Weapons Technology

Learn about the Viet Cong cross bow a simple and elegant solution to getting game and defending yourself. Learn how to "tiller" a functional bow and make arrows. See how to make and use an atlatl. Learn the skills and techniques of the sling, the throwing stick and a bunch more! Learn some basic hide tanning techniques and more information on the Lithic arts... Pressure flaking. (107 minutes)

Volume 7 - Jungle Living Skills

Hoods Woods went to the Amazon rain forest to practice the art of jungle survival! Learn to make an authentic jungle blowgun, make a bowl from mud to mug, learn how jungle beer is made, learn to prepare a monkey, construct a jungle trap, capture and eat alligators and more. Learn how to call jungle birds to your dinner pot, how to prepare your gear for hot-wet conditions and you will see how an isolated tribe of natives, the Chapra-Candoshi live in the heart of the jungle. This is a ground breaking video. Discovery with an attitude! (96 minutes)

Volume 8 - The Fundamentals of Tracking

One of the most important -- and most difficult -- skills of the Woodsmaster is the ability to track. In this volume of the Woodsmaster we examine the fundamental skills related to the art of tracking. We show you the "Four principles of sign," how to read "Action indicators," and ways to learn the age of a track. You'll see how to make and use a "Tracking pit" and exercises you can do to sharpen your tracking skills. Since light is critical to effective tracking you'll see the secrets of good lighting as well as dozens of Woodsmaster tracking tips and techniques. (98 minutes)

Volume 9 - Primitive Knife Making

In this video you learn the secrets of materials selection, forge building, tools, techniques and tempering so you can make your own terrific tools or blades at home or in the field. Why buy expensive knives when you can make your own...from JUNK? Once you've seen these techniques you will have the knowledge to make metal tools in the field. Find a horseshoe, build a primitive forge and a fire. Then, with a rock or a hard stick, you can heat and pound that piece of rusted junk into a usable and effective tool or weapon. You will learn that you don't need



electricity, power tools or boat loads of money to make beautiful, functional and durable knives or other metal pieces. You will see that you can build a forge in your own back yard and you don't need Arnie's arms to hammer hot steel. It's all in the technique... (1 hour 45 minutes!)

Volume 10 - Survival Camping

In this video Ron and Karen Hood take you and 12 folks into Idaho's River-of-no-Return Wilderness area for 8 days of survival skills and gear testing. What you will see is a no-holds-barred record of their experience. You will see how to tell time by the North Star, build a wilderness sauna and make a primitive forge from trash. You will learn how to make and use Bannock for food, make wilderness drills, body-bag hammocks, how to use a rotting carcass and how to fashion a fishing pole from your mini-kit parts. You will see how to prepare rawhide and tendons and trap game. You will also learn how to prepare your pack for when you want to go into the woods to test YOUR skills! (1 hour 58 minutes!)

Volume 11 - SOLO: The Quest for Survival

Follow Ron hood as he travels deep into the mountains of Idaho for a two-week test of his survival skills. During his adventure he is poisoned by bad food, attacked by a moose and finds that a forest fire has destroyed most of the small game and fish. To top it off the summer weather quickly became a two week winter storm. With less than a pound of food for the two weeks and only a blanket and a tarp for shelter in the subfreezing temperatures you will learn how even a planned survival test can quickly become the "Real thing" (1 hour 58 minutes!)

Volume 12 - Arid Land - Vehicle Survival

In this video you will learn the tricks and techniques needed to get your vehicle out of trouble and back on the road. A broken down or stuck vehicle is the cause of the vast majority of survival incidents reported each year. With these skills you can avoid becoming a statistic. (1 Hour 44 minutes)

Volume 13 - Desert Survival; On Foot

This video covers the tricks and techniques for survival on the ground, in the desert. Topics covered include travel, shelter, water, physiology and much more. (1 hour 40 min)

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Woodsmaster 1: Fire Starting	****	****	\$20.00	
Woodsmaster 2: Survival Shelters	***	****	\$20.00	
Woodsmaster 3: Survival Kits	****	****	\$20.00	
Woodsmaster 4: Navigation & Travel	****	****	\$20.00	
Woodsmaster 5: Traps	****	****	\$20.00	
Woodsmaster 6: Weapons	**	****	\$20.00	
Woodsmaster 7: Jungle Survival Skills	***	*****	\$20.00	
Woodsmaster 8: Tracking	*	***	\$20.00	
Woodsmaster 9: Primitive Knife Making	*****	*****	\$20.00	
Woodsmaster 10: Survival Camping	****	****	\$20.00	
Woodsmaster 11: Solo; The Quest for Survival	**	***	\$20.00	
Woodsmaster 12: Arid Lands Vehicle Survival	****	***	\$20.00	
Woodsmaster 13: Desert Survival: On Foot	***	**	\$20.00	
All Thirteen Ron Hood Woodsmaster Videos		(Save \$35)	\$225.00	

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Karen Hood "Cave Cooking Videos"

Produced by Ron & Karen Hood

Cave Cooking I

Karen shows you how to clean and cook fish, squirrel, marmot, maggot and some select wild edible plants. She teaches you how to make wilderness bread, the amazing stone oven, the hobo stove and hobo oven. You'll see the dough rising tent and how to get yeast from your environment. This is the perfect complement to the Woodsmaster Volume 5 where we catch the food that Karen is cooking in this video!



Cave Cooking II

In this second volume of the Cave Cooking series, Karen Hood teaches you important cooking methods for home and camp. You'll learn about the "Dutch" oven, the types, the uses, how to how to "season" it for use and how to care for it . You'll also learn some great recipes! You'll drool over the Pot Roast steaming with browned potatoes and thick gravy, you'll groan when you see how easy it is to cook a great breakfast with a Dutch, your arteries will thicken when you see her make DONUTS and then you'll moan when she serves up her famous rat stew... uhhh errr? Well, why not?

Ever heard about SOLAR cooking? You'll see the three basic types of solar cookers and how to make and use them. Solar Cookers are great non polluting cookers that are efficient and entertaining to use. Not only that but they are a real eye-opener. These things are used to cook the daily meals all around the globe. (73 minutes!)

Cave Cooking III: Fat, Frocks and Food

In this volume of Cave Cooking, Karen Hood flies you into Idaho's outback to show you some of the coolest chow, cooking tricks and gear you've seen yet. Before she takes off for the outback, you settle down to learn how to cut and assemble a buckskin rifleman's frock, you make tallow from waste fat, real pemmican with dried beef, tallow candles and other cool things. Back in Idaho's "River of no return wilderness" Karen will teach you how to put your wilderness cooking skills together. You'll learn how to combine pemmican, bannock (Instructions included) and wild thistle to make a delicious and nutritious meal. You'll also learn how to make wilderness pizza, stick bread and some special tricks about creating cooking gear from trash and more! (70 minutes VHS)

Title	Information	Presentation	Cost	Quantity
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Hoods Woods: Cave Cooking	*	****	\$20.00	
Hoods Woods: Cave Cooking II	****	****	\$20.00	
Hoods Woods: Cave Cooking III	****	****	\$20.00	
All Three Karen Hood Videos		(Save \$10)	\$50.00	

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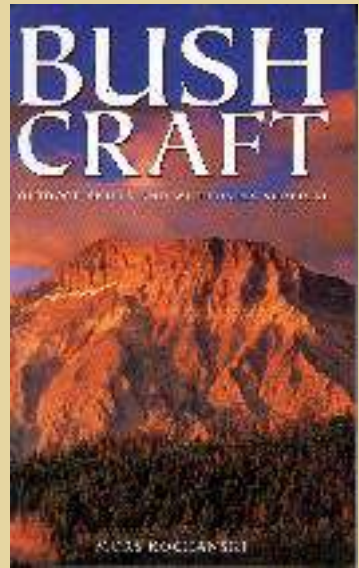
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Bush Craft: Outdoor Skills and Wilderness Survival

by Mors Kochanski

There are two broad traditions to the art of wilderness survival. One tradition is that of the woodsman--basically the engineer of the wilds--who can build absolutely anything with an axe, a saw and a knife. The other tradition is that of the native--one who faces the wilderness with little more than bare hands--to eke out a living mostly by avoiding work rather than creating it. Both traditions are equally valid and useful to know.



Mors Kochanski excels in the traditions of the woodsman, but is also remarkably adept at the native skills. In *Bush Craft* also known as *Northern Bush Craft*, Kochanski presents knife, ax and saw use in depth. Kochanski especially focuses on the special qualities of the northern trees: the birches, alders, spruces, tamarack, pines, firs, poplars, aspens, cottonwoods and willows. The woods skills include how to fell trees, build numerous shelters, start fires (and put them out!), and how to make cooking implements.

The native skills include excellent presentations on the bowdrill, tinder fungus, cordage and basketry, including birch bark containers, splint baskets, and split twig baskets. *Bush Craft* is packed with innovative tips, many of which I have not seen in any other books.

The only objection to the book might be Kochanski's extensive reliance on green tree boughs, which works well in the lush and remote forests of the north, but presents ethical questions in the south where the larger population can cause excessive impacts.

Expanded Edition, 1998. 300 pages. Cost \$13.

Bush Craft \$13.00

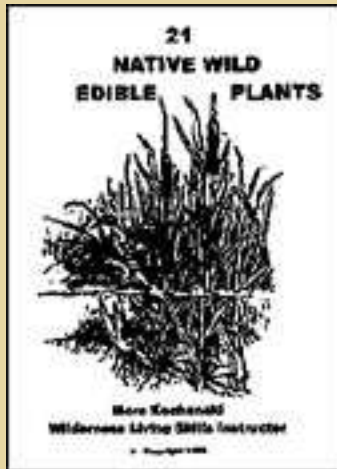
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Mors Kochanski's Wilderness Survival Pocket Books

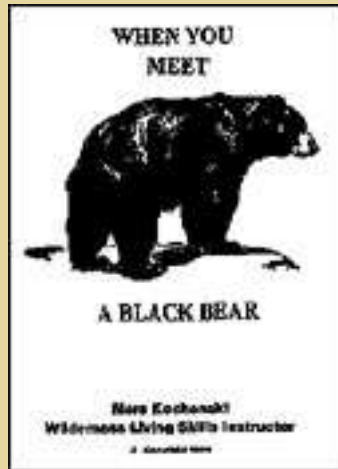
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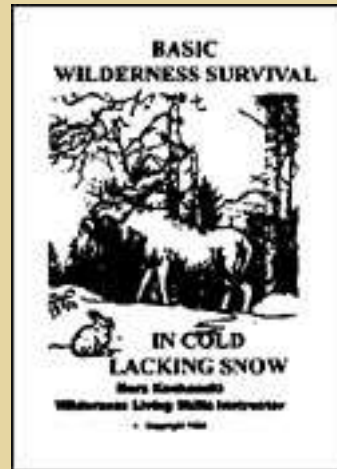
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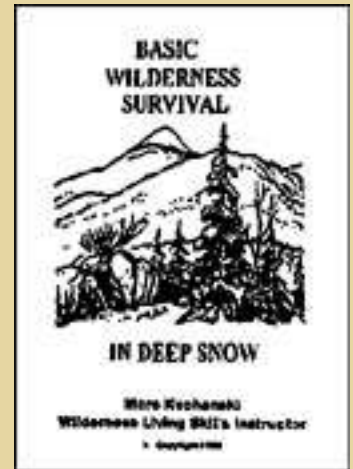
#1: 21 Native Wild Edible Plants



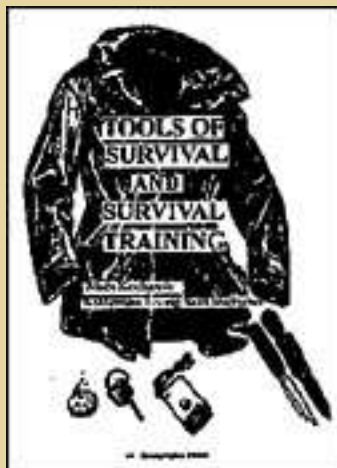
#2: When You Meet a Black Bear



#3: Basic Wilderness Survival in Cold Lacking Snow



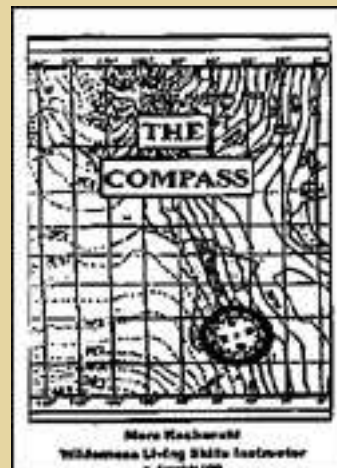
#4: Basic Wilderness Survival in Deep Snow



#5: Tools of Survival & Survival Training



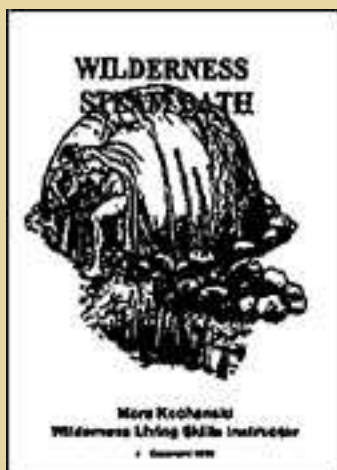
#6: Knife Sharpening



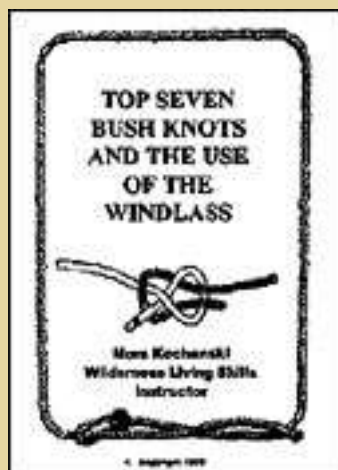
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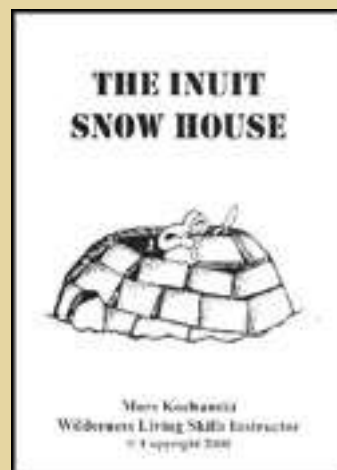
#8: Map Use



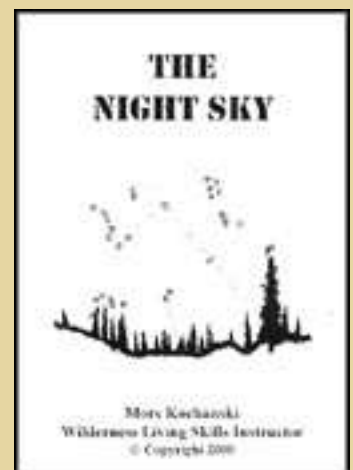
#9: Building a Wilderness Steam Bath



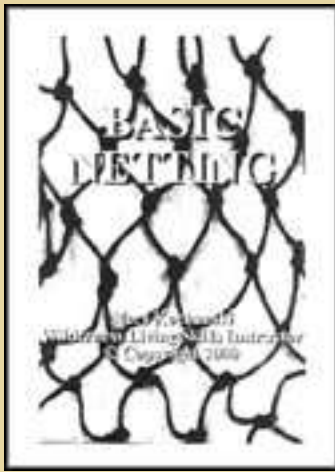
#10: Top Seven Bush Knots and the Use of the Windlass



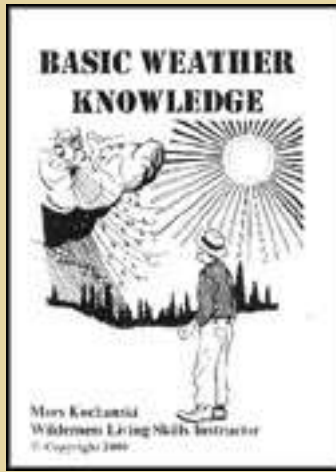
#11: The Inuit Snow House



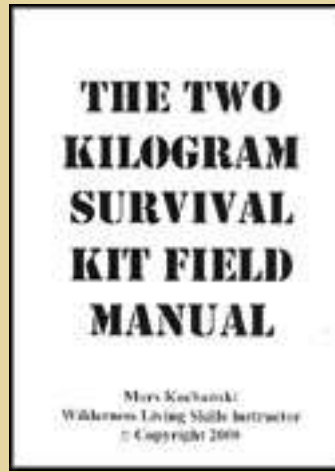
#12: The Night Sky



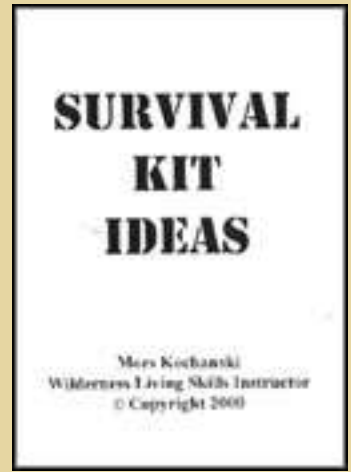
#13: Basic Netting



#14: Basic Weather Knowledge



#15: The Two Kilogram Survival Kit Field Manual



#16: Survival Kit Ideas

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Top Seven Bush Knots	\$2.50	Quantity:
The Inuit Snow House	\$2.50	Quantity:
The Night Sky	\$2.50	Quantity:
Basic Netting	\$2.50	Quantity:
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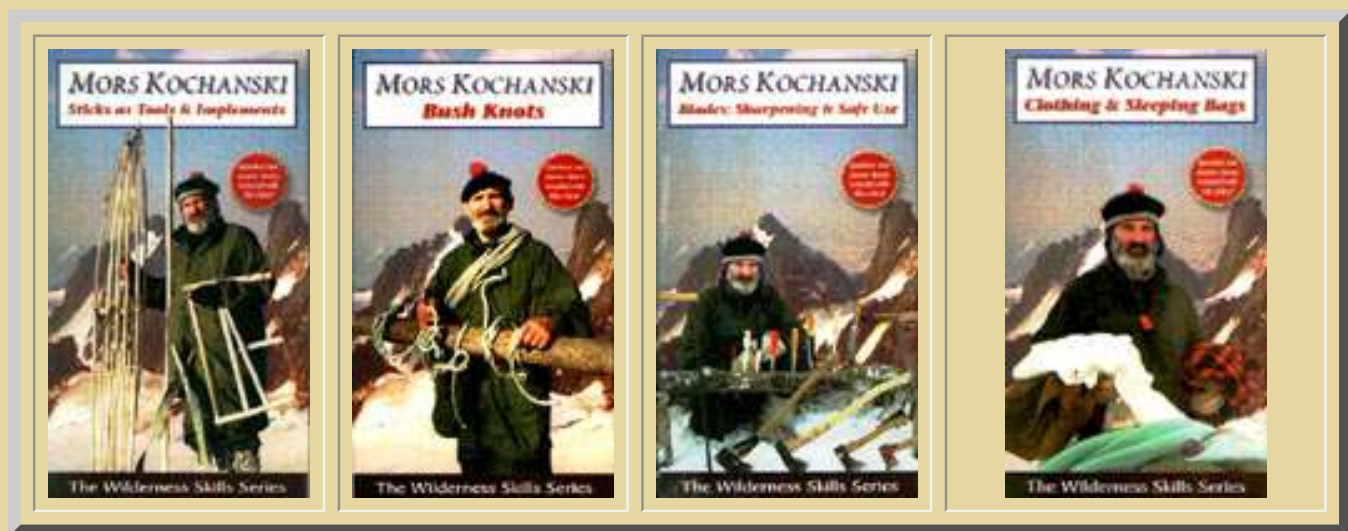
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Wilderness Skills Videos

with Mors Kochanski



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Sticks as Tools & Implements	****	***	\$20.00	
Bush Knots	****	***	\$20.00	
Blades: Sharpening & Safe Use	*****	*****	\$20.00	
Clothing & Sleeping Bags	****	***	\$20.00	

**All Four Mors Kochanski Skills
Videos**

(Save \$10)

\$70.00

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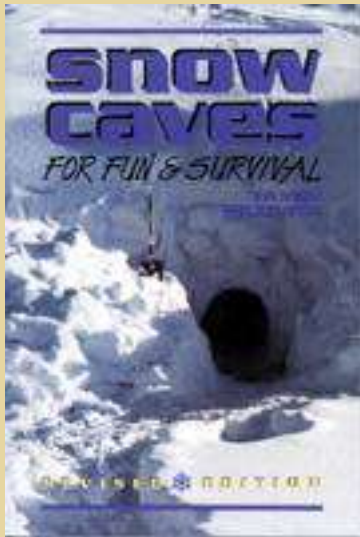
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by Ernest Wilkinson

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Another exciting aspect of *Snow Caves For Fun & Survival* is that you do not need to have deep, deep snow to make good shelters. Even in a foot or less of snow you can quickly pile up enough snow to make a cozy shelter. The book also includes coverage of igloos, emergency shelters, and lean-to's, plus there are chapters on winter clothing, winter food, and recommended equipment.

Snow Caves For Fun & Survival. ISBN: 1-55566-095-9. 1986, 1992. 98 pages. Cost \$10.00.

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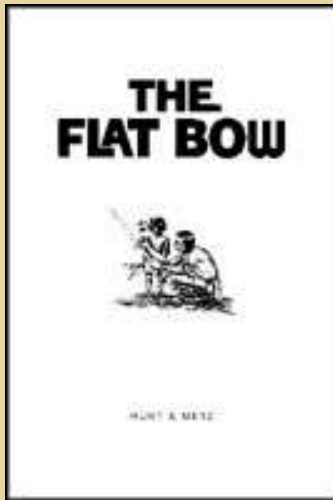
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The Flat Bow

by Ben Hunt & John J. Metz

The Flat Bow is an old book, but a good one. The flat bow, also known as the American bow, is a simple style of bow-making, widely used by the Native Americans. Written when there were few other bow-making texts available, this book helped to spark a new interest in self-made archery tackle. Many of today's bow-making authors grew up with *The Flat Bow* as their only guide. With only this book, plus a knife, a saw, and some files, you can make a fully functional bow. *The Flat Bow* was first published in 1936. Illustrated with line drawings and black & white photos. 70 pages. Cost: \$12.00.

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Bows & Arrows of the Native Americans

A Complete Step-by-Step Guide to Wooden Bows, Sinew-Backed Bows, Composite Bows, Strings, Arrows & Quivers

by Jim Hamm

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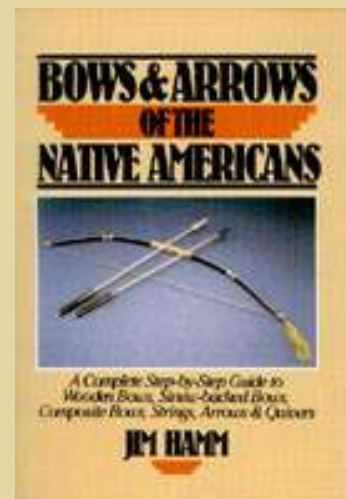
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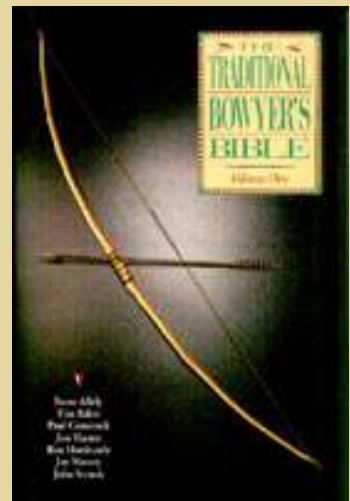
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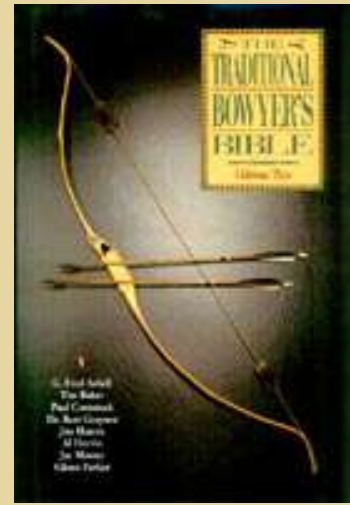


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9. **Helpful Hints and Shortcuts** by Jay Massey
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11. **Improving Accuracy** by G. Fred Asbell
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13. **"Old Ugly" and the Little Buck** by Jim Hamm



The Traditional Bowyer's Bible

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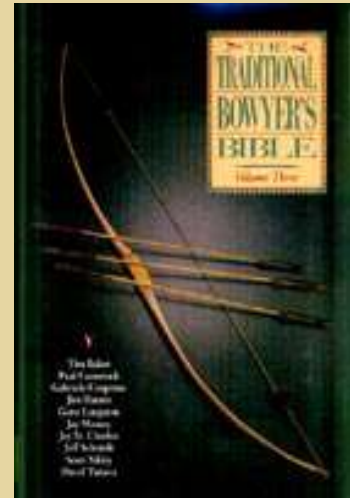
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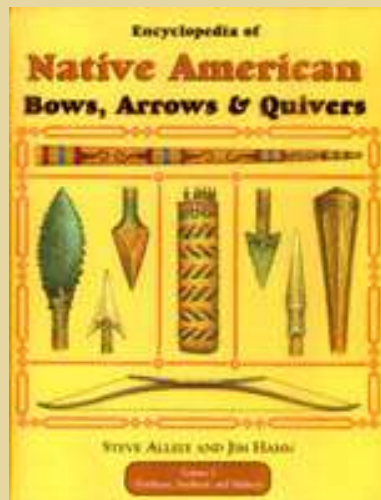
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The Atlatl

Primitive Weapon of the Stone Age

by Kris Tuomala

Want to build an atlatl? Check out Kris Tuomala's book *The Atlatl: Primitive Weapon of the Stone Age* Tuomala lays out simple step-by-step instructions for you to make your own atlatl and dart with local materials. It is a simple and good book. **The Atlatl: Primitive Weapon of the Stone Age.** 61 pages. April 2000. **Cost: \$8.00** (The \$1.00 per item shipping charge does NOT apply to this title.)

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Awareness Books, Tapes, Resources and Perspective

by Thomas J. Elpel

Thanks to everyone who has helped to review and edit this piece!

What is the single most important survival skill? Awareness! It doesn't matter whether you are in an emergency survival situation, out for a weekend camping trip, or even in your own home. You might be running a business, tackling a social or environmental problem, or simply investing money in the stock market. In any situation the most important skill is always AWARENESS or consciousness about the potential opportunities and threats around you. Awareness not only alerts you to what is around, but also brings you inward so that deep learning and understanding can take place on a physical, mental and emotional level.

In a winter survival situation, for example, you must be aware of when to start a fire, what to start it with, and where to build it. If you have any doubts about this, just read Jack London's classic story, *To Build a Fire*. After falling through the ice into frigid water the man in the story is struggling with cold fingers and a falling body temperature to get a fire. After many failed attempts, he finally gets his fire--his last hope for survival-- only to have it extinguished by snow falling from an overhead tree bough. If only that man had looked up!

Now it could be reasonably argued that this is all a matter of semantics--that fire-building is really the most important skill. Awareness about when, what, where and how to build fire are implicit in the skill. The same could be said about life in the city, that there are awareness skills specific to survival in urban environments--things you must be aware of to avoid being mowed down in the middle of the road or mugged in a back alley. In this sense, awareness is not an independent skill, but simply part of every other skill that you learn. Or is it?

If awareness is to be considered a skill in itself, then it must be something you can take from a situation like wilderness survival and apply it to another situation, such as running a business. The purpose of this paper is to make the case that awareness is indeed an independent skill that will aid you in any environment or situation. And yet, awareness itself is implicit in all other skills that we practice, so in a way it is very interdependent with everything we do from building fires to brushing our teeth.

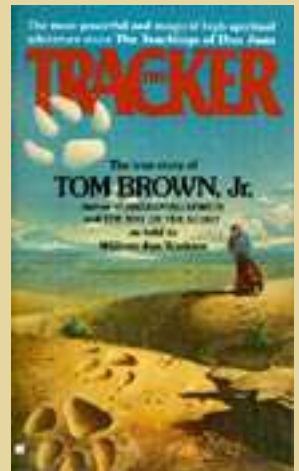
Let me emphasize that awareness is developed through the practice of survival skills and tracking as much as through specific techniques for expanding your capabilities of observation. The expanded capability for awareness that you gain through these pursuits will aid you in everything that you do, even in the modern world. If you can bring the observations learned from tracking, for example, to a simple and mundane activity like

signing your name on a check, you may learn a lot of very important things about your general state of being when writing the check (e.g. your relationship with money, whether or not you are impatient in everyday life, etc).

In this discussion I include my own experiences in developing the skills of awareness, as well as the books, tapes and other resources I have found helpful in that pursuit.

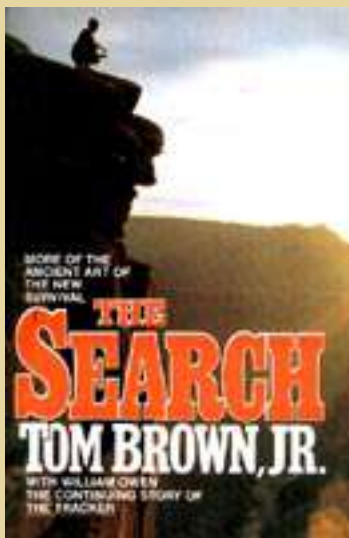
Tom Brown Jr. Autobiographies and Field Guides

As a teenager I virtually lived in Tom Brown's books. I bought each one as soon as it was published. I practiced wide-angle or peripheral vision and "fox walking" continuously. I practiced these skills in school, noticing life outside the windows while listening to lectures in class. In gym class when we were jumping hurdles, I was proud to over hear one girl say to another, "He runs like a deer!" After school I walked to a nearby wooded thicket to follow tracks and observe nature. I built my own camp there with a half-insulated debris hut and a campfire.



I taught myself to break the spell of the television, to be aware when people came into or left the room during a show. I learned to follow the landscape with my peripheral vision while reading in the car, so I always knew where we were and what was going on outside. I always knew where everyone was in the house, even while deep in a book. I kept a sandbox in my bedroom for studying tracks.

My grandma was the main influence that triggered my interest in primitive wilderness survival, but it was Tom Brown's books that fired my imagination for the possibilities. In the stories Brown describes the way he learned about primitive survival and tracking with his friend Rick under the tutelage of Rick's grandfather Stalking Wolf. As a reader you are easily caught up in the stories, desperate to learn what Tom and Rick did. Through these books Tom Brown has single-handedly inspired tens of thousands of otherwise rational adults and urbanized kids to let out their inner child and go play in the woods.

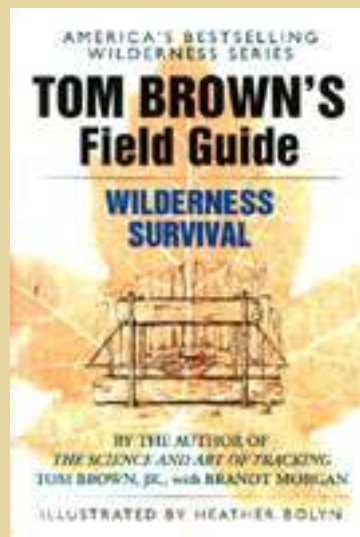


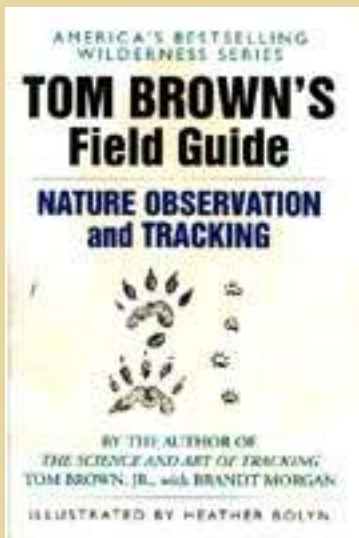
Tom Brown's stories about survival, tracking, and greater awareness are so fantastic--especially to those who are searching for deeper meaning in life--that it is easy to elevate him to a god-like status. It is just like Beatlemania, N-SYNC, or any other idolized public symbol, where it seems your life will somehow be improved if you can just be near such a great person. I've been there, and I've seen hundreds of other people doing the same thing, espousing the gospel of Tom Brown--talking incessantly about him, what he has done, and what he teaches and preaches.

There is a saying that in the path of knowledge and wisdom you have to "kill the Buddha". That is, you have to knock your idols and mentors down from the pedestals you placed them on, in order to learn what they are really teaching. It was a shock and a heart-break for me the first time I heard anyone say something bad about Tom Brown Jr., but it also helped jar me back into reality and increased my internal awareness. I write that here, because you cannot learn the awareness techniques that Brown teaches until you break through that spell over his apparent greatness.

I have had the opportunity to experience idol-worshipping from the other end too, when one of my readers was literally hypnotized by my presence. It was a strange experience to be followed around all day long by someone who just wanted to be close to me, as if something good would rub off. (Fortunately this is a rare occurrence!) This individual would have followed me into the bathroom if I had let him. Having experienced idol-worshipping from both ends, I've since revised my writing and teaching practices in an effort to temper people's expectations before they meet me.

It is interesting to notice how words on a piece of paper elevate one so quickly to the status of "authority", whether that status is warranted or not. For example, many primitive skills articles--including some of mine--were written by individuals who only tried a particular skill once, then wrote about the experience. I'm not saying that is a bad thing to do. Organizing your thoughts on paper is a great way to learn and solidify your experiences into real knowledge. The problem is that the writer is elevated to a status where it seems they must have done the skill for years, even when they didn't. I write this here to help you become more "aware" as a reader.





Writing is often embellished too, either directly or by recombining separate events to make a composite story. The most simple embellishment is an "embellishment by omission", which is to focus on one's successes and high points while omitting one's short-comings. A person who is good at something only fifty percent of the time can use that material for one-hundred percent of a story, thus creating an image that is much better--essentially flawless--compared to the their actual skill level.

When I realized I was setting myself up for a fall, projecting an image that is much better than my skill level, then I altered my writing to include my short-comings (especially evident in my on-line camping journals). I do not want anyone to come to me expecting to get something I do not have and cannot give.

For those who are interested in wilderness survival and nature awareness skills, I highly recommend Tom Brown's books to fire the imagination. From his books you can discover the possibilities, just be "aware" of the pitfalls of placing him on a pedestal. My favorite titles from his autobiographies and field guides are available here. Please scroll down to the end of the page for an on-line order form.

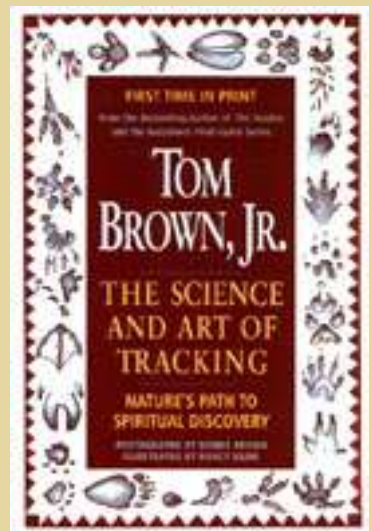
Nature Awareness and how it Relates to Everyday Life

The primitive skills taught at wilderness schools nationwide are those that were used by native populations (including Native Americans, African Bushmen and Australian Aboriginals) to survive in their natural surroundings. In December 1999 I gave a presentation on these skills that piqued the interest of Jeff Blend from Helena, Montana.

Jeff has long been interested in awareness of his internal self and his surroundings. He practices the arts of yoga and meditation.

Since he started practicing primitive skills, he has told me several times that these skills are most valuable to him for the awareness they give him, as opposed to the actual skills involved. Projects like making cordage or starting a fire-by-friction become the means for Jeff to plug into his deeper self and to learn about his surroundings. Through awareness--being in tune with the moment--the skills come alive with exciting possibilities and reinforce his connection with Earth. Without that awareness, the skills are usually "just another chore, like doing the laundry", says Jeff:

"I practice primitive outdoor skills for the awareness they bring me. Primitive skills



embody aspects of two very important things in my life: nature's wild energy and yoga's centering power. Really, these two things are one in the same because Yoga is simply the act of being present and accepting of everything that happens to you. That is exactly what nature is all about.

On primitive expeditions participants must often deal with hunger, cold, soggy and general discomfort because they intentionally do not bring along conveniences such as tents and cook stoves. While attempting to eat, stay warm, sleep and stay hydrated outdoors-- with little or no modern camping equipment-- they must tune into the present to deal with the situation. They must adapt to the harshness and uncertainty of meeting the body's basic needs in nature. If the weather becomes nasty, for example, then they must react and perhaps find shelter or at least stay warm. This requires courage, flexibility and the ability to stay calm in the midst of a tough situation.

"Once a person breaks down their comfort zone and releases dependence from their material things and normal routine, something happens on the inside. The 'primitive participant' begins to let actions flow based upon intuition and instinct. They lose that nagging sense of clock time and social obligation. In fact, they may lose the sense that they are an individual 'I' or 'me' at all! Instead, they become very connected to their landscape in a way that breaks down the barriers that separate the 'I' from everything else. This is a sign that one is naturally moving into a meditative state and truly living in the present.

Sitting on a meditation mat with incense burning is not needed for one to become "enlightened" or present, because one is already meditating on the primitive task at hand. It is much easier to stay in the present moment when concentrating on an essential task such as starting a fire for warmth than when making more mundane decisions such as what to watch on TV. This is why so many seek out the challenges of the outdoors or the challenges inherent in starting a business or extreme skiing.

"Because of its raw nature, primitive living demands flexibility and the ability to remain calm in any situation--even while you push beyond perceived limits. Interestingly, these are the same ideals encouraged by ancient Yogis and martial artists in the Far-East. When one needs to do something to survive and has only the materials around them, it is amazing how much ability we all have to improvise and really use our heads. It is no wonder that so many outdoor skills schools are being set up as alternative therapies for troubled children and teens who need to look inward to deal with deeper issues.

"Primitive expeditions wake up dulled senses and snap us out of our petty dramas into the present reality of nature. The garbage of mind and body is shed because there is really no margin for it out in the bush. I am not thinking about politics or the stock market when I am very hungry and am trying to make a meal that may or may not succeed. In yoga, we use the difficulty of a headstand or of sustained compassion to continually keep the spirit awake and aware. With primitive skills, it is the challenge of surviving and the

direct participation with the planet that cultivates that same awareness.

"I took my first outdoor expedition with Tom Elpel in the middle of a Montana winter and got a 'trial by fire' of how hard it is to live off the land. I was miserable for the first two days due to cold, hunger and the disruption in my schedule. With only a blanket for bedding and about one cup of simple food per day, my feet were always cold and my stomach perpetually empty. I swore I would never participate again in such a venture and almost left the group to hitchhike home. On day three, I couldn't get a fire started with my bowdrill set and finally walked off alone and after some meditation, cried for an undetermined amount of time. Once I let my emotional defenses down and detached from my ego, I felt great and then started a fire very quickly. The next four days were incredible as we walked across the landscape building shelters and learning about plants. I had released a lot of 'garbage' in the crying session and felt better than I had in a long time physically, emotionally and spiritually. By the last couple of days, time took on a new meaning and I pretty much lived every moment of those days in the present. I was so full of joy and wonder that I even found humor in our snowball fashioned toilet paper!"

Does Nature Awareness Help the World?

One of the central themes of Tom Brown Jr.'s work is awareness of "the whole", to take the details of individual tracks or events and connect them to the larger story. For example you would look at the tracks and behaviors of mice and pick up clues from that about what the owls are doing. He doesn't provide many specifics on the topic, except that it requires lots and lots of "dirt time" to learn it.

A question that bothered me while growing up was whether or not that kind of intimate knowledge about the interactions of owls and mice or anything else was really relevant to the larger world picture. For example, a really good tracker may be able to track mice or rabbits across western rangelands, studying the soil every step of the way, but would they notice that the bare ground between the plants is increasing from year to year?

Range ecologists never made that connection, because traditional management tools evaluated the health of the grass itself, rather than the soil. By itself the grass could score a high rating, even though there was less of it each year. As it turns out, Allan Savory, the individual who identified the critical role that hooved animals play in maintaining arid rangelands, made the discovery while man-tracking during the civil war of Zimbabwe in the 1960's. Tracking forced him to look at minute details on the ground. His job led him through wild lands, pasture lands, crop lands, and rested lands all across the country, often through several regions in a single day. He noted that the healthiest lands were those that were beaten by the hooves from massive herds of animals, while the worst lands had few or no animals on them. **(For more details on range ecology and**

desertification, be sure to read my article [The American Sahara: The New Desert Beneath Our Feet.](#)) Although Allan Savory was able to make the connection thanks to his tracking work, I've seen no evidence that any other trackers have been able to make the same leap.

So it seems that while tracking and nature awareness skills can create the opportunity to see the larger picture of ecology, there is no guarantee that a person will actually make that leap. Nevertheless, I think that these skills at least facilitate the opportunity to tune into the observations of others who have made those connections. And just as importantly, nature awareness skills can help us to spend more of our time in all situations really observing what is out there and not falling prey to media, programming or general lethargy.

For example, learning to start fires with a bowdrill set is a skill that requires and develops your awareness, because you need to be aware of what types of woods are best to work with and where to get them. But even if you worked with a resource like cottonwood for years and years, you might not ever notice that along many rivers there are only mature trees and no young ones.

The problem is that cottonwoods require flooding to establish seedlings, so the river downstream from a dam often has no new trees. It is a simple observation, but most people would miss it, even after spending years around cottonwoods. We tend to accept our world as it is, without questioning the basics. The difference is that if you are practicing primitive skills and nature awareness then you are far more likely to tune into a news report about cottonwood ecology. Thus you may not develop the awareness skills to pick up on cottonwood ecology by yourself, but you will be alert to it if someone else makes the discovery. That alone is very valuable, and can be used to monitor your own actions at work, at home and with others.

For example, you might look into how to live sustainably at home and ultimately save money and resources. Without this awareness, you might not think twice about how you live. You might just pay your high energy bills and take out your five bags of trash every week, as if that were perfectly normal!

Through the awareness and attention inherent in the primitive experience comes a respect for the Earth that words cannot express. Living off the land, one sees how they affect the environment with every act of consumption and respect is generated. In modern society, most living necessities are conveniently provided by others. Farmers grow our food, carpenters build our houses, utilities provide our power and laborers make our clothes. Fossil fuels--energy borrowed from the past--run a majority of our culture and make most of us materially wealthier as a society than ever before. As a result, most of us have few skills that provide our basic needs. Instead, we know the living skills for modern survival such as driving, good writing, check book balancing, computer literacy and information processing. While these are extremely important, they tend to keep us

apart from the planet and its subtle energies. Comfort becomes our master if not occasionally broken.

Our necessities are easy to come by because we have the technology to easily obtain them. Stoves and lighters ignite with a touch of the hand, food is always available at the store and gasoline is cheaply available. Therefore, most of us take these things for granted and think we should have them immediately and cheaply. Some of us tend to lose our humility and respect for the Earth as a result. Taking four hours to start a fire, on the other hand, gives one the humble feeling of what it really takes to biologically sustain us.

The awareness that you gain in the outdoors is easily transferred back to life in the modern world. You will notice the resources we consume and the foolish ways that we waste them, such as building new houses with most of the windows facing north. Even the most lowly reptiles know enough to take advantage of solar gain on a cold day, yet so many people fail to recognize the obvious and spend thousands of dollars consuming fuel to heat a house that would have mostly heated itself, if only it were turned around!

Through primitive skills and nature awareness you will realize that we live in a world of great abundance. Our environmental problems are not due to a shortage of resources, but to a shortage of awareness about how we use those resources.

Jon Young Audio Tapes

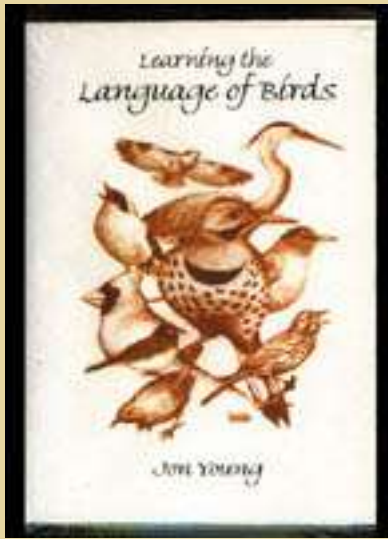
One impression I had from Tom Brown's books was that the path to knowledge and wisdom was to spend thousands of hours of "dirt time" studying minute details of tracks and behaviors, comparing those to the greater whole. I desperately wanted to go out and learn everything directly from nature, but was discouraged when I didn't seem to get anywhere that way.

Ultimately I realized that our ancestors spent not just thousands of hours, but literally thousands of years of dirt time to progress from one idea to the next, such as from the atlatl to the bow and arrow. Nature is in many ways like a university of knowledge, but without guidance it is the campus only. It is helpful to have teachers--at least some good books and resources--to outline a path forward. Once you have an inkling of where to go, then you can make your own unique discoveries in the natural world.

A particular topic I wanted to learn, but didn't know where to begin, was learning how to read the "concentric rings of nature" as Brown describes it. The idea is that a disturbance



anywhere in the forest sets off an alarms that reverberates through the woods. If you could learn to read the signals then you could sense what is happening far beyond the range of your five senses.



The process for deciphering the concentric rings was first outlined by Jon Young, who's original "claim to fame" was being Tom Brown's first student and the first instructor at Brown's school. Jon Young has since distinguished himself and his work through his audio tapes and naturalist correspondence training programs.

Many books and tapes about nature skills require that you have access to wild lands to hone your abilities. But Jon Young gives you awareness skills for the country or the city. His tapes are especially helpful for people who have the desire to learn but not much time to spend in the woods.

The *Seeing Through Native Eyes* series bears some resemblance to the material presented in the Tom Brown Field Guides, but through Jon's fresh perspective. The best tape of the Native Eyes series is definitely *Learning the Language of the Birds*. In this tape Jon outlines a simple and universal system for interpreting bird calls and the concentric rings of nature through recognition of "base-line" or normal behavior versus alarm calls of various intensity. You do not even have to know the names of most birds to be able to interpret meaning from their calls. *Learning the Language of the Birds* is also available as a single cassette.



Jon Young also produced a six-tape series called *Advanced Bird Language*. The former tape is still the most important one for understanding the basic theory of understanding bird language. The value of the new series is that Jon puts theory into practice, describing the process of learning and using bird language. Especially helpful are Jon's numerous stories of field experiences where he and others have used bird language to read the forest around them. He gives tangible examples of how disturbances ripple through the concentric rings of nature. Please scroll down to the end of the article for an on-line order form.

Learning to See

As a naturalist you can make interesting observations everywhere in nature, even from a pile of crap in the woods. With basic training you can identify such things as the animal

that dropped it, as well as what plants or animals they ate and about how recently they were there. But to make these simple observations you need to know the animals and their scat types and the possible plants or animals they might eat. Although nature observation sounds romantic and fun, much of the process involves book learning and rote memorization. The more names, facts and figures you know, the more exciting and in depth your observations are likely to be.

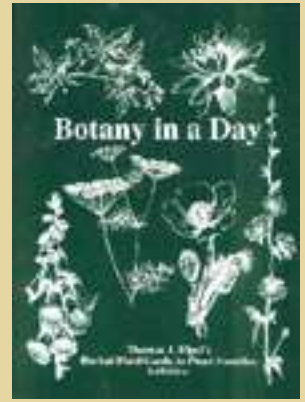
I spent much of my childhood memorizing plants, because I had the necessary resources and the desire to learn. My grandmother taught me many wildflowers on our walks, and from there I wanted to learn the rest. I brought samples back to the house and spent hours flipping through pages and pages of color pictures trying to match the specimens to the photos. If I could not identify a plant that way, then I brought it into the herbarium at the university where the botanists would key it out and give me a Latin name. Back at home I looked up the Latin name in my books and read everything I could find about the plant. I constantly quizzed Grandma about the names of plants and flowers we found on our walks. The funny thing is that although I "knew" hundreds of species of plants, I never really stopped to look at them!

That statement may seem surprising, but stop and think about it. Chances are you can probably identify a dandelion, but did you ever stop to study one in such detail that you can still see every part vividly in your mind... so well that you could draw one from memory? It is easy to become familiar with something without ever taking the time to study it.

I was familiar with hundreds of species of plants that I recognized on my walks with my grandmother, but I never stopped to observe the most basic features, such as alternate or opposite leaves, or the number of petals, or what it looked like inside the flowers. I never really looked at people either, although I certainly knew and recognized many of them. The funny thing is that I seldom recognized my neighbors if I bumped into them in another town. I usually had to "meet" people about ten times before they became familiar enough for me to remember them.

I was shocked and thrilled the first time I looked at wildflowers, more than ten years after I began learning them. It all started during an herb walk at our school, when the herbalist pointed out some basic patterns about flowers. She showed us several members of the Rose family and pointed out that they all had flowers with five petals and usually numerous stamens. She said that most members of the Rose family were astringent, and that an astringent tightens up tissues and closes off secretions. In a few short words she explained what an astringent does and gave us the basic identification and uses of virtually every member of this one family. She went on to summarize several other families of plants in a similar way.

I was totally dismayed that I had been studying for all those years and no book ever mentioned that there were patterns or any kind of logic to the plant world. In short, this class totally changed everything I ever knew about plants. From there I had to relearn every plant I already knew in a whole new way. I set out to study the patterns in plants, learning to identify the plants and their uses together as groups and families. For the first time I looked at the flower parts and learned to recognize the patterns between related plants. Soon I was able to recognize these patterns even in plants I had never seen before. This quest ultimately led to the writing of my book, *Botany in a Day*, which is now used nationwide in herbal and wilderness schools, even in university botany classes, and especially by thousands of individuals who just want a faster, easier way of learning about plants and their uses. *Botany in a Day* doesn't teach you to memorize every feature of a plant, but it teaches you the two or three critical details that you must know for proper identification.



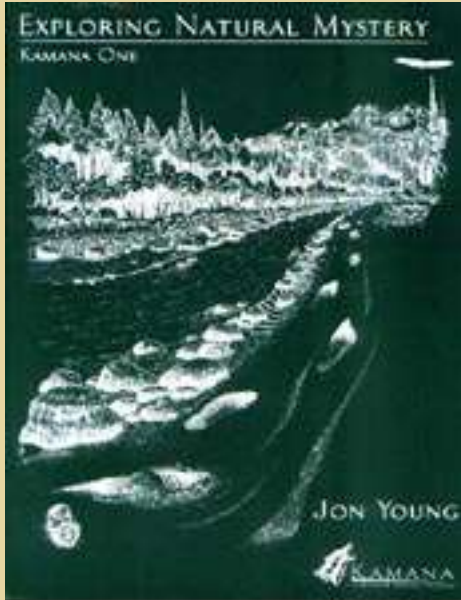
Somewhere along the way I also picked up Kevin Trudeau's Mega Memory home study course, mostly to help me better memorize people, so I wouldn't embarrass myself so often. Trudeau encourages you find distinctive features in a face and associate that with comical, unforgettable images inspired by the person's name. It takes a little practice to get good at doing it well when you are otherwise trying to listen to what a person has to say, but with practice it definitely gets easier. As Trudeau points out, the important thing is that it makes you consciously focus on the person and their name. You will remember the person long after you forget the comical association.

I have never been out and around other people enough to get really good with the associations, but at least it taught me to focus on people's names and faces for the first time in my life. Mostly I practice this skill in my plant classes. I ask all fifteen or so students at the beginning of class to introduce themselves, and I memorize their names and faces as best as I can. It was hard at first because I simply lacked the neural net to do it.

Learning is literally the process of growing new neural connections, so it is just a matter of time to learn to do a skill well. It took me about five years of practice (only a few times each year) before the skill suddenly clicked together. Now it is relatively easy for me to learn new names and faces... as long as I remember to focus on the task. Obviously a skill like this can be immensely useful, both in nature studies and in your social and business life.

Jon Young's Kamana Naturalist Training Correspondence Course

Becoming a naturalist doesn't happen over night. It is a gradual process of waking up to the world around you. You learn about the plants and trees and insects and birds and rocks and animals, and you begin to see things in the world that other people do not notice. Your observations might not be major at first, just little things like, "Gee, that interesting. The deer have been eating the *Agaricus* mushrooms." The more of these little observations you make, the deeper your connection to the natural world becomes.



My training as a naturalist and in primitive skills proceeded haphazardly, learning bits and pieces at random from books or people I met. I did not have any kind of step-by-step instruction book to suggest how to proceed. Some subjects I learned really well, but with other topics, such as learning the concentric rings, I couldn't even find a place to begin.

Through the Kamana Naturalist Training Program, Jon Young and the Wilderness Awareness School have created a step-by-step course that anyone can follow to achieve greater awareness of the natural world. Kamana One is an introductory program which takes about forty-eight hours of time over two weeks to complete. After finishing the assignments you can mail in a report to the Wilderness Awareness School, and if you desire, you may continue with advanced levels of Kamana. (My book *Botany in a Day* is used in Kamana Three.) Kamana seems to be designed at least partly to meet mainstream concepts of curriculum. In effect, this is a program that you might be able to implement with an entire class in high school, or you might do it on your own for college credit. In fact, the biggest objection to the program is that you might feel like you are back in school, completing homework assignments!

Kamana One includes a variety of awareness exercises, with an emphasis on learning to make detailed observations. You do not learn a lot of plants or birds, for example, but simply study a few in great detail, learning to memorize every feature until you can see it vividly in your mind's eye. It is essentially the process of developing a "photographic memory". You will use this skill throughout your life to memorize plants, birds, tracks, maps, people's faces, even conversations. As you move through advanced levels of Kamana you learn to journal minute details about every day events, such as each time the wind shifts during the day, every change of the weather, the behavior of the birds and animals, your own moods, what insects are out and about. In short you develop a sort of hyper-awareness about the world around you.

While the benefits of such training are extremely profound, the process of learning it is not. The exercises in Kamana One are surprisingly simplistic, intended to help you break through the normal cloud of distractions to experience the world around you much more clearly.

The *Seeing Through Native Eyes* cassettes are required resources used in conjunction with *Kamana One*. Please scroll down to the end of this page for an on-line order form.

Chris Chisholm's Wolf Journey Part One: Trail of the Naturalist

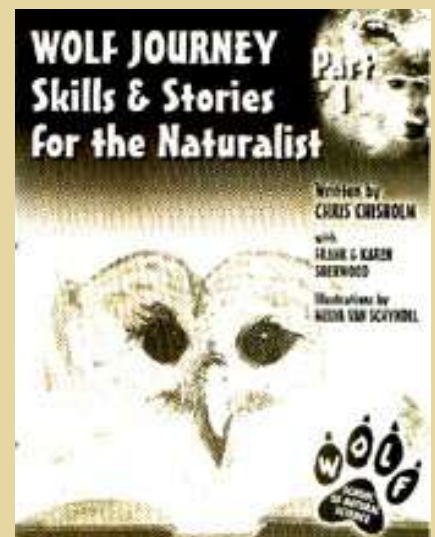
One of the greatest challenges to developing awareness capabilities is that people are always in a hurry, even when going out into nature to slow down. All the animals hide or flee, and we humans are moving too quickly and thinking too much to see them anyway. Therefore, one of the most important skills in nature awareness is learning to just stop and tune into a single place.

A secret spot is a special place you choose to connect with in a very intimate way, returning to it almost daily for a year or more--through sunshine, rain, sleet, or snow, even in darkness. In this time you will study the plants, the animals and their tracks, the birds, the weather, the insect life and soil. Over the course of a year you will learn about your secret spot in great detail, becoming an expert on that place. But it isn't just a matter of learning to identify everything in your surroundings. The key is to be still and quiet enough, and there so often that you become part of the place, accepted by the wildlife that shares it with you.

Finding and using a secret spot is a significant part of John Young's *Kamana Naturalist Training Program*, as well as Chris Chisholm's closely related program, *Wolf Journey: Skills & Stories for the Naturalist*. As Chris writes:

"By consistently studying and observing your chosen area, you will gain perspective on how wildlife interacts around you, and how nature's patterns change with the seasons. If you visit your study site for two consecutive years, your knowledge will multiply many times, as you see patterns repeat themselves.

"Learn the rhythms of the natural world at your secret place, and you will develop skills to understand how animals, plants, and the elements co-exist. You will see that once you discover the patterns of your study site, you will be able to know other sites more quickly. Often the patterns will be the same elsewhere, but with different individuals playing the roles."



Chris Chisholm has attended a couple courses at Tom Brown's Tracker School, several courses with Jon Young at the Wilderness Awareness School, and he has trained with Frank & Karen Sherwood at Earthwalk Northwest. The Sherwoods were former instructors at Tom Brown's Tracker School, and they are the editors of *Wolf Journey*.

Wolf Journey has much of the same content and flavor as *Kamana One*, especially in terms of sensory awareness and use of the secret spot. One key difference is that *Kamana* emphasizes a prayer-like approach to nature that may be uncomfortable for some, especially when used with groups of people or public schools.

Wolf Journey emphasizes a similar respect for the earth, but through "nature appreciation" as opposed to "honoring the Creator". This is a correspondence course where you purchase only the workbook, with the option of later mailing in your completed assignments and a fee for Chris Chisholm to review your work. As with *Kamana*, there are multiple levels to the *Wolf Journey*, so you can graduate from one level to the next. *Wolf Journey* was beautifully illustrated by Melva van Schyndel. *Botany in a Day* is used as a guide with this workbook. Please scroll down for an on-line order form.

Conclusion

Awareness is the simple but profound act of being conscious of the world around you. It is a matter of knowing where the electricity comes from when you flip on the light switch, what the dog is barking at out in the yard, and where the food on the table came from and how it was grown. Awareness is also about making a connection with the plants and birds and insects and wildlife and geology every place you go. To me it is like living in a world full of friends, and in my daily walks or distant travels I recognize old friends and flowers, some of which I haven't seen in years.

The more you practice awareness skills, the more neural connections you will make, expanding your view of the world and your ability to interpret and evaluate it. Any observation that cannot be understood suddenly requires your personal investigation. You may find yourself plagued with questions, causing you to screech to a stop beside the road, desperate to know what that flower was, or possessed by the need to study the ecology of a particular field or forest.

Instead of switching on the television news and accepting every story as absolute truth from an authority figure, you will recognize certain inconsistencies--that so many stories are based on flawed assumptions. When the news describes desertification from over grazing you will recognize it as desertification from too few animals on the land. When the news describes an energy shortage you will see such a surplus of wasted energy, that the same supply could profitably meet the needs of twice as many people. When the news describes a horrible crime, you may no longer see the criminal as the cause of the problem, but as the symptom of something more basic about our society and our relationships with each other and the world around us.

Surprisingly, awareness will teach you about yourself more than anything else. You will

observe your own patterns of behavior and begin to question those that are less than positive. When someone says that you are being completely unreasonable, you might just stop and realize that they are correct, because you noticed it too. You will begin to discover a new you, and find much more satisfaction in the life you live.

Order Form

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Tom Brown: The Search	\$13.00	Quantity:
Tom Brown's Field Guide to Wilderness Survival	\$13.00	Quantity:
Tom Brown's Field Guide to Nature Observation & Tracking	\$13.00	Quantity:
Tom Brown: Science & Art of Tracking	\$13.00	Quantity:
Jon Young: Seeing Through Native Eyes	\$50.00	Quantity:
Jon Young: Learning the Language of the Birds	\$13.00	Quantity:
Jon Young: Advanced Bird Language	\$50.00	Quantity:
Jon Young: Kamana One Naturalist Training Program	\$25.00	Quantity:
Chris Chisholm: Wolf Journey Part One	\$18.00	Quantity:
Thomas J. Elpel: Botany in a Day	\$22.50	Quantity:

Please Note: The audio tape *Learning the Language of the Birds* is included in the *Seeing Through Native Eyes* series.

Also be sure to see these related pages:

[Birding: Learn to Identify Birds and Interpret Bird Language](#)

[Jon Young Nature Awareness Resources](#)

[An Interview with Tom Brown, Jr. & Larry Dean Olsen](#)

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Bird Fact: How many birds are killed by collisions with communications towers?

Answer: Biologists with the U.S Fish & Wildlife Service conservatively estimate that 4 to 5 million birds are killed nationwide each year. There are about 74,000 communications towers in this country. Night-migrating birds crash into the towers and support wires on dark, foggy nights. Awareness of the problem has grown in recent years when flocks of up to 10,000 birds were found dead after a single night. Exactly why birds crash into the towers is unknown, but conservationists speculate that they are attracted to the tower lights, which are used to warn aircraft.

Lights in tall buildings pose a similar problem. Night migrating birds seem to be attracted to the lights and fly around until they either crash or drop from exhaustion. Volunteers in Toronto, Canada help patrol city streets on mornings during the migrating season to look for surviving birds that may be revived with rest. Volunteers also founded the Fatal Light Awareness Program (FLAP) to help educate people on the need for reduced lighting on tall buildings.

References:

"*Birds and Towers Don't Mix.*" Popular Science. August 2000. Page 40.

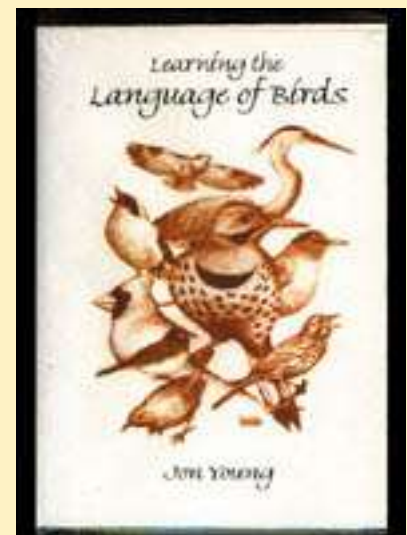
"*Fatal Attraction.*" Bird Conservation. Issue 17. Pages 10-11.

"*Making a Flap.*" Bird Conservation. Issue 17. Pages 10-11.

Birding: Learn to Identify Birds and Interpret Bird Language

Audio Tapes by John Young

My approach to nature awareness definitely has its roots in Western culture-- I tend to focus my studies on the plants, rocks, birds and other animals that are most "useful" towards achieving my goals. In this case, the goal would be successful primitive wilderness survival living. In other words, I tend to think from my stomach: "Sure it's a cute bird, but can I eat it?" This utilitarian approach to nature may sound alarming and offensive when first exposed, but believe me, you definitely develop a great respect and appreciation for every living thing when you interact with the world this way, instead of just looking at nature and saying, "Gee, isn't that cute."



Besides being illegal to kill song birds (unless you have a communications tower for a weapon), there really isn't any meat on them anyway, just lots of fluff. It is for that reason that I put off seriously studying birds for so long. I knew I wanted to get into birding eventually to round out my nature skills, but I prioritized more "useful" skills first.

Two things helped to shift bird identification to the top of my list. First, I reached a level of satisfaction with my other skills, such as edible and useful plants (i.e.: [Botany in a Day](#)) that made birding seem like the next good skill to develop. Second, and more importantly, I finally learned that it would actually be very "useful" to become proficient in bird identification.



It was Jon Young's tapes, [Seeing Through Native Eyes](#) and especially tape number six of the series, *Learning the Language of the Birds* that really turned me on to birding. On that tape, Jon Young describes the process of deciphering bird songs to discover if there are other animals or people nearby that are beyond the limited range of your own five senses. It isn't a matter of translating any particular bird call into English, but rather of being able to interpret alarm calls based on the intensity of the alarm and the preferred habitat of the bird(s) sounding the alarm. For example, a ground-feeding bird like a robin is going to squawk about threats on the ground--such as a cat--while a tree-top feeding bird like a tanager is going to squawk about threats from the air--such as a hawk. You might have some experience with this process already, for instance, if you know who or what is coming up the road just by the tone of your dog's bark or the wag of it's tail.

In *Learning the Language of the Birds*, Jon Young out-lines a systematic process for distinguishing between normal or "baseline" bird songs versus their alarm calls. In theory at least, it isn't necessary to be able to identify which species of bird is making the call, as long as you know it's preferred habitat (low, middle, or high) in the tree cover. In practice, however, you have to learn at least the most common song birds in your area to develop your skills, then you can extrapolate that information to other species you are not so familiar with.

Jon Young also produced a six-tape series called *Advanced Bird Language*. The former tape, *Learning the Language of the Birds* is still the most important one for understanding the basic theory of understanding bird language. The value of the new series is that Jon Young puts theory into practice, describing the process of learning and using bird language. Especially helpful are Jon Young's numerous stories of field experiences where he and others have used bird language to read the forest around them. He gives tangible examples of how disturbances ripple through the concentric rings of nature.

Learning the Language of the Birds (one audio tape) \$13.00 Quantity:

Advanced Bird Language (six audio tapes) \$50.00 Quantity:

Remember: *Learning the Language of the Birds* is also included in the [Seeing Through Native Eyes](#) series!

-Please scroll down the page for the "Add to Order" button.-

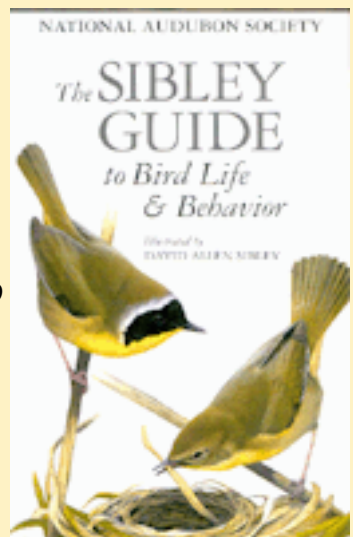
Bird Identification Books

The Sibley Guides

The process of learning to interpret bird language naturally requires some bird identification skills. The easiest time to begin identifying birds is when there are the least of them around to confuse you. That would be winter here in the northern latitudes. But don't let that stop you from learning birds any time of year. Just start with the most common, most distinctive birds first and work your way gradually towards the LBB's or "little brown birds" that all look alike.



There are many great bird identification books, of which the most comprehensive book is undoubtedly the 544 page National Audubon Society's ***Sibley Guide to Birds*** by David Allen Sibley. Sibley began studying birds seriously at age 7, under the tutelage of his father. Unlike other guides, the *Sibley Guide to Birds* includes complete descriptions for all 816 bird species found in North America north of Mexico. Most species are pictured at rest



and in flight, and from several angles, above and below. The pictures also show plumage in every stage of development and in both sexes, so you can see the complete range of variations within a species. Also included are descriptions of each bird's distinctive markings, plus range maps and migration routes. The book even includes measurements for the typical wingspan, length, and weight of the birds.

Sibley planned the book for nearly twenty years and produced the fantastic life-like

drawings--several thousand of them-- in just five years. One feature I especially like is that, if you are looking for one type of bird, like a warbler, then you can look at scaled down images on a single page covering all possible choices. That makes it easy to compare one species to another without constantly flipping back and forth through the pages. This is the sort of book that is so beautiful and so well organized that it is fun just to sit down and browse through the pages. The only thing lacking in the *Sibley Guide to Birds* is information about bird habits, such as nesting preferences, the number and type of eggs, and dietary choices, etc.... all of which is included in the equally impressive companion book *The Sibley Guide to Bird Life & Behavior*.

The Sibley Guide to Bird Life & Behavior was written with the input of forty-eight expert ornithologists, and it is encyclopedic in its coverage of the birds of North America. The first 120 pages introduce the reader to bird anatomy, evolution, classification, behavior, habitats and conservation. While this part of the text is less-than-exciting, it is useful background information that any birder should be familiar with.

The rest of this 588 page book is dedicated to exhaustive coverage of the bird families of North America, including family traits, taxonomy, adaptations, feeding, breeding, vocalizations and displays, nesting, migration, and conservation. Nowhere else can you find so much information under one cover. The book is illustrated with more of David Allen Sibley's incredible artwork. Owning both of the Sibley Guides is like owning an entire library of bird books!

Sibley Guide to Birds (paperback) \$35.00 Quantity:

Sibley Guide to Bird Life & Behavior
(hardcover) \$45.00 Quantity:

-Discount-

-Order both *The Sibley Guide to Birds* and *The Sibley Guide to Bird Life & Behavior* and save \$5.00.-

-Order both Sibley Guides and all seven of Jon Youngs bird language tapes and save \$18.00.-

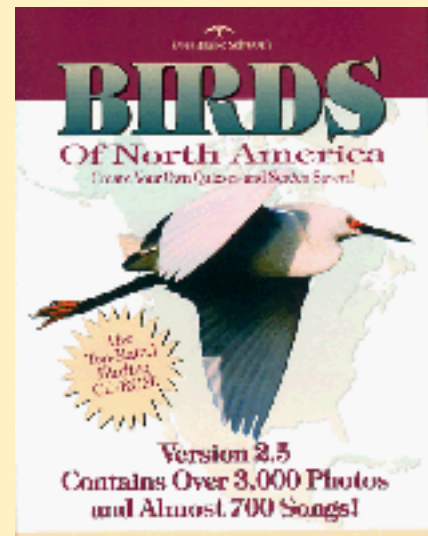
Sibley Guide to Birds + Sibley Guide to
Bird Life & Behavior \$75.00 Quantity:

Sibley Guides 1 & 2 + Language of the
Birds + Advanced Bird Language \$125.00 Quantity:

Bird Identification Software

One nice thing about bird books is that you can easily haul them into the field and use them while you are still looking at the birds. But there are two things about bird identification software that I like even more.

First, programs like the National Audubon Society's *Interactive CD-ROM Guide to North American Birds* have search functions, so that you can enter the season, region, habitat, color and approximate size of the bird you are looking for, and the computer will do a search and return all possible matches. In other words, the computer does the searching work, so you don't have to. Then you can easily compare the possibilities on the screen to find the most likely species.



The second thing I like is that when you have a probable match, or a few possibilities, then you can play each bird's main song and compare them that way too. That's helpful because you are often trying to identify small birds way up in trees fluttering about so that you never really get a good look at them. If you are unsure from the images, then the song can be the clincher, and that's good practice when you are learning to interpret bird language any way.

Now, I have heard that Thayer's Birding Software [Birds of North America CD-ROM](#) is the best birding program on the market, but it apparently runs only on Windows, not Macintosh, so I don't have any way of testing it. I think that is unfortunate too, because a large percentage of naturalists work on Macs like I do. I think they are losing many potential customers. Anyway, if you have a computer that runs Windows, then you can [click here](#) to order the program from Amazon.

The Audubon Society's [Interactive CD-ROM Guide to North American Birds](#) does run on both Macintosh and older Windows computers, but unfortunately not on Windows 98 or newer systems. Anyway, I absolutely love the program. It took a few sessions to get comfortable with the software, since it doesn't come across very intuitively. But once you figure out how to use the search functions the way I described above, you will find birding greatly simplified and rewarding. And as you learn each new species then you can add it to your own electronic bird list, with the picture and your own notes for future review.

Bird Files: How do homing pigeons and migratory birds navigate?

Answer: Possibly by "infrasound" or "very low frequency sound", according to geophysicist Jon Hagstrum of the US Geological Survey. Hagstrum has been studying homing pigeons, which are able to find their way home from thousands of miles away as easily as if they were following a map. Hagstrum theorizes that the birds may be building "topographic sound maps" based on the distinctive, but very low frequency sounds of things like ocean waves, waterfalls, or the wind whistling over the mountains, plains, or cities.

Lab experiments show that pigeons are sensitive to infrasounds, but do not indicate why. Hagstrum researched pigeon races where thousands of birds were released at once to race home. Four races were distinctive because the birds were either hopelessly late or failed to return at all. In each case the races coincided with nearby flights of the concorde. Hagstrum speculates that the sonic booms temporarily defeaned the birds, knocking out their ability to map the landscape. Bird behavior is noticeably altered just prior to major earthquakes too, and Hagstrum speculates that also may be due to infrasound. Infrasound may explain how other migratory birds, monarch butterflies and even whales navigate.

Source: Josie Glausiusz. *"The Bird on the Plain Flies Mainly With the Brain."* Discover. March 2000. Page 24.

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Jon Young Audio Cassettes

Most books and tapes about nature skills require that you have access to wild lands to hone your abilities. But Jon Young gives you awareness skills for the country or the city. Jon's tapes are especially helpful for hard-working people who have the desire to learn but not much time to spend in the woods. Listening to these tapes on the commute to work will refresh your perception of the world around you. The *Seeing Through Native Eyes* series bears some resemblance to the material presented in the Tom Brown's Field Guides, but through Jon Young's fresh perspective. The tapes are excellent resources for the beginning naturalist.

Seeing Through Native Eyes

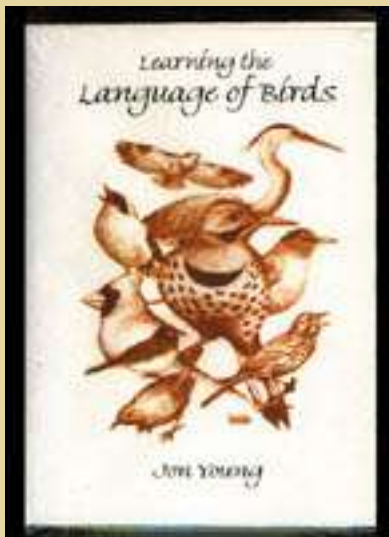
Understanding the Language of Nature
Six Jon Young Audio Cassettes



Because they lived close to the land, native cultures the world over spoke the language of their place. They knew how to navigate and find shelter and food. They had an intimate understanding of plant and animal life-styles. Above all they knew how to move with grace and ease through the wilderness. Practicing routines that made them invisible, they could read the language of tracks and interpret the stories birds told. Seeing through native eyes means immersing the senses in the natural world and discovering heightened spiritual awareness and a sense of belonging.

- #1 Basics: Wilderness awareness , secret spot, tuning the senses.
- #2 Tracking: Learn to interpret nature through the "seven arts of tracking".
- #3 Wandering: Develop a native sense of navigation, plus plant id strategies.
- #4 Community: Honoring the elders and the story-telling tradition.
- #5 Survival: Scout skills, including shelter, water, fire, food, comfort of mind.
- #6 Language of the Birds: Learn to interpret and disarm the forest alarm system.

Seeing Through Native Eyes. Six 90 minute audio tapes. Cost: \$50.00. Please scroll down for our on-line order form.



Learning the Language of the Birds

A Jon Young Audio Cassette

How many times have you surprised a fox at play? Or glimpsed a buck before it saw you? How often have you seen a wild creature eye to eye instead of in retreat? What secret do wild things know that allows them to melt into shadows before we arrive?

For over 25 years, Jon Young, has studied the forest alarm system which allows animals and birds to escape our detection so effectively. In this tape, Jon shares one of the best-kept secrets in nature.

By learning the "Language of the Birds", the listener can begin to disarm the forest alarm system, and can learn to enter the world of nature as a welcome guest. ***Learning the Language of the Birds***. One 90 minute audio tape. Cost: \$13.00.

Please Note: This audio tape is included in the *Seeing Through Native Eyes* series. Please scroll down for our on-line order form.

Advanced Bird Language

Six Jon Young Audio Cassettes

If you've listened to Learning the Language of the Birds and you want to hear more fascinating tips about interpreting bird language, then you'll be excited about Jon's new six tape series, Advanced Bird Language. His former tape is still the most important one for understanding the basic theory of understanding bird language.

The value of the new series is that Jon puts theory into practice, describing the process of learning and using bird language. Especially helpful are Jon's numerous stories of field experiences where he and others have used bird language to read the forest around them. He gives tangible examples of how disturbances ripple through the concentric rings of nature.

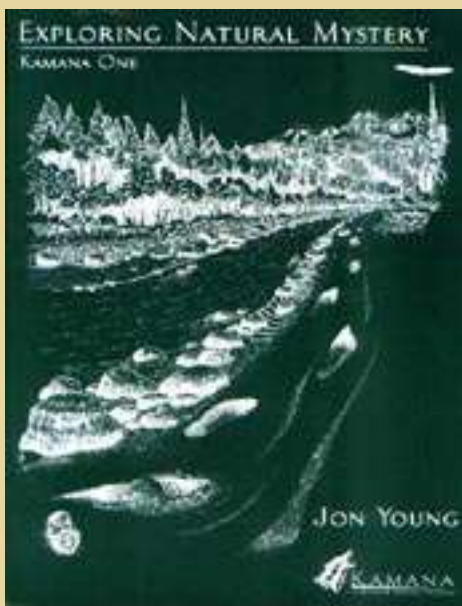
Not all of the tapes are directly related to understanding bird language. Some of the tapes are reminiscent of the Native Eyes series, covering tribal village life and the way of the scout. ***Advanced Bird Language*** Six 90 minute audio cassettes.



Kamana One: Exploring Natural Mystery

Naturalist Training Program by Jon Young

Becoming a naturalist doesn't happen over night. It is a gradual process of waking up to the world around you. You learn about the plants and trees and insects and birds and rocks and animals, and you begin to see things in the world that other people do not notice. Your observations might not be major at first, just little things like, "Gee, that interesting. The deer have been eating the *Agaricus* mushrooms." The more of these little observations you make, the deeper your connection to the natural world becomes.



Through the Kamana Naturalist Training Program, Jon Young and the Wilderness Awareness School have created a step-by-step course that anyone can follow to achieve greater awareness of the natural world. Kamana One is an introductory program which takes about forty-eight hours of time over two weeks to complete. After finishing the assignments you can mail in a report to the Wilderness Awareness School, and if you desire, you may continue with advanced levels of Kamana. (My book *Botany in a Day* is used in Kamana Three.) Kamana seems to be designed at least partly to meet mainstream concepts of curriculum. In effect, this is a program that you might be able to implement with an entire class in high school, or you might do it on your own for college credit. In fact, the biggest objection to the

program is that you might feel like you are back in school, completing homework assignments!

Kamana One includes a variety of awareness exercises, with an emphasis on learning to make detailed observations. You do not learn a lot of plants or birds, for example, but simply study a few in great detail, learning to memorize every feature until you can see it vividly in your mind's eye. It is essentially the process of developing a "photographic memory". You will use this skill throughout your life to memorize plants, birds, tracks, maps, people's faces, even conversations. As you move through advanced levels of Kamana you learn to journal minute details about every day events, such as each time the wind shifts during the day, every change of the weather, the behavior of the birds and animals, your own moods, what insects are out and about. In short you develop a sort of hyper-awareness about the world around you.

While the benefits of such training are extremely profound, the process of learning it is not. The exercises in Kamana One are surprisingly simplistic, intended to help you break

through the normal cloud of distractions to experience the world around you much more clearly. The *Seeing Through Native Eyes* cassettes are required resources used in conjunction with *Kamana One*

Order Form

Seeing Through Native Eyes (six audio tapes)	\$50.00	Quantity:
Learning the Language of the Birds (one audio tape)	\$13.00	Quantity:
Advanced Bird Language (six audio tapes)	\$50.00	Quantity:
Jon Young: Kamana One Naturalist Training Program	\$25.00	Quantity:

Remember: *Learning the Language of the Birds* is included in the *Seeing Through Native Eyes* series!

Also be sure to see these related pages:

[Birding: Learn to Identify Birds and Interpret Bird Language Awareness Books, Tapes, Resources and Perspective](#)

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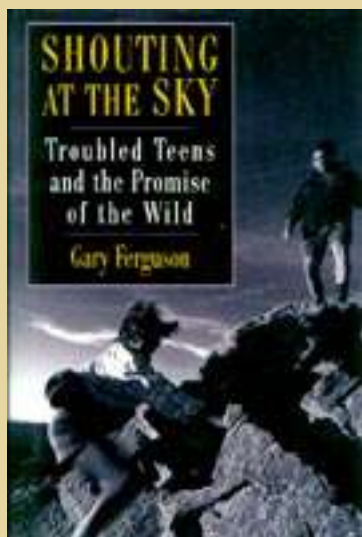
Aboman's Guide to Wilderness Schools

by Joseph A. Bigley

Looking for just the right wilderness school experience? Check out *Aboman's Guide to Wilderness Schools*. Aboman (Joe Bigley) provides a useful overview of thirty-five primitive wilderness survival skills and nature awareness schools around North America, plus eleven gatherings. Each listing includes useful information on school philosophy, location, area of focus, the instructors and a generalized description of classes, plus class photos and a quote from the director. With this book you can compare each school in detail to make sure that you find the primitive wilderness learning experience you are looking for. Copyright 2000. 144 pages. \$15.00

Aboman's Guide to Wilderness Schools \$15.00

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Shouting At The Sky

Troubled Teens and the Promise of the Wild

by Gary Ferguson

There are many wilderness therapy programs available for at-risk or troubled teens. Some of the programs are very good and others are not good at all. I worked for both the good and the bad in the late 1980's and early 1990's. From my experience in the field I can tell you that author Gary Ferguson has put together an excellent portrayal of what the kids go through in wilderness therapy.

Ferguson doesn't paint an all rosy picture of wilderness therapy, or claim that it works for every kid. What he does do is track the lives of a group of kids before, during, and after their experience at Aspen Achievement Academy in southern Utah, telling it exactly like it is. This book is a "must read" if you are considering sending a child to a wilderness therapy program... or working in one. Otherwise, it is still an excellent, entertaining and thought-provoking read that will help you to understand some of the situations and challenges so many kids face in the world today. Copyright 1999. 249 pages. Hardcover. \$25.00

Shouting at the Sky \$25.00

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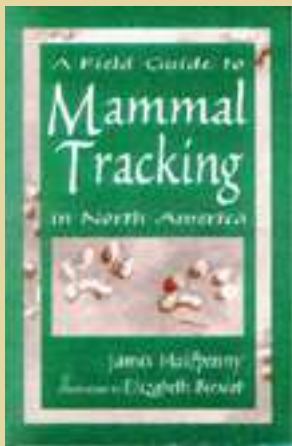
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Mammal Tracking in North America

by Dr. James Halfpenny

"quite simply the best book ever written on the subject." --The Mother Earth News

Jim Halfpenny has taught tracking since 1967, and today he continues to lead people out to find the wolves of Yellowstone Park or the polar bears of the arctic. His book *Mammal Tracking in North America* includes everything you need to know about track identification, gaits and following trails. Halfpenny takes special care to provide track comparisons between similar species, so you can identify tracks with confidence and accuracy.

The book includes hundreds of artistic and precise illustrations by Elizabeth Biesiot, including stop-motion style drawings to better communicate the gait patterns, plus a handy photo gallery of scat for easy comparison. *Mammal Tracking* is just the right size, weight and content to bring on every outdoor trip. 1986. 163 pages. \$15.00.

Mammal Tracking in North America \$15.00

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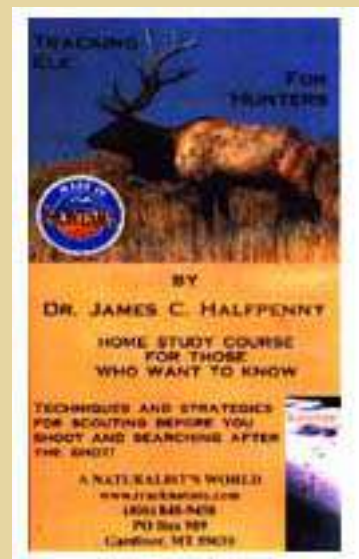
Tracking Elk for Hunters

video by Dr. James Halfpenny

Anyone who has worked with video knows that what the camera sees can be very different from what the human eye sees. Tracking can be especially difficult to portray on video, since the tracks or track details may not show up at all on camera. However, Jim Halfpenny has done a superb job of making the invisible truly visible through his video work.

It is also very difficult to hold the attention of the audience with just one person on camera, but Halfpenny is a very dynamic speaker, and the tapes are well edited, so the viewer is easily captivated by his enthusiasm for the subject.

Tracking Elk for Hunters is especially designed to help hunters interpret elk track and sign, determine the sex of the animals, predict where and when to find them, and

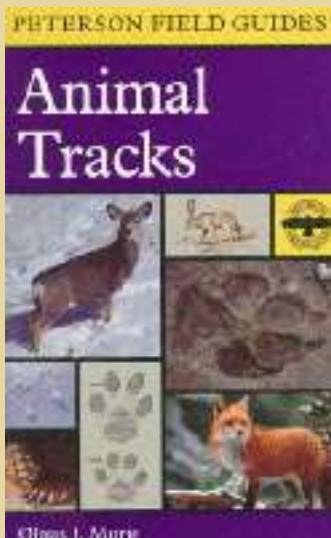


ultimately track them after the shot. Whether you are a hunter or not you will learn all kinds of tips about elk and their habits. It is a very well done video, and most of the material presented in it is new and different from what is presented in Halfpenny's book or his other videos. Cost: \$40.00.

International Customers Please Note: Do you know that different countries use different video formats? All our videos are in NTSC format, used mostly in North America, Japan and Taiwan. Not sure what format is used in your country? Click [here](#) to find out. For our European customers we may be able to special order PAL format. Please send an e-mail to us through our [E-mail Contact Page](#) to inquire.

Tracking Elk for Hunters, VHS video \$40.00

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Animal Tracks

A Peterson Field Guide
by Olaus J. Murie

Animal Tracks is a classic book based on Murie's research starting in 1921 and first published in 1954. Almost fifty years later it is still one of the best books on tracking.

Animal Tracks is especially helpful for track identification of the smaller animals, the woodchucks, ground squirrels, tree squirrels, chipmunks, rabbits, gophers, rats, mice, voles, shrews, etc. It also covers the more obscure animals that are not covered in other books, such as the ringtail, peccary, armadillo, seals, opossum, birds, reptiles and amphibians-even insects! The book includes more than 1,000 illustrations covering both the tracks and gaits of more species than you would have thought existed in North America. Animal Tracks even covers the domestic livestock-sheep, cows, horses and pigs-to help you distinguish them from their wild cousins. \$18.00.

Animal Tracks: A Peterson Field Guide \$18.00

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Recycled Plastic Ocarina



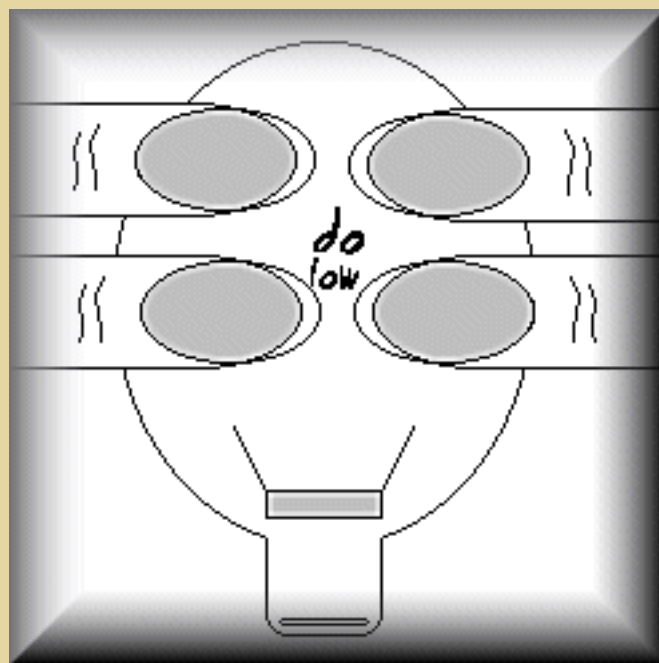
Stoneware Ocarina

-Listen to a Stoneware
Ocarina-

Learn To Play The Ocarina!

Ocarinas are very ancestral instruments, perhaps tens of thousands of years old. Nearly every culture and society has had a vessel flute of some sort. In their basic form, their origins date to stone age times, some of the earliest found in Central Africa. For centuries, they have been part of the Global Music Culture, as a 'hsuan' in China, in France a 'cou-cou', and to Italy, we trace the word 'OCARINA' ('sweet little goose'), now part of the international vernacular.

The Ocarina works on this principle: The airway in the mouthpiece forces a smooth flow of breath out of the slit, across the window and onto the 'lip', or 'reed' of the Ocarina, causing the air to break into vortexes; which gives rise to the oscillations heard as musical tones. Finger holes in the chamber allow the changing of tones. The Four-Hole Western Scale ("English Style") system emulated in the recycled plastic and stoneware ocarinas works because of 'cross-fingering'. Follow along with the animation and you are on the way. The scale chart below gives you the sharps and flats!



Note that there are four holes of different sizes, each one slightly larger than the adjacent one. That is the elegance of simplicity, the wonderful marriage of science and art. With the four holes, you can go from 'do' to 'do' and, by 'SLIDING" your fingers gradually off the holes, cover each and every frequency between. With all the holes open, blow into the whistle only enough to make a clear tone, not too forcefully nor too timidly. Now, cover the holes completely and slowly slide your fingers off while you blow, then slide them back over the holes. Now try it again and say "tu-tu" while you do it. Practice, Practice, Practice. The tu-tu part is a basic wind instrument technique that will give you the breaks between the notes. If condensation builds up in the airway; give it a blast to clear it.

Stoneware Ocarina

Although all musical instruments can be traced to ancient times, it is those of clay that have most direct and basic roots to antiquity. Ceramic musical instruments are made with a variety of techniques that remain basic. The sounds they produce remain rooted and unchanging. The surface may catch our eye at first, or perhaps the shape, but the true intrigue is the void they encompass, for it is the void within the vessel that gives the sound of all history.

The pitch of the sound produced in a vessel flute varies with the size, from very small whistles that produce penetrating bird-like sounds (like the Stoneware Ocarina sold here) to larger vessels with soft and mellow, deep pitched sounds (like the larger Plastic Ocarina). The number and sizes of the tone holes determine scaling which can range

from a few little notes to a nearly two octave range. Stoneware Turtle Ocarina: \$20.00.

Stoneware Turtle Ocarina \$20.00

Quantity:

Recycled Plastic Ocarina

The Plastic Ocarina has all the grace and quality of ancient ceramic ocarinas, but it is made of modern materials with the durability required for kid's instrument. These ocarinas are based on the Four-Hole "English Style" System and play a complete chromatic octave starting in "D". Plastic Ocarinas are finely tuned and consistent in quality. They are wearable as pendants.

This product has been endorsed by the Smithsonian Institute, Native American Indian education groups, Orff-Schulwerk Music Educators, and the ethnic music departments of several universities. These Recycled Plastic Ocarinas are fine beginning instruments that can be self-taught, taught by the classroom teacher or the music specialist.

We are told that the raw pellets used for production contain between 65% to 80% recycled plastic, though it is not clear if this is pre-consumer or post-consumer recycled matter. Most likely it is the manufacturing scraps from another product reprocessed for making the ocarinas. Cost: \$10. **Now you can choose a color! When you finalize your order, please specify in the "Comments" box which color you want: black, silver, red, blue, green or yellow.**

Recycled Plastic Ocarina \$10.00

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Making a Five-Hole Flute from recycled PVC Pipe

"I like your flutes, the sound is so soft and mild." -Pearl B. Detroit, MI

I remember sitting on a rock beside Hollowtop Lake one quiet summer evening, listening to the soothing sounds of a flute trailing out across the water. I do not know who played that night, but the flute has been my favorite instrument ever since. Later I learned from a student how to make simple five-hole flutes from scrap PVC pipe, and I absolutely love them. Although I don't consider myself all that musical, I've learned to play the flute well enough to add my music to our [Art of Nothing Wilderness Survival Videos](#). Someday I will add some flute music to our website too.

I used to make and sell a few flutes, but I have since become so busy that I just don't have the time any more. So here is a quick out-line of the instructions so you can make your own. Eventually I will post some pictures and more detailed instructions, but at least this is a start.

These instructions will be brief, but I think adequate to make a duplicate of my flute. There is room to vary certain parts of it, but for simplicity, let's stick to these measurements:

Start with a scrap of 3/4" PVC pipe (schedule 40) that is 18 inches long. I will refer to the "top" of the flute (where your mouth goes) and the "bottom" (the end away from you). All holes in the flute should be drilled with a 1/4" bit. I make marks along the side of the pipe that has writing printed on it to keep my holes straight.

From the bottom, measure up the flute and drill 7 holes centered on these measurements:

- 4-15/16"
- 6-1/8"
- 7-13/16"
- 9-3/4"
- 10-11/16"
- 14-5/16"
- 15-1/16"



The first five measurements are for the "five-hole" flute. The last two measurements are used to make the whistle.

Now the tricky part is to make a good whistle. First you need to cut a channel between holes #1 and #2 (from the top of the flute). So you are making a 1/4" wide channel on the surface of the PVC between those two holes. The channel should only be about 1/16" deep, so you are not cutting all the way through the PVC. Later you will wrap a piece of paper over the channel to contain the air as it comes up out of the first hole, runs through the channel and splits on the whistle of the second hole. I have carved this channel with sharp tools, but it is dangerous and difficult. A Dremel tool with a selection of cutting and abrading tips makes the job much easier.

The second hole was drilled straight in at first, but now you need to go back and cut it at an angle on the downwind side of the hole, so that air coming through the channel will split on the sharp edge, with half the air going down and half the air going up. You can tilt the drill at an angle to cut away the plastic inside the hole. But try not to eat away at the upwind side of that hole, as you want to keep the 90 degree edge there. Again, the Dremel tool makes the job a lot easier. You can take just a little bit off the top edge of the hole (downwind side), but most of the angle should be achieved by carving off the bottom edge, inside the flute. I fear that this sounds confusing, but I don't know how else to explain it without pictures.

Anyway, the next step is to pour a beeswax plug in between those first two holes. I use a 3/4" dowel with tape wrapped once around the end to thicken it a little, and push it up through the bottom of the flute until it has just barely plugged hole number two from the top (the whistle). If you pour melted beeswax into the top of the flute then it will form a plug between holes number one and two, forcing the air up out of hole one, through the channel to split on the whistle of hole number two. Allow the wax to cool thoroughly before removing the dowel. Look through the flute to make sure the wax doesn't pull away from the inside of the pipe to allow air past it. Sometimes that happens and you have to redo the wax.

Now you are ready to test the flute. Wrap a piece of paper over hole number one and the channel, so that the air can still split on hole number two. Tie a string around the paper and flute to keep the paper in place. Blow through the flute with and without fingering the holes to see what happens. The rest is experimentation, as you try adjusting the angle of the whistle or the size and shape of the channel until you get a good sound on all the holes. I have spent hours fine-tuning flutes that way in the past, though I am faster at it now.

When you get it just the way you like it, then you can finish the flute with paint. Rub it all down with coarse sand paper to give the paint more texture to grab on to, and round out the top and bottom ends of the flute. Finally paint it with a couple coats of acrylic paints. I pound a large nail into a board to hold the flute up while the paint is drying. I lay a pencil

beside the nail to lift the bottom end of the flute up a little bit, so that the only painted part in contact with anything is the bit resting on the pencil. When it is dry then you can put the paper and string back on and play to your heart's content. The layer of paint may slightly alter the sound though, so it could require some precise fine-tuning.

Playing the Five-Hole Flute

These flutes do not fit to a Western do-re-mi scale. For those with more musical background than I have, the lowest note is G (played with all the holes closed), followed by a B flat, C, D, F and G at the high end. A few other notes can be achieved through various combinations of open and closed holes. But the exciting thing about these flutes is that you do not need to have a musical background to play.

Here's some simple instructions: First, **position your hands correctly** on the flute. The **left** index and middle fingers are used to play the upper two holes. The left ring finger is positioned on top of the flute (as if there were another hole there) and does not move during play. The left thumb is positioned below the flute and also does not move. The **right** index, middle, and ring fingers are used to play the lower three holes. The right thumb is positioned below the flute and does not move. Put both your lips inside the pipe, or your lower lip outside and your upper lip inside.

The trick to playing the flute without experience is to start by playing simple scales. Play a note with all the holes open, then cover the first hole (closest to you), then cover the second (keeping the first closed), and so forth, until all the holes are closed. Then do the same thing in reverse, uncovering the holes one-at-a-time until all are open.

Start **playing the notes** in order this way, and you can experiment more later. Much of the musical quality from the flute is made by your rhythm of air pulses and finger movements. You can create nice tunes just by playing with rhythm up and down the scale. With practice and experience you will be able to explore new note combinations.

The haunting sounds of the Native American flute can be made by barely lifting your finger tips and hovering over the holes, up and down, or back and forth. Also try adding sudden starts and stops for interest. With a traditional Native American flute you would have to use your tongue to block the air, but with this style you can just open or close your lips for air control. But I must emphasize, stick to the basic scales and techniques before you try anything too fancy.

Short, impromptu sessions with the flute are the best. Practicing the flute is a good way to relax, so keep it next to the recliner, or where ever you usually sit down to take a break.

Note: We are more interested in promoting the sale of flutes from recycled PVC than making them ourselves. If you know of someone that makes and sells them already, we

would be delighted to get connected with them. Send us a note through our [E-mail Contact Page](#). We will only accept flutes from recycled or scrap materials. The production of PVC (polyvinyl chloride) is highly detrimental to the environment, even though the end product is reasonably benign.

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Ordering Information

Order on-line with your Visa, Mastercard, or Discover. Simply click on the links to learn more about each product and enter the quantity you want in the little white boxes, then click the "Add to Order" button. We also accept checks and money orders. For orders by mail, e-mail, or telephone, you can still use the on-line shopping basket to tally the order and postage. Then print or copy the information and send it in to:

**Thomas J. Elpel's
Hollowtop Outdoor Primitive School, LLC
PO Box 697
Pony, MT 59747-0697
406-685-3222
[E-mail Contact Page](#)**

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The Stars: A New Way to See Them

by H.E. Rey

Most star books depict the constellations as either elaborate allegorical figures bearing little relationship to the stars, or as geometrical hieroglyphs without meaningful shapes. But now you can learn the constellations as simple, easy-to-recognize stick figures, thanks to H.A. Rey's classic book, *The Stars*. I studied out of this book more than a decade ago, but today the constellations are still immediately recognizable to me. It is like seeing old friends in the sky every time I walk outside at night, and they always help to guide me on my night-time expeditions.

The Stars includes user-friendly models illustrating the phases of the moon and the changing seasons, plus fascinating trivia about stars, the solar system, and the galaxy. This book is great for adults and easily used with kids. Almost fifty years after it was first published, *The Stars* is still the best book on the subject. 160 pages. **Cost: \$12.00**

The Stars \$12.00

Quantity:

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Tom's Journals & Articles
Tom's Class Schedule
Schools of North America
Calendar of Schools



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Hollowtop Outdoor Primitive School, LLC**

Directory of Primitive Wilderness Living & Survival Schools

Those of us who live and breathe ancient skills and nature awareness are often faced with a dilemma when we make the decision to share with others what we have learned. We are people who are passionate about what we do. We believe in living close to the earth, and we teach from the heart. The dilemma is that in order to share these earth skills we have to jump feet first into the modern world of business... we have to spread the word about who we are and what we have to offer.

At HOPS we are working to more effectively get the word out about the many talented individuals, couples, and families around the country who want to invite you into their lives to share what they have discovered. In essence, it boils down to "economies of scale": by working together we can reach out far more successfully than if we each try to do it all alone.

There are many of us around the country now, tucked out-of-the-way in backwoods canyons, or making camps and practicing skills in thick tangles of brush along the edge of suburbia. Collectively we have more classes in more locations than ever before, so you can always be assured of finding the specific instruction you want.

**Also see our directory of
[Primitive Living & Nature Awareness Schools of Europe](#)**

Check this out!

Search for primitive survival and nature awareness classes with the
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[On-Line Calendar of Schools](#)

Wilderness Schools Across North America

Most of these schools are part-time "hobby" businesses. Year-round schools are

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Wildflowers & Weeds

Plant Identification
& Edible Plants
Rangeland Ecology
Weed Control Alternatives



Wildflowers Store

Plant & Mushroom Guides
Holistic Management
Grazing Resources
Books & Videos

3Rivers Park

A Place for People
Help us Secure the Rivers!

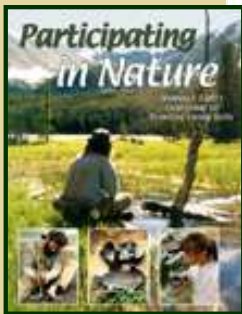
What's New?

See what's new
on all our websites!

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Macintosh computer!



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listed in capital letters. **Please Note:** We are continuously updating this page, adding or deleting schools and updating contact information. (We update it about 20-30 times a year, every year!) If you find an error please send a note to us through our [E-mail Contact Page](#). Thanks!

Schools of the United States

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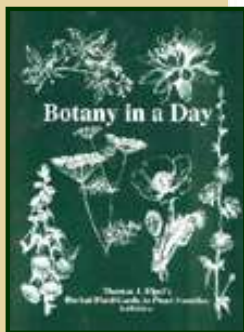
Alabama

<p><u>Primitive Outdoors</u> Brian Curnel 416 Hay Drive, Suite D-7 Decatur, AL 35603 256-303-3016 Brian@primitiveoutdoors.com</p>	<p>Check this out! Search for primitive survival and nature awareness classes with the Hollowtop Outdoor Primitive School On-Line Calendar of Schools</p>
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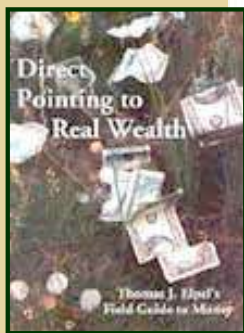
Arkansas

<p><u>Cedar Creek Nature Studies</u> Randy & Susie Teague 1796 Cedar Creek Road Hot Springs, AS 71901 501-262-0567 ccns@cedarcreeknaturestudies.com</p>	<p>Check this out! Search for primitive survival and nature awareness classes with the Hollowtop Outdoor Primitive School On-Line Calendar of Schools</p>
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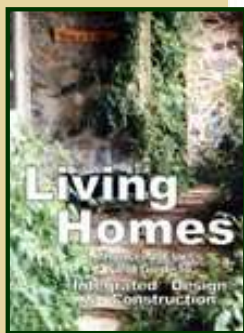
Arizona



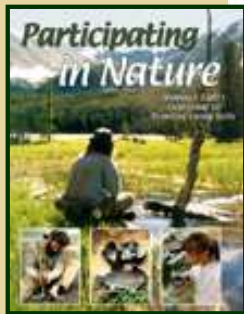
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Ancient Pathways, LLC

Tony Nester
1931 E. Andes
Flagstaff, AZ 86004
928-774-7522
anester@attglobal.net

Aboriginal Living Skills School, LLC

Cody Lundin
PO Box 3064
Prescott, AZ 86302
520-636-8384
abodude@aztec.asu.edu

Reevis Mountain School

Peter Bigfoot
HC 02, Box 1534
Roosevelt, AZ 85545
520-467-2675

Raven's Way Traditional School

Vince Pinto
PO Box 16367
Portal, AZ 85632
520-403-5085

Arizona Outdoor Institute

Dave Ganci
4753 Gloria
Prescott, Arizona 86301
928-778-2567
canyon@hotmail.com

Native American self-Awareness Institute

Dr. John Standingbear Hoopingarner & Molly Swan
2422 N. 72nd Place
Scottsdale, AZ 85257
480-970-8811
stbrtewa@aol.com

The Desert People Wilderness School

Danny August
Three Points, AZ

Willow River Wilderness School

Randy Kinkade
141 W. Forrest Feezor
Corona, AZ, 85641
520-360-6868
randy@willowriverwildernes

California

Earth Skills

Jim Lowery
1113 Cougar Court
Frazier Park, CA 93225
661-245-0318
earthskills@anamorph.com

School of Self Reliance

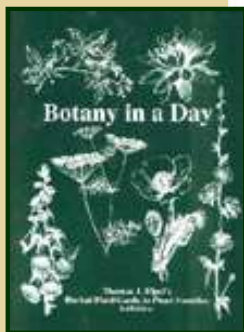
Christopher & Dolores Nyerges
PO Box 41834
Eagle Rock, CA 90041
323-255-9502
contact@self-reliance.net

Oldways Workshops

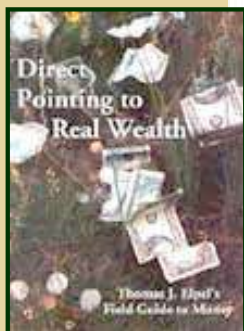
Norm Kidder
Sunol Regional Wilderness
PO Box 82
Sunol, CA 94536
925-862-2600
svisit@ebparks.org

HEADWATERS OUTDOOR SCHOOL

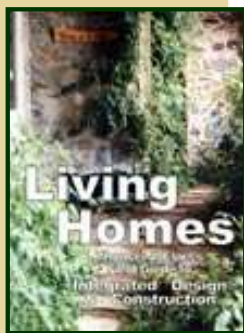
Tim Corcoran
PO Box 1698
Santa Cruz, CA 95061-1690
831-423-3830
info@hwos.com



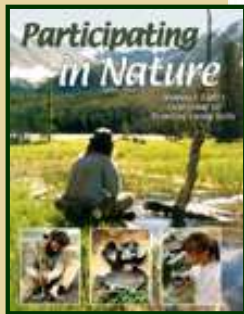
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Earth-Heart
Malcom & Deborah Ringwalt
PO Box 926
Topanga, CA 90290
310-967-1336
mail@earth-heart.net

Colorado

Earth Knack
Robin Blankenship
PO Box 508
Crestone, CO 81131
719-256-4909

BOULDER OUTDOOR SURVIVAL SCHOOL

Josh Bernstein
PO Box 1590
Boulder, CO 80306
800-335-7404
bernstein@boss-inc.com

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Nature Knowledge
"Mountain Mel" Deweese
1825 Linden Street
Grand Junction, CO 81503
907-242-8507
mtnmel@youwillsurvive.com

Wilderness Institute of Survival Education
Don Davis
8415 Coyote Run
Loveland, CO 80537-9665
970-669-9016
dondavis@frii.com

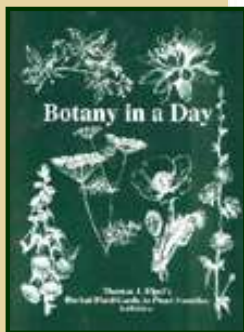
Primitive Skills & Braintanning
Michael Foltmer
1330 Brantner Road
Evans, CO 80620
970-339-5608

Connecticut

Two Coyotes Survival & Wilderness Awareness School
Scott Eldridge
PO Box 427
Kent, CT 06757
860-927-4870
scott@twocoyotes.org

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Florida

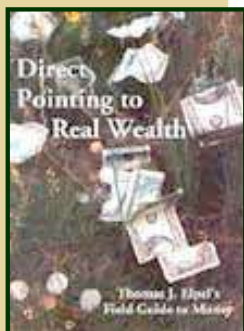


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Global Principles Survival School
653 West 23rd St. #294
Panama City, FL 32405
850-722-7870
president@globalprinciples.com

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Georgia

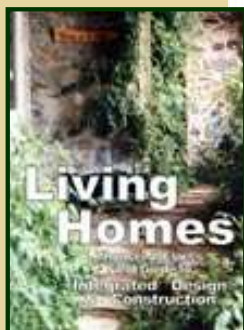


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Medicine Bow Wilderness School
Mark Warren
104 Medicine Bow
Dahlonega, GA 30533
medbow@alltel.net

Hofunee Programs
Scott Jones
2550 Elberton Rd
Carlton, GA 30627
706-743-5144
scottj@arches.uga.edu

Idaho



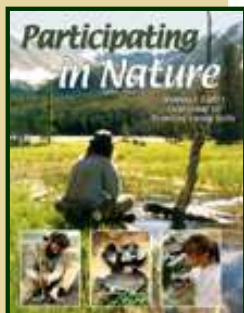
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Salmon Outdoor School
Joe & Denise Bigley
PO Box 17
Tendoy, ID 83468
208-756-8240
school@aboman.com

BACKTRACKS, LLC
Dave & Paula Wescott
PO Box 905
Rexburg, ID 83440
208-359-2400
Dwescot@aol.com

Soaring Spirits
Kathleen Hechimori & Steve Wilson
PO Box 877
Bellevue, ID 83313
208-788-6185
mail@soaringspirits.com

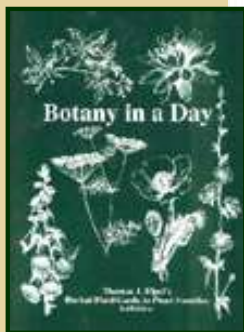


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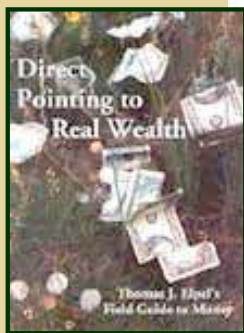
Nature Education Programs, Ltd.
Suite 215 - 3030 Warrenville Rd.
Lisle, IL 60532
630-955-9550
natedpro@aol.com

Ancient Lifeways Institute
John & Ela White
Michael Hollow Road
Michael, IL 62065
618-576-9255
AncientL@aol.com

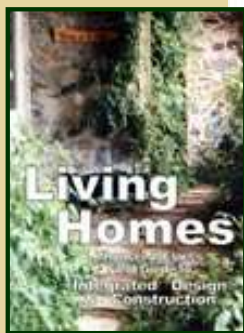
Illinois



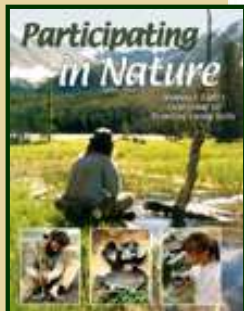
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Center for American Archeology

PO Box 366
Kampsville, IL 62053
618-653-4316
CAA@caa-archeology.org

NORTHWEST SCHOOL OF SURVIVAL

Brian Wheeler
800 W. 5th Ave., Suite 103-B
Naperville, IL 60563
603-305-9717
Info@nwsos.com

Maine

The Maine Primitive Skills School

Michael Douglas
175 Heartbreak HL
Palermo, ME 04354-7137
207-623-7298
primitiv@mint.net

EARTHWAYS

Ray & Nancy Reitze
RR2, Box 2700
Canaan, ME 04924
207-426-8138

Beartraks Schools of Wilderness Living

Dan Fisher
99 Woodside Road
Brunswick, ME 04011
207-729-8616
info@beartraks.com

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Massachusetts

Photography & Nature Programs

Paul Rezendes
Bearsden Road Star Route
South Royalston, MA 01331
978-249-8810

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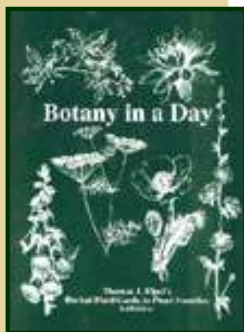
Michigan

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Woodland Wilderness Skills

Dan Jones
2869 114th Avenue
Allegan, MI 49010
dannwjones@allegan.net

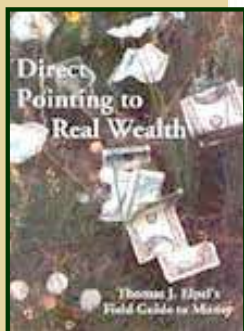


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Ancient Arts Folk School
Casey Makela
PO Box 1
Lincoln, Michigan 48742
989-736-7627
folkartschool@hotmail.com

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Missouri

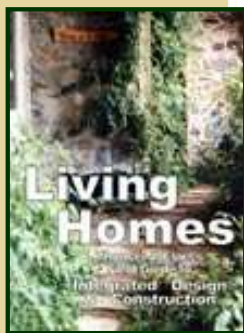


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Bo Brown
3425 N. FR 209
Strafford, MO 65757
bo@firstearth.org

Montana



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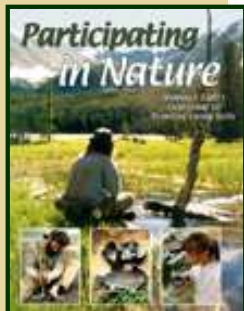
Hollowtop Outdoor Primitive School
Thomas J. Elpel
12 Quartz Street
Pony, MT 59747-0697
406-685-3222
[E-mail Contact Page](#)

A NATURALIST'S WORLD
Jim Halfpenny & Diann Thompson
PO Box 989
Gardiner, Montana 59030
406-848-9458
trackdoctor@tracknature.com

The Artisan
Melvin Beattie
PO Box 9736
Helena, MT 59604-9736
406-458-5493
msbeattie@iglide.net

The Hunter Gatherer Project
Lynx Shepherd
PO Box 550
Kila, MT 59920
406-889-5619

Nebraska

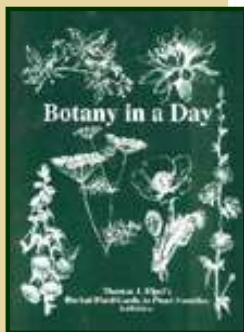


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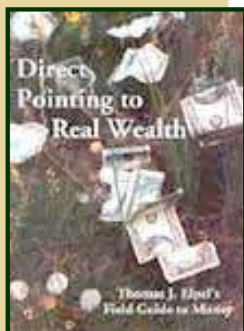
Spirit in the Wind
Rick & Doris Hamilton
87255 464th Ave.
Stuart, NE 68780
402-924-3180
hamilton@elkhorn.net

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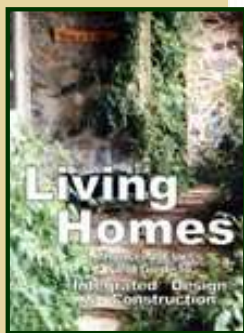
New Hampshire



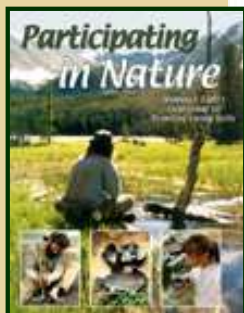
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Life Skills Training Center
George Drowne & Dan Rigger
486 Thayer Road
Dorchester, NH 03266
603-786-9338
lstcntr@worldpath.net

Virtual Mountain Wilderness School
Bruce Carroll
PO Box 84
Fitzwilliam, NH 03447
603-585-3094
bc@virtualmountain.org

JACK MOUNTAIN BUSHCRAFT, LLC
Tim Smith
PO Box 61
Wolfeboro Falls, NH 03896-0061
603-569-6150
timsmith@jackmountainbushcraft.com

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New Jersey

Ingwe's Wilderness Trail
182-B Broad Street
Red Bank, NJ 07701
908-741-2486

THE TRACKER, INC.
Tom Brown, Jr.
PO Box 173
Asbury, NJ 08802-0173
908-479-4681

Primitive Industries
Jack Cresson
40 E. 2nd Street
Moorestown, NJ 08057
856-234-3286
jackcresson@juno.com

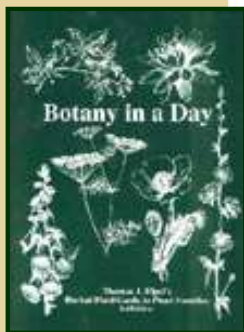
Wild Food Company
Linda Runyon
PO Box 83
Shiloh, NJ 08353
856-234-3286
lrunyon8@yahoo.com

New Mexico

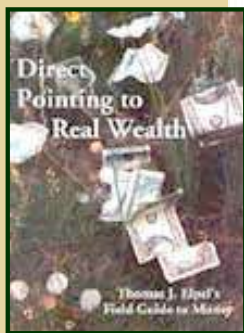
The Earthen Spirituality Project
Jesse Wolf Hardin and Loba Hardin
PO Box 516
Reserve, NM 87830
505-533-6446
earthway@concentric.net

The Tracking Project
John Stokes
PO Box 266
Corrales, NM 87048-8788
505-898-6967

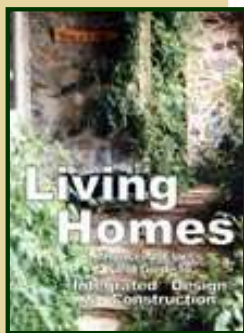
New York



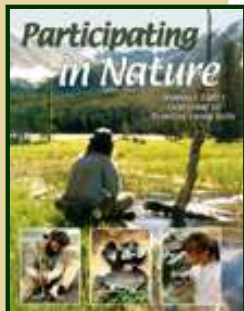
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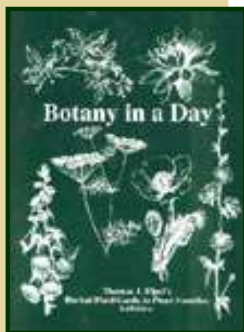


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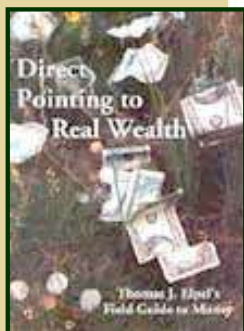
<p><u>Gibbons' Woodfolks</u> PO Box 35 Plattsburgh, NY 12901 518-578-4124 <u>Woodfolks35@Yahoo.com</u></p>	<p><u>Ndakinna Wilderness Project</u> 23 Middle Grove Road Greenfield Center, NY 12833 518-583-9980 <u>jim@ndakinna.com</u></p>
<p><u>HAWK CIRCLE</u> Ricardo Sierra PO Box 506 Cherry Valley, NY 13320 607-264-3396 <u>Ricardo@hawkcircle.com</u></p>	<p>Ancient Skills School Joe Longshore II 357 Cowan Road Canton, NY 13617 213-255-9502</p>
<p>Check this out! Search for primitive survival and nature awareness classes with the Hollowtop Outdoor Primitive School <u>On-Line Calendar of Schools</u></p>	<p><u>Wildman Steve Brill</u> 143-25 84 Dr. Apt. 6C Jamaica, NY 11435 718-291-6825 <u>wildmansteve@bigfoot.com</u></p>
<p><u>Wilderness Way School</u> Mike Head 744 Glenmary Drive Owego, NY 13827 607-687-9186</p>	<p><u>The Wilderness Center</u> Marty Simon 435 Sandy Knoll Road Chateaugay, NY 12920 518-497-3179</p>

North Carolina

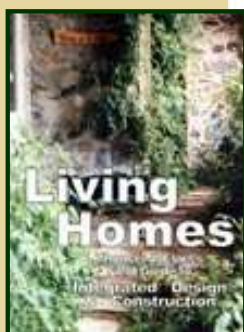
<p><u>Skills Alive</u> Mac Maness 103 Briarpatch Lane Boone, NC 28607 828-262-9629 <u>mac@abotech.com</u></p>	<p>Yonah Earthskills Programs Steven "Snowbear" & Mary Taylor 901 S. Carter Cove Road Hayesville, NC 28904 828-389-9336 <u>yonah@grove.net</u></p>
<p>Check this out! Search for primitive survival and nature awareness classes with the Hollowtop Outdoor Primitive School <u>On-Line Calendar of Schools</u></p>	<p><u>Windsong Primitives</u> Benjamin Pressley 1403 Killian Road Stanley, NC 28164 <u>benjamin@perigee.net</u></p>
<p><u>Turtle Island Preserve</u> Eustace Conway 1443 Lonnie Carlton Road Triplett, NC 28618 828-265-2267 <u>mail@turtleislandpreserve.com</u></p>	<p><u>Earth School</u> Richard Cleveland PO Box 337 Tuckasegee, NC 28783 828-293-5569 <u>richard@lovetheearth.com</u></p>



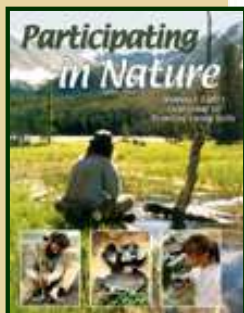
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Ohio

Goosefoot Acres Center for Resourceful Living
Peter Gail, Ph.D
PO Box 18016
Cleveland, OH 44118
216-932-2145
PETERGAIL@aol.com

Midwest Native Skills Institute
Tom Laskowski
PO Box 31764
Cleveland, OH 44131
440-526-3675
tom@survivalschool.com

Wilderness Survival Training Center
Bob Newcomer
PO Box 283
Old Washington, OH 43768
740-432-9018
bob.newcomer@starband.net

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Oregon

WILD FOOD ADVENTURES
John Kallas, Ph.D
4125 N. Colonial Ave.
Portland, OR 97217-3338
503-775-3828
mail@wildfoodadventures.com

NORTHWEST SCHOOL OF SURVIVAL
Brian Wheeler
2870 NE Hogan Rd, Suite E, #461
Gresham OR 97030
503-668-8264
Info@nwsos.com

Pennsylvania

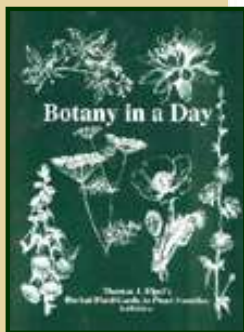
Earth Star Survival
Bob Collins
224 Trinity Ave.
Ambler, PA 19002
215-654-9164
bobcollins@earthstarsurvival.com

Native Survivalist Nature & Wilderness School
Pat Papoutsis
209 Shakespeare Drive
Sinking Spring, PA 19608-1723
pxp177@telocity.com

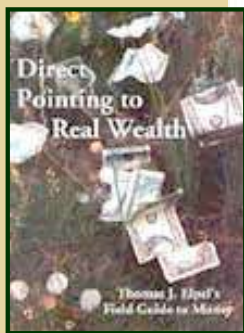
Tennessee

Spirit Bow Wilderness School
Doug Jones
2024 Blue Ribbon Downs
Lebanon, TN 37087
doug_jones@spiritbow.com

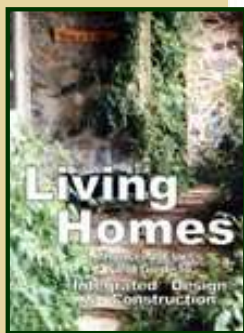
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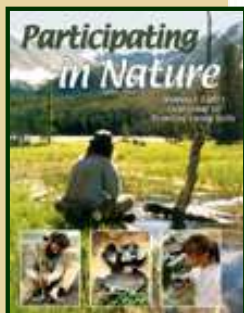
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Texas

Skills of Survival
David Alloway
May 24, 1957 - Mar 11, 2003

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Utah

Lifeways Earth Living School
Holly Stokes
PO Box 70
Spring City, UT 84662
435-787-3732
lifewaysschool@hotmail.com

Boulder Outdoor Survival School
offers many classes in Utah. See [Colorado](#) for contact information.

Vermont

Camp Wihakomwi
Bull Run Rd
Northfield, VT 05663
802-485-4321

Vermont Wilderness School
Steve Young and Mark Morey
67 Main Street, Suite 13
Brattleboro, VT 05301
802-257-8570
steve@VermontWildernessSchool.com

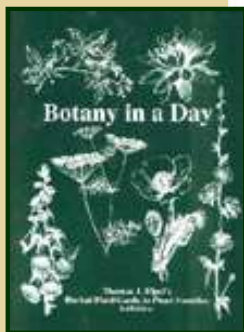
Virginia

Nature & Vision
Charles Worsham
RFD 4, Box 446 Thomas Road
Madison Heights, VA 24572
804-846-1987

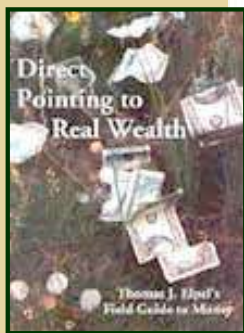
Cliffside Workshops
Errett Callahan
2 Fredonia Avenue
Lynchburg, VA 24503
434-528-3444

Earth Connection
Tim MacWelch
PO Box 961
Marshall VA 20116
540-270-2531
econnect@earth-connection.com

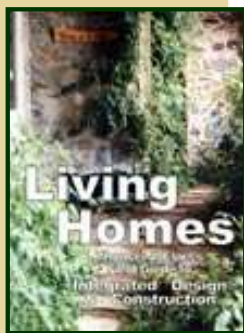
NATURE AWARENESS SCHOOL
Del & Lynne Hall
PO Box 219
Lyndhurst, VA 22952
540-377-6068



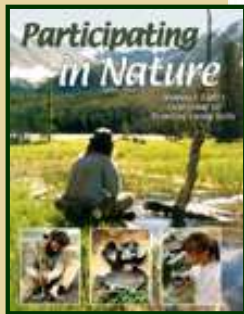
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Earth Quest
David Dabbs & Steve Sims
506 Wilson Lane
Stuart, Virginia 24171
540-930-3340

Two Suns Earth School
Route 1, Box 318
Fulks Run, Virginia 22830

Washington

EARTHWALK NORTHWEST, INC.
Frank & Karen Sherwood
PO Box 461
Issaquah, WA 98027
425-746-7267

Simply Survival
Greg & Kim Davenport
PO Box 449
Stevenson, WA 98648
509-427-4022
info@simply-survival.com

WILDERNESS AWARENESS SCHOOL
Jon Young
26331 NE Valley St. PMB-137
Duvall, WA 98019
425-788-6155

WOLF School of Natural Science
Chris Chisholm & Melva van Schyndel
PO Box 123
Lummi Island, WA 98262
360-319-6892
info@wolfjourney.com

Wisconsin

Medicine Hawk Wilderness Skills, Inc.
PO Box 07482
Milwaukee, WI 53207
630-955-9550
natedpro@aol.com

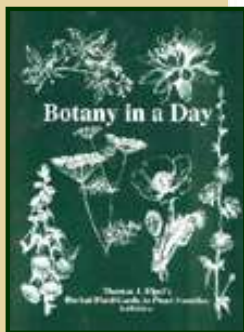
TEACHING DRUM OUTDOOR SCHOOL
Tamarack Song
7124 Military Rd.
Three Lakes, WI 54562
715-546-2944
tdrums2@newnorth.net

Wisconsin Outdoor Survival School
Tom Cartwright
S 88 W 25810 Edgewood Ave.
Mukwonago, WI 53149
262-662-5003
cartwright@execpc.com

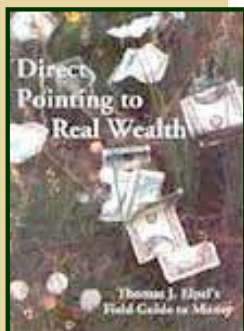
Tracks & Trees Learning Center, LLC
Doug Gaulke
N7597 County Hwy Y
Watertown, WI 53094
920-699-3217
dugtracs@execpc.com

Native Ways School
Gregg Weiss
PO Box 133
Cornucopia, Wisconsin 54827
360-708-1598
nativeways@hotmail.com

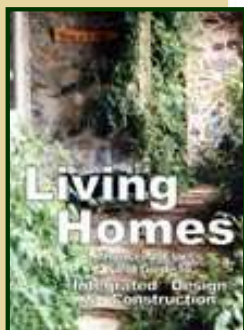
Forager's Harvest
Sam Thayer
PO Box 129
Bruce, WI 54819
715-868-3643



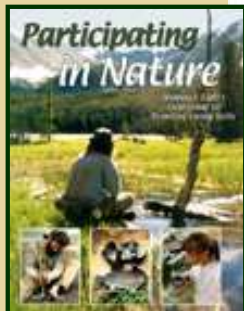
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CANADA

Alberta

KARAMAT WILDERNESS WAYS

Randy & Lori Breeuwsmas
Box 483
Wildwood, AB TOE 2M0
780-325-2345
randy@karamat.com

The Trapper
Ross Hinter
PO Box 246
Tomahawk, AB TOE 2H0
780-797-3808

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Boulder Outdoor Survival School offers classes in Alberta. See [Colorado](#) for contact information.

British Columbia

Windwalker

Wes Gietz
2205 Walnut Ave
Comox, BC V9M 1N6
250-339-3197
wgietz@windwalker.ca

Survivors Edge

Jackson Wagner
3127 Robinson Road
Sooke, BC VOS 1N0
250-642-0628
survivorsedge@hotmail.com

Okanagan Outdoor Skills and Wilderness Survival

Michelle Dallyn
3861 15th Ave
Vernon, BC V1T 8H5
250-833-4507
250-503-7056
ronandmichelle@telus.net

WOLF School of Natural Science

Chris Chisholm & Melva van Schyndel
Box 434, 1641 Lonsdale Ave
North Vancouver, B.C., V7M 2J5
604-418-8900
info@wolfjourney.com

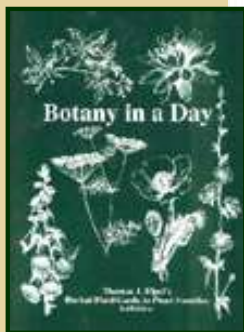
Ontario

Alba Wilderness School

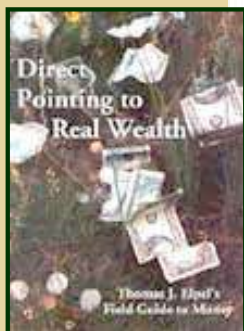
Chad & Barry Clifford & Tania Marsh
R.R.#4
Lanark, ON, KOG-1K0
613-259 3236
alba@magma.ca

Check this out!

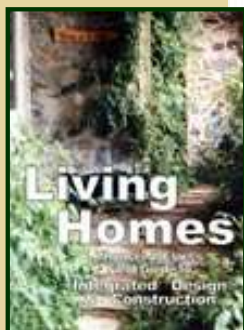
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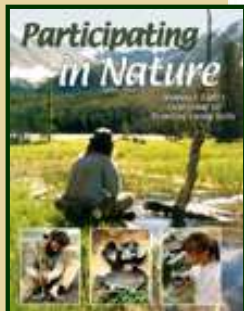
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MEXICO

[The Desert People--Tribal Village](#)
(Baja California, Mexico)
Danny August
dezertwalker@netscape.net

Boulder Outdoor Survival School
offers classes in Mexico. See
[Colorado](#) for contact information.

Other [Primitive Living Skills Links](#)

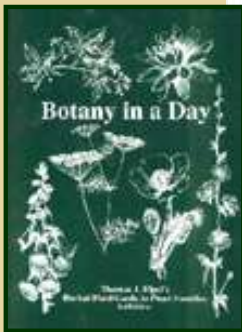
Hello!

Just wanted to say how much I really enjoyed your two video's ([3 Days at the River, Mountain Meadows](#)). They are exactly what I have been looking for in a video. I'm already looking forward to the next one. Thanks!

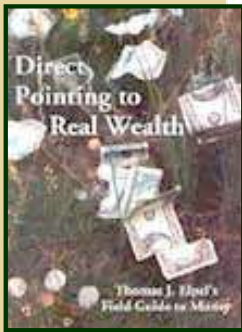
*-- Tim Dowling
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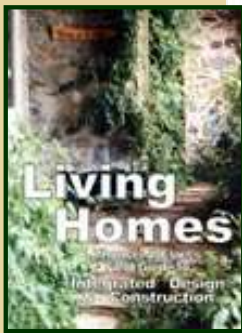
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Those of us who live and breathe ancient skills and nature awareness are often faced with a dilemma when we make the decision to share with others what we have learned. We are people who are passionate about what we do. We believe in living close to the earth, and we teach from the heart. The dilemma is that in order to share these earth skills we have to jump feet first into the modern world of business... we have to spread the word about who we are and what we have to offer.

At HOPS we are working to more effectively get the word out about the many talented individuals, couples, and families around the world who want to invite you into their lives to share what they have discovered. In essence, it boils down to "economies of scale": by working together we can reach out far more successfully than if we each try to do it all alone.

There are many of us now, tucked out-of-the-way in backwoods canyons, or making camps and practicing skills in thick tangles of brush along the edge of suburbia. Collectively we have more classes in more locations than ever before, so you can always be assured of finding the specific instruction you want.

**Also see our directory of
Primitive Living & Nature Awareness Schools of North
America**

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Plant Identification
& Edible Plants
Rangeland Ecology
Weed Control Alternatives



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Help us Secure the Rivers!

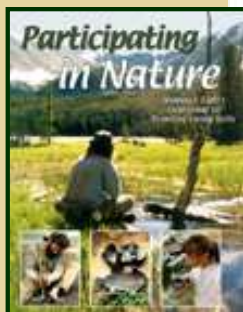
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PO Box 697
Pony, MT 59747-0697
406-685-3222
E-mail Contact Page



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Macintosh computer!



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Schools of Europe, Australia & New Zealand

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New Zealand

Australia

Dundalli Art & Culture

Rick Roser
PO Box 247
Fortitude Valley 4006
Australia

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Finland

Finland Survival Guild

Petri Heinonen
Heikinkuja 4 C 24
F-13800 Katinala
Finland

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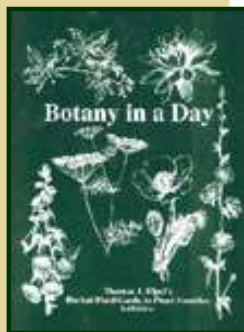
Ireland & United Kingdom

Woodlore Ltd.

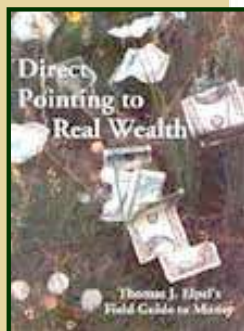
Ray Mears
P.O. Box 3
Etchingham
TN19 7ZE
United Kingdom
(phone)01580 819668
info@raymears.com

The UK Survival School

Seymour House
24 East Street
Hereford
HR1 2LU
United Kingdom
(phone)00 44 (0)1432 376751
info@uksurvivalschool.co.uk



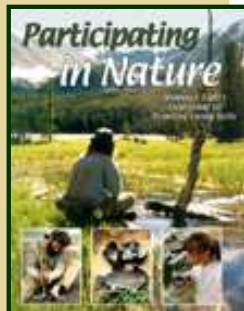
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[South West Survival School](#)

Nigel Startin
Hollybush Bungalow
Fore Street
Tintagel
Cornwall
PL 34 ODE
United Kingdom
(phone)08700 755763
nigel@i-survive.co.uk

[Cambrian School of Survival](#)

PO Box 82
Aberystwyth
Ceredigion
SY23 1WH
United Kingdom
(phone)(01970) 612969
info@cambriansurvival.co.uk

[Breakaway Survival School](#)

Mick Tyler
17 Hugh Thomas Avenue
Holmer
Hereford
HR4 9RB
United Kingdom
(phone)01432-267097
mick@breakawaysurvival.co.uk

[Woodsmoke](#)

Ben McNutt
PO Box 45
Cockermouth
Cumbria
CA15 9WB
United Kingdom
(phone): 01900 821733
info@woodsmoke.uk.com

[Bison Bushcraft](#)

Roger Harrington
No. 3 Beech Farm Cottages
Bugsell Lane
Robertsbridge
East Sussex
TN32 5EN
United Kingdom
(phone): (+44) 01580 882194
Info@bisonbushcraft.co.uk

[Survival School](#)

Jonny Crockett
Northwood
Poltimore
Exeter
Devon
EX4 0AR
United Kingdom
(phone): (+44) 01392 460312
jonnycrockett@survivalschool.co.uk

[WILD-LIVE](#)

Anthonio Akkermans
5 Wellington Street
Lurgan Co. Armagh
BT67 9AD
Ireland & U.K
information@wild-liveschool.com

[Outdoor World Survival School](#)

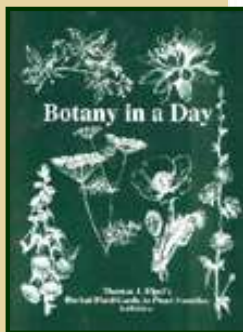
7 Highland Court
Bryncethin
Bridgend
Mid Glamorgan
South Wales
United Kingdom
CF32 9US
Telephone No. 01656 725532
Outdoorworldactivities@tesco.net

[Natural Pathways](#)

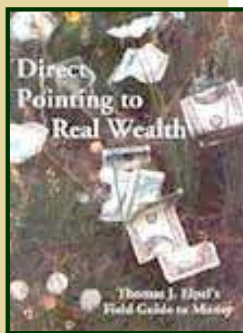
PO Box 824
Canterbury
CT4 6YQ
United Kingdom
Telephone No. 44 (01304) 842045
naturalpathways@onetel.net.uk

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The Netherlands

[Kokopelli Earth Survival School](#)

Bastiaan Dolmans
30 Heiweg
6581 EB MALDEN
The Netherlands
(phone)00-31-24-3582882
stg.kokopelli@inter.nl.net

[DA VAJ TREKKING & BUSHCRAFT](#)

Geerd de Koning
Kofferen 12
5492BN Sint Oedenrode
The Netherlands
(phone)0031413478847
g.dekoning1@chello.nl

Sweden

[Swedish Survival Guild](#)

Spelmanshšjden 13
174 50 Sundbyberg
Postgironummer: 282901-8
message@survive.nu

[The Institute for Ancient Technology](#)

S. Strandvšgen 7
832 43 FROSON
Telefon: 063 - 10 63 20
nevka@telia.com

New Zealand

[Ancient Skills](#)

Stephen Coote
Author & Teacher

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[Wilderness Survival based on US Army Training Manuals](#) - Chris Beasley

[The Flintknapper.com](#) - Tim Anderson

[Cherokee Primitive Survival](#)

[Hoods Woods](#) - Ron & Karen Hood

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[The Mountain Man Web Ring](#)

[Lenny's Blades N' Things](#)

[Recreating History](#)

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[Rivercane Main](#)

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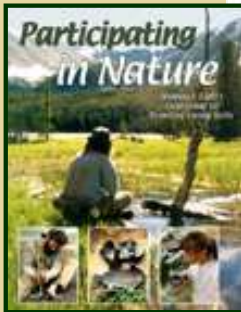
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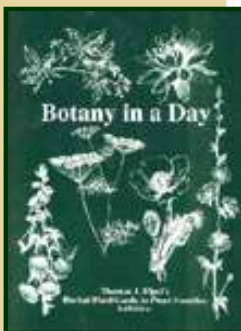
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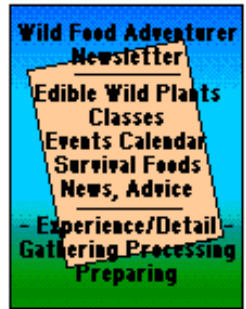
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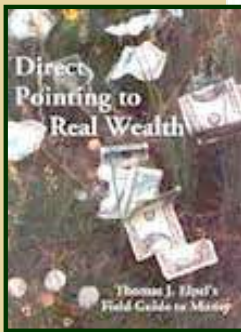
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**Directory of Primitive Skills Gatherings &
Demonstrations**

February

Winter Count Primitive Skills Conference - Maricopa, AZ - Dave & Paula Wescott -
PO Box 905 - Rexburg, ID 83440 - 208-359-2400 - Dwescot@aol.com

April

Riverfest - Columbus, Georgia - 706-576-4760

May

Rivercane Rendezvous - Helen, Georgia - Snow Bear - 901 S. Carter Cove Road -
Hayesville, NC 28904 - 828-389-9336 - yonah@grove.net

June

Earth Knack Gathering - Boulder, Colorado - Robin Blankenship - PO Box 508 -
Crestone, CO 81131 - 719-256-4909

July

Echoes in Time - Salem, Oregon - Dale Coleman - 19027 Abiqua Road NE - Scott
Mills, OR 97375 - echoesintime@aol.com

Firemaker Primitive Skills Gathering - Victoria, BC - Windwalker (Wes Gietz) - 2205
Walnut Ave - Comox, BC V9M 1N6 - 250-339-3197- wgietz@windwalker.ca

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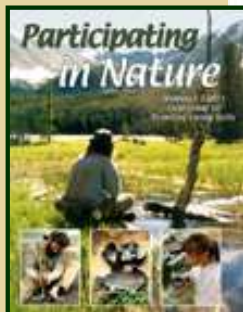
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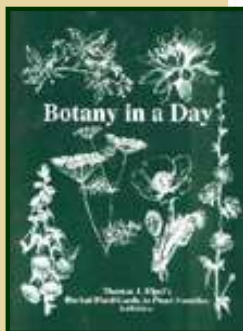
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[Moccasin Meet](#) - Sloansville, New York - Walter & Eva Gigandet - PO Box 40, Route 20 - Sloansville, NY 12160 - mocmeet@juno.com

August

[Peoples of the North Primitive Skills Gathering](#) - Canaan, Maine - Ray & Nancy Reitze - RR 2 Box 2700 - Canaan, Maine 04924 - 207-426-8138 - TimSmith@JackMountainBushcraft.com

[Great Lakes Primitives Summer Gathering](#) - Bois Blanc Island, MI - Jim Gilligan - Michigan Atlatl Association - 7273 Hamburg Road - Brighton, MI 48116 - primitive1@chartermi.net

[Silverwater Rendezvous](#) - Todd, North Carolina - Hawk & Ayal Hurst - 2511 Bald Fork Road - Todd, NC 28684 - 336-385-1401 - silverwater@skybest.com

September

[Rabbitstick Rendezvous](#) - Rexburg, Idaho - Dave & Paula Wescott - PO Box 905 - Rexburg, ID 83440 - 208-359-2400 - Dwescot@aol.com

[Bois D' Arc Primitive Skills Camp & Knap-In](#) - Goodman MO near Neosho - 104 N. Arrowhead Rd. Willard, MO 65781 - 417-742-0773 - bo@firstearth.org

[Ozark Primitive Skills Gathering](#) - Branson, Missouri - Derek McLean - 417-335-6725 - OzarkPrimitiveSkillsGathering@hotmail.com

[Beaver Creek Knap-In & Primitive Skills Gathering](#) - At Beaver Creek in north central Nebraska. - Rick and Doris Hamilton - 402-924-3180 - hamilton@elkhorn.net

October

[International Tracking Symposium](#) - Hotchkiss, Colorado - Dan Rain - PO Box 5000 - Duvall, WA 98019 - raindan@animail.net

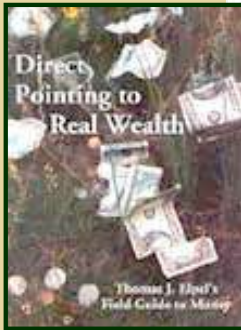
[Harvest Hope Festival](#) - Cherry Valley, New York - Ricardo Sierra - PO Box 506 - Cherry Valley, NY 13320 - 607-264-3396 - Ricardo@hawkcircle.com

[Falling Leaves Rendezvous](#) - Helen, Georgia - Snow Bear - 901 S. Carter Cove Road - Hayesville, NC 28904 - 828-389-9336 - yonah@grove.net

Check this out!

Search for primitive survival and nature awareness classes with the

Hollowtop Outdoor Primitive School On-Line Calendar of Schools



[Direct Pointing to Real Wealth](#)



[Living Homes](#)

Tom,

I just wanted to thank you for taking the time to write Participating in Nature, its been a wonderful help to me in my outdoor experiences.

For years i have searched the internet for information on "survival" or "outdoor skills" but with my dumb luck, never turned up much useful info. I finally "am a kid flipping burgers" (or used to be) so i had enough money to purchase a few books on the subject, including yours. Needless to say i have finally found some very useful skills to experiment with.

Even though i have spent my whole life growing up in the suburbs, my most memorable experiences have always been of the outdoors, from family camping trips to boy scout backpacking excursions into the rockies, i have truly found happiness and fulfillment from nature.

Again, thanks for your words! They have been very helpful.

*--Aaron Armstrong
(used with permission)*

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16th Annual Rabbitstick Primitive Skills Conference

September 14-20, 2003

Near Rexburg, Idaho.
(Map available with registration.)



Rabbitstick is the primitive skills gathering that started them all! It is a chance for new participants to meet some of the top instructors in the nation for world-class instruction in the primitive arts and wilderness survival living. For returning participants it is also a family homecoming--an opportunity to re-unite with friends and colleagues while continuing to expand their knowledge. Many of the participants and instructors have been returning to Rabbitstick for more than ten years... there is always so much more to learn and experience!

Rabbitstick includes workshops from expert authors, instructors, and practitioners in the field of primitive survival and primitive technology, on such topics as: edible, medicinal and constructive plants, wilderness medicine and self-help, buckskin and rawhide crafts, wilderness living skills, flintknapping: basic to advanced, primitive instruments and games, pottery and fiber work, advanced weapons and compound tools. There is even a comprehensive program skills program for kids!

Rabbitstick is held every September in southeast Idaho on 400 acres of river, meadows and sloughs filled with wildlife and abundant natural resources for primitive living skills.

Also join us for the **World Open Atlatl Contest** at Rabbitstick, September 13-15th, 2003. Formerly held in Wyoming, the World Open Atlatl Contest has a brand new home at Rabbitstick, and Backtracks is pleased to continue this long-held tradition.

For more information, and to register, please contact:

Backtracks, LLC
PO Box 905
Rexburg, ID 83440
208-359-2400
dwescot@aol.com

Winter Count Primitive Skills Conference

February 16-22, 2003

50 miles south of Pheonix, off Maricopa Road.
(Map available with registration.)

Join us for the 8th Annual Winter Count Gathering. If you follow the trail of the "ancient ones" and practice their arts and skills you won't want to miss this years event.

Come learn the "old ways" technologies: fire-by-friction, flintknapping, pottery, brain tanning, useful plants, primitive weapons, natural fiber arts, primitive instruments and games, compound tools, wilderness living skills, tracking, containers, evening campfires and more! Backtracks has invited the top specialists, teachers and artisans in primitive technology to attend this gathering in order to share ideas and methods, as well as spread the arts through hands-on workshops to people such as yourself.

Cost: \$245 pre-registration (\$275 at the gate). The fee covers camping, two meals per day, and instruction. Additional materials fees may be required for some classes. Please No Drugs, Alcohol, or Pets!



Also join us for the **Desert Classic Atlatl Contest 2003** at Winter Count February 21-22, 2003. This event is open to the public. We encourage everyone to come and learn how to throw an atlatl dart, or compete with the rest of the world in the WAAISAC Contest. Be a part of this great new (OLD) family sport and joins us in the desert this February.

For more information, and to register, please contact:

Backtracks, LLC
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Rexburg, ID 83440
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dwescot@aol.com

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**Primitive Skills Internships
and Work Exchange Opportunities**

Maine Conservation School

Woods Survival Head Field Teacher needed to teach woods survival programs to youth ages 12-14. Must enjoy working with children, living in the outdoors, and should be able to hike and be active. A great resume builder. Some training is available for qualified applicants. Debris huts, animal tracking, map and compass, hunting skills, water purification, wild edible plants, fire making skills, swimming, and more! Camps located in Bryant Pond and Princeton, Maine.

Check out www.meconservationschool.org for more info. Contact Jeff Eckhouse, Maine Conservation School, PO Box 188, Bryant Pond, ME 04219 Phone: (207) 665-2068

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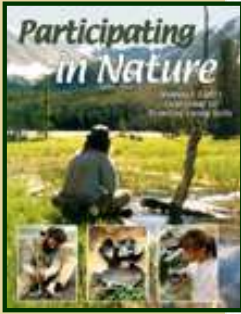
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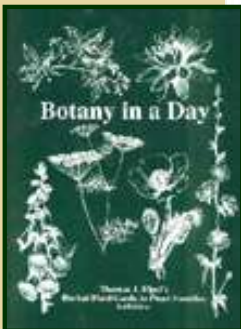
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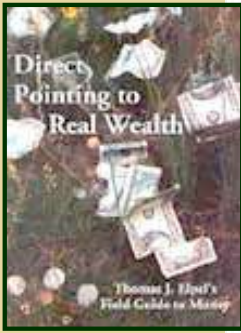
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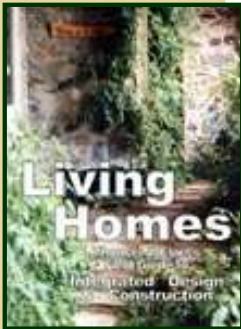
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Living Homes



RAVEN'S WAY TRADITIONAL SCHOOL (RWTS)



Near the Chiricahua Mountains,
Southeastern Arizona

Primitive skills and nature workshops,
private and custom courses, trips, demonstrations, and school programs

Reconnect to your primal self along ancient and sacred paths

Vince Pinto

RWTS

PO Box 16367

Portal, AZ 85632

520-403-5085

ravens_way@hotmail.com

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About Raven's Way Traditional School

RWTS's MISSION Founded by Vince Pinto in 1994, RWTS is dedicated to teaching traditional primitive (i.e. stone-age) skills to people from all walks of life. Our main goal is to help people reconnect to nature through primal human activities. It is our hope and belief that this will nurture inner peace and respect for all Life. The way of the Raven is one of spirit, mystery, playfulness, joy, and power. Come join us in a journey of Discovery.

WHY TAKE A RWTS PROGRAM?

We feel that anyone would greatly benefit from our diverse programs. Here are a few reasons why you might think of participating:

- Reconnect to nature by exploring your hunter-gatherer heritage--one we all share.
- Increase your self-confidence, self-reliance skills, and group living skills in the wilderness, while leaving modern technology behind.
- Deepen your awareness of and connection to plants, animals, rocks...All of Life!
- Relax and enjoy the Beauty of Mother/Father Earth while having fun.
- See some of the most beautiful natural areas remaining on the planet.

WHO MIGHT PARTICIPATE IN A RWTS PROGRAM? We have no real "target" group in terms of interest or age. Anyone willing to learn is welcome. In general, our programs would most benefit: Hikers, Nature Observers, People seeking Alternative ways of living, Backpackers, Artists of all kinds, Hunters and Outdoor Enthusiasts. Participants should be in reasonably good condition to get the most out of their RWTS experience.

RWTS offers meticulous attention to each student's learning style and pace. We will work with you to help make your experience unforgettable. We also provide flexible program lengths and itineraries.



WHERE DO RWTS PROGRAMS TAKE PLACE?

Although we may be willing to travel to your location, Raven's Way programs typically occur in the Southwest. Within this vast area, we generally focus our attention on Southeastern Arizona.

This area, known as the "Sky Islands", has numerous mountain ranges, (islands) which soar thousands of feet above drier desert grasslands, (seas). RWTS is based in the Chiricahua Mountains near the New Mexican

and Mexican Borders. The Chiricahuas are the largest single mountain range in Arizona and encompass over 100,000 acres of Federal wilderness. Add to this the rest of the National Forest, other Federal lands, and State lands and you have enough wild country to roam over several lifetimes!

From arid deserts to chaparral, to woodland, and up to thick spruce-fir forests dotted with meadows and nurtured by streams, the Chiricahuas have all of the life zones present in Arizona, except for tundra. Many peaks tower to over 9000 feet, topping out at 9795 feet on Chiricahua peak. Thus, while it's 90 degrees in the desert in summertime, it can easily be in the 60's or 70's in the high elevation forest. Heavy winter snow accumulations up high and mild winter weather down low are also quite common. Perennial and seasonal springs and streams run throughout the range, as do spectacular rock formations, known as "hoodoos".

Finally, the Chiricahuas are renowned for their biological diversity. Countless plants, many useful for primitive skills, grow in the range. Many of these are more typical of Mexico than of the United States. If you want to see wildlife, then this is the place. 13 species of hummingbirds, 4 species of skunk, 5 species of felines (including the rare jaguar), black bear, white-tailed and mule deer, coatimundis, ringtails, roadrunners, a plethora of lizards and snakes, several species of turtle, countless beautiful and fascinating insects, and -- best of all--two species of Ravens! Something to offer everyone.

RWTS's head instructor Vince Pinto owns over 50 acres in the Chiricahua foothills. His land is entirely protected with no modern developments. Instead, Vince has built a hunter-gatherer encampment using only stone-age technology. His land includes: an on-going stone pit house project, (already functional in many ways), brush wickiup, shade arbor, cooking hearth, yoga/exercise area, mesquite shelter, sweat lodge, hide working area, agave baking pit, tool making area, stone dams, solo/quest hut, the beginnings of small natural home, and more! The land also includes a mountain top, a 500 foot elevation change, and an archaeological site! Many RWTS classes take place on site at Vince's land. **Tuition for RWTS classes is charged for time spent on Vince's land only.**

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Raven's Way Traditional School Fall 2003 Class Schedule

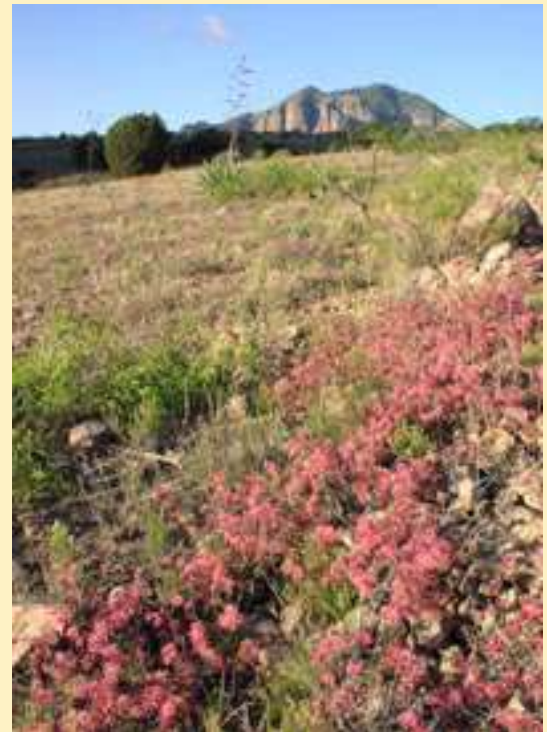
Costs include all materials, camping, and meals where indicated.
Participants can usually arrive the day before a program begins.

2-day Primitive Intensive (Oct. 18 - 19)

Join Vince and Miguel as they take you into the world of primitive living. In just two days you'll immerse yourself in the Stone Age and learn : fire-making, natural shelters, water-finding, stone-age tools, wild edibles, wild medicinal plants, primitive hunting and trapping and more. This is a golden (or is it obsidian?) opportunity to learn to return to the Earth in the most primal way. Location: RWTS, near Portal Arizona. Cost: \$140 (includes all food).

Primal Journeys - A primitive skills weekend for women (Oct. 24 - 26 -- Friday evening till Sunday about noon)

Vince and Quynn Elizabeth of The Institute for the Shamanic Arts are presenting this unique workshop for women. Vince will focus on two main areas. One will help participants become more comfortable in a wild setting, particularly via sensory awareness and natural history. Additionally, he'll guide



everyone through a variety of stone-age skills that will bring us closer to the Earth and each other. These will include: fire-making, aboriginal art, stone-age tools, wild edible plants , wild medicinal plants. natural hygiene, rop[e-making, and more.

On Saturday evening Quynn will present "Journey with the Fire", a Shamanic Journeying Fireside Experience. There will be a potluck on Friday evening and on Saturday Quynn will cook a vegetarian dinner. Participants will camp in tents or cars on Vince's land. Cost: 100\$ To register, contact Vince or call Quynn at (520) 954-2004.

Sensational Sotol (Oct. 29 - Tucson Herb Store , approx. 2 hours in the evening)

Vince is teaming with Tucson Herb Store to give you a serious (but fun) look into one of the Southwest's most useful and beautiful plants, Sotol. Students will learn how to use this desert dweller for food, tools, shelter, drying mats, containers, spoons, and fire-making. They will take home several projects and a new-found appreciation for this amazing plant. Cost: \$15.



Fishing Class with Miguel de la Iglesia Arevalo Herrera Garcia (November 15) Do you want to be able to make simple fishing-nets and fish traps in a traditional way? In this class we will talk about different traditional ways of fishing and the plants used for it. You will learn how to weave diferent styles of traditional fishing-nets from different parts of the world. You will also gather your own material to make a traditional fish-trap and learn how to use it. Location: The Gila River (NM) Cost: \$70 (All materials and healthy snacks provided.)

Basic Flintknapping (November 22)

Many stone-age skills revolve around being able to make and use functional tools from rocks. This class will teach you how to find good materials, to protect yourself, and produce a variety of tools that will help you cut, saw, chop, scrape, drill and more. Each person will bring home a basic stone-age tool set. Come, let us rock your

world! Location: RWTS, near Portal Arizona. Cost: \$70 (includes all materials)

Primal Music (December 6-7)

Learn what it takes to shake, rattle and drum - native style! Many cermonies and rituals (not to mention, just plain fun) revolved around natural music. In this workshop, you'll make several stone-age insruments to take home with you. We'll cover materials and methods and play around the evening fire. Be it rasps, rattles,, drums, or a unque creation, you'll create some wonderful new sounds with us. Location: RWTS, near Portal Arizona. Cost: \$80

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Raven's Way Traditional School Custom Workshops

(ADD \$10 PER PERSON PER DAY IF YOU WANT MEALS INCLUDED)

*Classes without set dates can be scheduled and customized at your request.

Also, classes with set dates can be repeated for you- just ask!



FIRE BY FRICTION

Imagine being able to literally rub two sticks together to create the miracle of fire. After taking this workshop, you can leave the imagining behind and join the ranks of the matchless crowd. Using only stone-age tools, crafted by you during the class, you'll make and take home one or more fire-by-friction sets. You can choose from hand drill, bow drill, fire plow, fire saw, or try all of the above! Other topics covered include: primitive uses of fire, fuel selection, building effective fires, transporting fire and safety.

Length of course: 1-2 days

Cost: \$15/hour, up to \$60 per person per day

STONE-AGE TOOLS

Journey back to a time when all you needed came directly from the earth. Leaving all modern tools behind, you'll seek the skill and ingenuity of your hunter-gatherer ancestors as you find and create a variety of stone-age tools. Some of the items you'll make and take home may include: knife, saw, scraper, pounder, cactus brush, backpack, musical instrument, bowl, digging stick, and toothbrush. We'll also cover the art of scavenging and using our tools for a variety of primitive tasks. Once you've made tools from rock, wood, antler, and other natural sources, you'll treat these life-givers with a new-found respect.

Length of course: 1 - 2 days

Cost: \$15/hour, up to \$60 per person per day

PRIMITIVE HIDE-TANNING

Learn to turn your deer hide (we provide one) into beautiful and durable buckskin using only stone-age technology. You'll be able to use your natural leather for clothing, pouches, necklaces, a backpack, or??!

Length of course: 3 days

Cost: \$150.

NATURAL SHELTERS

Shelter is one of our most basic human requirements. At various times we need it to protect us and our belongings from heat, cold, wind, rain, and animals. However, modern houses tend to separate us from our vital earth connections. This workshop helps you reconnect. You'll learn how to construct both solo and group shelters in desert and mountain environments using only nature's bounty. For your materials, see how stone, wood, brush, earth, and hides can be transformed into beautiful abodes, such as pit houses, wickiups, and arbors. We'll also cover basic stone tool use, site selection, and safety. Join us and discover the true meaning of home.

Length of course: 1 - 4 days

Cost: \$15/hour, up to \$60 per person per day



WILD EDIBLE PLANTS

Addressing the eternal question of "what's for dinner?" this course delves into the wonderful world of wild, edible plants. Southeastern Arizona boasts a vast array of delicious and nutritious native plants. We'll either supplement our diet with these foods or use them as our sole source of sustenance, depending upon their availability. Among the area's deserts, streams, forests and grasslands, you'll learn how to find, identify, harvest, process, eat and store a variety of plants. We'll look at a hunter-gatherer diet for the area, cover a variety of primitive cooking techniques, and discuss safely using wild edibles. During the class, you'll make a digging stick and several other plant collecting tools. By the end of the class you'll know each plant covered as a friend for life.

Length of course: 1 - 4 days

Cost: \$15/hour, up to \$60 per person per day

WILD MEDICINAL PLANTS

For years, Vince Pinto has effectively "cured what ails him" using the healing power of wild plants. Join him and learn about some of the southwest's wonderful medicines. You'll learn how to cure colds, throat infections, upset stomach, eye inflammations, joint pain, headaches, poison ivy rashes, sunburn, diarrhea, constipation, and more. You'll also take home several medicines crafted by you during the course. Wild Medicinal Plants can be complimented with a Natural Hygiene workshop.

Length of course: 1 - 2 days

Cost: \$10/hour, up to \$50 per person per day (If combined with "Natural Hygiene", \$20/hour, up to \$80 per person per day.)

NATURAL HYGIENE

What would you do to maintain your health if you could no longer use your store-bought toiletries and beauty products? This course answers that question. No toothbrush? No problem - make one! You'll also learn how to create shampoos, soaps, facial astringents, nail-care tools, self-massage tools, skin stimulants, and more. By the course's end, you'll have an effective primitive hygiene kit to take home with you. This class can be combined with the "Wild Medicinal Plants" into a unified workshop (see above).

Length of course: 1 - 2 days

Cost: \$10/hour, up to \$50 per person per day

SENSORY AWARENESS

In the modern world, we're bombarded daily with loud noises, mind-numbing speeds, blinding lights, and countless other sensory assaults. We need a more sensible approach to life, and this is precisely what the "Sensory Awareness" class is about. Unlearning some of our modern tendencies, we return to our natural ways of moving, breathing, seeing, touching, tasting, smelling, hearing, and being whole with our natural environment.

Length of course: 1 - 2 days

Cost: \$15/hour, up to \$60 per person per day

NATURAL ROPE-MAKING

Though we may take it for granted, rope has been and continues to be a vital link in human societies, especially hunter-gatherer ones. Rope can be used to tie your shelter together, carry firewood, bind your tools, bind your wounds, make baskets, become part of your clothing, adorn you in many ways, help you make fire, and more. In this course, you'll learn how to find, identify, collect and process natural sources of fiber for making rope. Both beginning and advanced cording methods will be covered and you'll take a rope-related project home with you. Remember, you have to be tied to be fit when you take this class!

Length of course: 1 - 2 days

Cost: \$15/hr. Up to \$60 per person per day.

ABORIGINAL ART

Aboriginal art is not only from native people in Australia, but from anyone using primitive materials in a wild setting (my own definition!). Whether it's a piece of painted buckskin, a rope necklace, a mini-petroglyph, a deer willow figure, a basket, a walking stick, or a buckskin pouch, you'll seek new levels of creativity using what the earth provides. Of course, you get to take home any projects. You may also participate in group projects,

such as making a pictograph on a boulder. Move over Picasso and make room for (fill in your name here)!

Length of course: 1 - 2 days

Cost: \$15/hour, up to \$60 per person per day (Some projects may have an extra fee for materials - generally \$10 or less.)

THORNS, STINGERS AND FANGS

Whether you're new to the Southwest or a seasoned hand, you won't want to miss this course. Combining science and sensory awareness, you'll learn how to positively interact with the area's potentially dangerous plants and animals. From agave to cactus, rattlesnake to black widow, scorpion, and cone-nosed bug, you'll find out how to identify, avoid, appreciate, and primitively treat wounds from these and other species. Learn to turn the fear into love and walk among your relatives in peace.



Length of course: 1 day

Cost: \$15/hour, up to \$60 per person per day

NATURAL HUNTING AND TRAPPING

A nice compliment to Wild Edible Plants and a fine course all its own. You'll learn to procure meat using your hands, stones, sticks, traps, and bows. We'll also cover how to butcher and cook an animal using only stone-age tools. Finally, we discuss the tanning process for any hides we procure. Primitive hunting tools can be made, if desired. Let's put the hunt back into hunter-gatherer!

Length of course: 1 - 3 days

Cost: \$10/hour, up to \$50 per person per day

BASIC FLINTKNAPPING

This class is designed for beginners who wish to make functional stone tools. Using rocks local to the Chiricahuas, as well as some imported materials, we'll cover equipment, safety, basic concepts, and use of tools. You can create stone knives, saws, choppers, scrapers, spokeshaves, and more. Some novices are even able to produce arrowheads and spearpoints during their first efforts. Leave you metal knife behind and learn how to "smash rock" with us .

Length of course: 1-2 days

Cost: \$70 per person per day

SOUTHWESTERN BASKETRY

As you create a basket, you'll also weave the lives of the plants involved into your own. Baskets have been useful throughout the ages for storage, eating, drying, and leaching foods, or any other uses you can come up with!

Length of course: 1 - 2 days

Cost: \$10/hour, up to \$50 per person per day

PRIMAL JOURNEYS: RETREATS FOR MEN

Open to a variety of focuses, this male-only course will address traditional male roles in the context of nature and primitive skills. Men will support men, while learning to strengthen themselves. There will be plenty of ritual space, stories, and primitive music.

Length of course: 2 - 4 days

Cost: \$100 per person per day

INTRODUCTION TO THE SOUTHWEST

If you are new to the Southwest (i.e., Arizona and New Mexico) or just want a new perspective, then this is a great opportunity for you. During the course, we'll delve into the region's natural history and human history while exploring some of the area's most beautiful spots. From mountains to deserts and from hunter-gatherer encampments to ghost towns, we'll travel from one fascinating destination to another, all the while learning about this incredible land and its stories.

Length of course: 2 - 5 days

Cost: \$20/hour, up to \$80 per person per day

PRIMITIVE SKILLS SAMPLER

Here's your opportunity to devise your own course. You choose any combination of primitive skills taught by Raven's Way and we provide the instruction. The ultimate custom-made course!!

Length of course: open

Cost: \$15/hour, up to \$60 per person per day

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Raven's Way Traditional School Custom Trips & Additonal Courses

(ADD \$10 PER PERSON PER DAY IF YOU WANT MEALS INCLUDED)



NATURAL HISTORY TRIPS

These trips focus on the Southwest's plants and animals and include some of the area's most spectacular scenery. We'll discuss the identification and natural history of many of the species we encounter. There will also be many opportunities for observing interesting animal behavior and plant characteristics.

Length of trip: open

Cost: \$100 per person per day

SOUTHEASTERN ARIZONA SAMPLER

Explore a variety of natural and cultural areas in this incredibly diverse region.

Length of trip: open

Cost: \$100 per person per day

PRIMITIVE LIVING I

A leisurely trip designed to introduce the novice to a number of primitive skills. Travel is minimal and many modern implements are permitted. You'll learn basic fire-making, sensory awareness, simple stone-age tools, wild edible plants, rope making, wilderness safety, water finding, and more.

Length of trip: 3 days

Cost: \$120 per person per day (for individuals or groups -- by request only).

PRIMITIVE LIVING II

This intermediate level class expands upon and adds to skills learned in Primitive Living I. We'll become more mobile and use less modern gear. Some of our topics include: more wild edible plants, hunting and trapping, wild medicinal plants, natural shelters, beyond-basic stone-age tools, fire by friction, and more. (Prerequisite: Primitive Living I or equivalent.)

Length of trip: 4 days

Cost: \$120 per person per day (for individuals or groups -- by request only).

PRIMITIVE LIVING III



This advanced class permits minimal to no modern gear and requires rigorous travel. Topics include: advanced fire by friction, primitive uses of fire, adhesives, containers, hide-tanning, basketry, advanced hunting, aboriginal art, and more primitive shelters and tools. (Prerequisite: Primitive Living I and II or equivalent.)

Length of trip: 5 - 7 days

Cost: \$120 per person per day (for individuals or groups -- by request only).

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About the Instructors

Vince Pinto, Head instructor and

RWTS Director: Vince is an accomplished naturalist and primitive skills instructor. He has been teaching primitive skills and nature workshops for over 12 years throughout much of the country. He's learned his skills through countless hours of experimentation, direct experience, and from some of the field's leading teachers. His wit and creativity bring much to Raven's Way.



Education: Master of Arts in Environmental Studies, Prescott College, Prescott, Arizona, 2000.

- Focus: Southwestern Hunting and Gathering Cultures.
- Thesis: "Primitive ways of making and using fire in the American Southwest."

Bachelor of Science in Wildlife Biology, University of Montana, 1998, with Honors.
Tom Brown's Tracker School, New Jersey, 1990, Standard course.

PROFESSIONAL EXPERIENCE

Vince has been an instructor of primitive living skills at the following places and events:

Pueblo Grande Museum (Phoenix, AZ) Dona Ana
Branch Community College (Las Cruces, NM) New
Mexico College of Natural Healing (Silver City, NM)
Western New Mexico University (Silver City, NM)
American Museum of Natural History's Southwestern
Research Station (Portal, AZ)
Sharlot Hall Museum (Prescott, AZ)
Smoki Museum (Prescott, AZ)
Prescott College (Prescott, AZ)
Apache Grade School (Apache, AZ)
Cochise College (Sierra Vista & Benson, AZ)
Chiricahua National Monument (Arizona)
The Chewonki Foundation (Wiscasset, ME)
Appalachian Mountain Club (Gorham, NH)
Poko MacCready Outdoor Education Center (Willsboro,
NY)
Fairview YMCA (Newton, NJ)
Pennypack Environmental Education Center
(Philadelphia, PA)
Greenkill YMCA (Huguenot, NY)
Corinth Elementary School (Corinth, NY)
Pathfinder Ranch Environmental Education Center (Mountain Center, CA)
Several teacher's conferences (NY)
Whiteface Mountain Native American Festival (NY)
Permaculture Class (Prescott, AZ)
Primitive Living Skills Conferences:
-Wintercount (Maricopa, AZ)
-Rabbitstick Rendezvous (Rexburg, ID)
-Northern Lights (British Columbia)



SOME OF VINCE'S OTHER EXPERIENCES INCLUDE:

-Guest instructor at Tom Brown JR's Tracker School
-Wildlife Researcher:

- Spotted Owls (NM, OR)
- Wild Turkey (NM, AZ)
- Reptiles and Amphibians (MO)
- Mammals (MD)
- Wildlife Habitat (UT)
- Fish/Sea Life (AK)

-Substitute Teacher (AZ)
-High School Instructional Aide (AZ)

- Environmental Educator (CA, NY, NJ, NH, ME)
- Extensive backpacking experience in AZ, NM, UT, CO, WY, MT, WA, NY, NJ, PA, MD, ME NH, FL, MO, and Jamaica
- Full Stone-Age Living Trips in Arizona (solo and two-person) and Idaho (group)
- Sells his primitive art

JEFF STAUFFER

Jeff's unique blend of infectious enthusiasm, high level of skill, and scientific knowledge lend themselves well to Raven's Way. In particular, his botanical expertise is impressive. Jeff works primarily as an environmental education instructor, and his favorite subject is Ethnobotany. Currently, he offers workshops in California through Raven's Way.

MIGUEL DE LA IGLESIA, Visiting Instructor

Since he was a kid, Miguel has wanted to be a "primitive man". Growing up in Spain, he studied Biology, to learn about nature and how to understand and respect it. His great interest for Native Cultures means that as soon as he has some money saved, he uses it to travel around the world to learn the primitive ways. He has been to the Amazon rainforest learning from the Waorani people, who called him Ömmene (Blowgun). After that, he has been a volunteer at the Teaching Drum Outdoor School, and at the moment he is teaching primitive skills at the Atapuerca Park in Spain, near the archaeological site where the first fossils of Homo antecessor were found. He has a great respect for native cultures.

RYAN KOCH

Born and raised in Tucson, AZ, Ryan has been surrounded by the desert Southwest all of his life. As Vince's apprentice, Ryan was always learning something new and exciting about his native environment to teach to others. Ryan's primary interests are primitive living and sensory awareness, as well as native shelters and foods.

Ryan left Raven's Way in May of 2003 and is now teaching at a children's camp near Tucson. He accomplished much during his stay with Vince. Not only did he help with many land-based projects, he also learned and taught much that will not soon be forgotten. Ryan is always welcome back at Raven's Way.

RAVEN'S WAY TRADITIONAL SCHOOL HAS BEEN FEATURED IN:

- Arizona Highways, February 2003 issue (in the "Off-ramp" section)
- Wilderness Way Magazine
- The Daily Courier (Prescott, AZ)
- The Press-Republican (Plattsburg, NY)

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How to Register

To register for raven's way courses, please call 520-403-5085 and leave a message for Vince Pinto, indicating which course(s) you are interested in. Leave your name, phone number, and the best times to call back. (Don't hit "5". Leave your phone number on Vince's voice mail.) It may take a few days, as Vince lives rather primitively, but you WILL get a call back as promptly as possible. AND/OR write to us or send us an e-mail at ravens_way@hotmail.com and include your name, address, and phone number, and any classes that you are interested in.

We'll either call or write to you. Once we receive a deposit on the course that you wish to take (50% of its total cost), then we will mail you a detailed itinerary and gear list. The deposit is fully refundable up to two weeks in advance of the course. After this time, if you need to cancel then we'll apply your deposit to a future course of your choice. If we cancel a course, then you receive a full refund. Please make checks out to Vince Pinto, Not RWTS. Please print and fill out the following application and send with your deposit:

Name _____

Address _____

Phone Number __ (____) _____

Courses (deposit=1/2 cost) _____ **Price:** _____

_____ **Price:** _____

_____ **Price:** _____

Items from Raven's Way Store _____ **Price:** _____

_____ **Price:** _____

Total: _____

How did you hear about Raven's Way? _____

Comments/Requests: _____

OTHER IMPORTANT NOTES:

As the number of people in any one course or trip increases, Raven's Way will attempt to lower its prices accordingly. While we need to survive financially, we understand your needs as well.

Please know that if you choose to participate in any Raven's Way Traditional School programs, then you do so AT YOUR OWN RISK. We are quite safety conscious, but accidents can and do happen everywhere in life. So if you come, we'll be very happy to have you, but BE A RESPONSIBLE ADULT and take ownership of your own actions, choices, and their consequences.

It is up to you to let us know if you have any medical concerns, take medications, or need special care. We will then try to accommodate you or support you as best we can. Meals can be included for some programs, often at an extra cost. This is on a program-by-program basis, depending upon the number of students and their dietary needs. Let us

know what we can do for you.

We can provide transportation for a limited number of students in most courses, but this may vary. Again, let us know what you need.

Finally, basic camping gear is necessary for many trips, though there are numerous local bed and breakfasts and several hotels. You can generally choose to camp primitively, modernly or do the hotel-thing.

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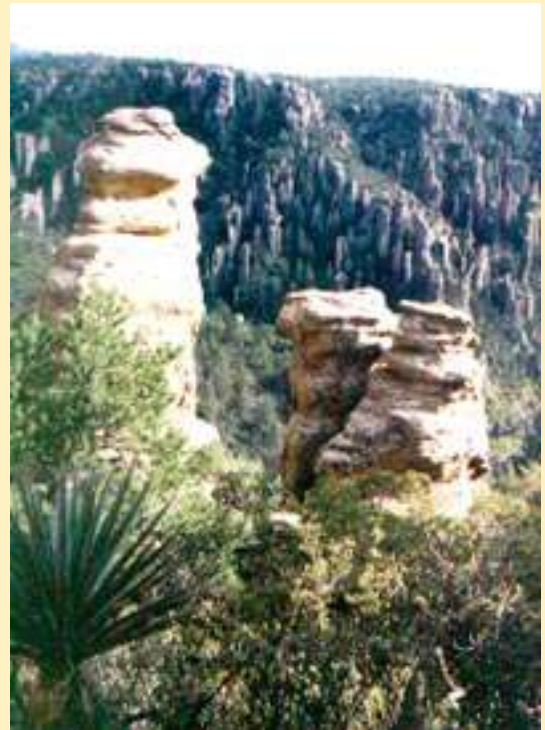
Internship Opportunities

APPRENTICE WANTED

Vince Pinto, director of Raven's Way Traditional School, is looking for an apprentice to help with various projects. The position is available now and will remain open until filled.

Qualifications

- Must own a reliable vehicle (for your own use).
- Must have a dependable shelter (i.e.: vehicle and/or tent).
- Must be able to feed yourself on a regular basis!
- Must have an open mind and open heart.
- Must have a strong desire to learn a variety of primitive living skills.
- Must have patience.
- Must be physically fit and prepared for all types of weather.



Also Helpful

- Computer knowledgable
- Drawing skills
- Spanish language skills

The Work You Will Do

- Assist with and possibly initiate primitive projects on "Raven-Looks Mountain" (Vince's land). Examples include: stone pit house, shade arbors, sweat lodge, earthen dams, quest hut, etc.
- Posting fliers in nearby towns.
- Collecting/processing natural materials for projects and classes.
- Help plan school schedule.
- Help develop fliers and other advertisements.
- Care-take on Raven's Look Mountain.
- Assist us (as you are able) with teaching.

What You Will Get In Return

- A tremendous experience in one of North America's most diverse natural areas.
- Camping on Vince's land. (Valued at 3,000 clamshells a season!)
- Frequent one-on-one primitive skills instruction.
- Pay for any computer or art work.
- A percentage of class proceeds if you do significant teaching during it.
- The occassional shared meal.
- Gas reimbursement for school business.
- Attend any Raven's Way class for free during your stay.

To Apply, Contact Vince at:

Vince Pinto
RWTS
PO Box 16367
Portal, AZ 85632
520-403-5085
ravens_way@hotmail.com

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Primal Creations: The Raven's Way Store

Multiple purchase discounts are available. All of the following - save the T-shirts! - are crafted using only stone-age technology employed on wild lands.

- Hand Drill Fire-by-Friction Sets - \$10 per set; made from native southwestern woods and pre-tested for quality. Includes instructions and is bound with buckskin.
- Mini Petroglyphs - \$15 - \$25 each; many designs available with natural scenes, plants and animals etched and pecked into small rocks. (Most rocks are about hand-sized.)
- Buckskin Pouches - prices vary, starting at \$10; made from naturally tanned animal hides, all are beautiful and functional.
- Deer Willow Figures - \$2 each; these are bent willow figures resembling deer and are based upon ancient ones found in southwestern caves.
- Agave Rope Baskets - \$20 for small, \$30 for medium; these baskets are made from dead agave leaves and are very sturdy and eye-catching.
- RWTS T-shirts - \$15, 100% cotton, specify S, M, L, or XL; these t-shirts sport the Raven's Way logo (an abstract design with many raven images coming together to form one), and some of our many classes are depicted in Raven footprints. We've had rave reviews for these shirts! Anyone who attends a Raven's Way course wearing one of our T-shirts gets a 10% discount for that course.

Raven's Way Traditional School Arts are also sold at the American Museum of Natural History's Southwestern Research Station in Portal, Arizona and the Western New Mexico University Museum in Silver City, New Mexico.

For more information on Raven's Way Traditional School Classes & Products, please contact:



**Vince Pinto
RWTS**

**PO Box 16367
Portal, AZ 85632
520-403-5085**

ravens_way@hotmail.com

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Primitive Living Skills FAQ's

We spend a lot of time answering e-mail questions. Some of them we answer again and again, so this page is the start of a FAQ's column to hopefully provide meaningful answers without having to rewrite them all the time. We'll add much more to this page as we go along. If you [e-mail a question to us](#), please let us know if we can use your letter on the website. Also, be prepared to wait a week or two or sometimes much longer (especially in summer) for a reply as we have a lot of distractions already, and sometimes it is really difficult to keep up with all the e-mails.

Questions:

- [How can I pursue a career as a wilderness survival instructor?](#)

How can I pursue a career as a wilderness survival instructor?

Hi!

My name is Matt, and I'm doing a career project at my high school. I've always had a fascination with nature, and in the past few years I've been able to improve my skills as an outdoorsman. When I got the career project assignment, I thought that a career as a survival skills instructor might be worth looking into. I was hopeful that you would be able to lend me some information about this career. So, if you're willing, here are my questions:

- what are the jobs and duties of an instructor?*
- what is the usual starting salary?*
- what kind of training/experience is necessary?*
- are there opportunities for advancement?*

Thanx for considering my request.

Matt

Matt,

Thanks for writing. Don't expect to make a real income from teaching wilderness survival skills as a paid employee. There are a lot of schools you can work for as a survival skills instructor, but most will pay only a stipend to cover your food, if anything at all. It is a great way to polish your skills and to learn how to teach, but not a great way to make money. To be financially successful in this line of work virtually requires that you take the

route of the self-employed and start your own business.



I think you will find that if you take a few wilderness survival classes, then you will be able to start asking around for a place where you can help out as an intern. You can live and breathe the skills every day and gradually start teaching. With experience you will know when you are ready to venture out and start your own school.

As for the jobs and duties of the instructor, the most important duty is to watch out for the safety of your students. You will also need to provide in some way for their needs (shelter, food, etc.) while they are with you. The job of "teaching" varies from "watch closely, this is how you do it" to the more subtle process of mentoring, where you see where the student is at and give helpful hints to steer them towards the answers they are looking for.

Also keep in mind that there are many ways to pursue a career in wilderness skills besides teaching classes. For example, I make a living by writing and publishing my books, producing videos, and through e-commerce with our on-line store. I am "teaching" all the time, but I rarely have students in the conventional sense.

Here in Montana most classes would take place in the summer months, but I would rather spend that time with my kids. So I just offer a class or two in the spring and fall for personal enjoyment. When I make an income for my efforts, than that is just icing on the cake.

I think that the most important thing is to do what you really enjoy, and then figure out how to make a living at it, and I sense that you have figured that much out already. I wish you great luck and great success on the path to your Dreams!

Sincerely,

Thomas J. Elpel

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The Jefferson River Walk Tom's Camping Journal Wednesday August 29th - Monday September 3rd, 2001

Crayfish are a delicacy to a landlubber like me. Also known as "crawdads", these critters are essentially scaled-down, fresh-water lobsters. Crayfish and trout are about as close as we ever get to "seafood" here in land-locked Montana. I thoroughly enjoy our local venison, beef, and wheat, but also crave every little taste of sea food I can get. So I was thrilled to see the crayfish peeking out from below their rocky shelters in the bottom of the river. Although they are always here, they are usually too small to bother with. This time, however, the crawdads measured three to four inches long, small by southern standards, but definitely big enough to eat. Dustin, Jeff and I put down our pack frames just a few hundred feet from our starting point and spent the next couple hours catching crawdads.

We were near the end of the Bighole River only a mile or two upstream from the junction with the Beaverhead River, where the two combine to form the Jefferson. It was just three months back that I was last drawn to this area to camp and explore the lively river corridor. On that trip we paddled down the river by canoe, moving swiftly along with the current while steering around those dangerous submerged trees in the water.

But now, late in the season and after several consecutive years of drought, the rivers were so low that a person would be dragging a canoe more than paddling it. We left our canoe and home and walked instead. I noticed immediately that it was easier to stop and gather resources when walking.

Before picking up our packs again, we collected about sixty crayfish for dinner-- based on an estimated serving size of twenty each--then gathered a bunch more just because it was so much fun turning over rocks and catching the little clawed critters. It was a good thing we gathered them when we did, since we never found another good spot to harvest them. Downriver on the Jefferson, the crayfish were smaller and not nearly so abundant.

We carried most of our catch in a pot of water and wrapped the rest in a bandana, which we periodically dipped into the water as we went along. We didn't go far though before we stopped to investigate a patch of arrowhead or wapato, hoping to find some starchy tubers. On the coast the tubers grow to the size of a small egg. But here they were only about the size of a pea, not worth the trouble to harvest. Instead we gathered rosehips nearby and ate them as fast as we could right off the bushes. It was so dry everywhere that the grass just crackled and



crunched under our footsteps.

It was good to be close to the river, where at least the air was a little more humid. Yet it was still so hot and so dry that even the fish suffered. The Montana Department of Fish, Wildlife & Parks shut down all fishing on the Jefferson River just a few days before our trip, to protect the heat-stressed fish. We passed one small pool just a few feet in diameter where cool ground water seeped into the river, attracting about a dozen large trout to the spot. They seemed to be gasping for air, as if they just couldn't breathe in the warm, oxygen starved river. We could have jumped right on top of them and grapped an easy and delicious meal, but I agreed with the decision to close the river to fishing. Those fish were clearly stressed enough already. We watched for a moment, then continued on our way.

Next we found a pond without water, where the entire population of pond snails clinging to the mud-covered bottom for life. Obviously the mud would dry out in a few more days and all the snails would be dead. I've never eaten pond snails before, but hey, there is a first time for everything, and these were so easy to gather that we could hardly pass up the opportunity. We only gathered a sampling though--not much over a cup--since we figured we would have limited appetite for such things!

We covered only a few miles before making camp, then found a nice rocky beach where we would be able to make a small fire beside the water, far away from the dry grass in the woods. But it wasn't time to make dinner. It was time to nap.

Being out just a couple days before the full moon, we knew we would have good moonlight for night-walking. Night walking is always exciting anyway, but also made sense, because the extreme fire danger seriously limited our shelter options. It would simply be easier to walk at night than to build an insulated shelter to sleep warm without any form of fire. We would also be able to wear more of our clothes and gear at night, therefore carrying less on our backs. The only problem with walking at night is that it can be very difficult to sleep in the day. We split up to find our own patches of shade to nap in. I never did fall asleep, and I don't think Jeff did either. Dustin slept some, but only because he was already sleep-deprived before the trip.

Trying to impose sleep in the middle of the day like that seemed very artificial and imposed, rather than spontaneous and intuitive, but sometimes these adventures start that way until we learn to blend and flow with the time and place. It takes awhile to tune in and become part of the natural world.

We rested as long as we could, then Jeff brought out his bowdrill set and started a small cooking fire by the water. Dustin shared this note from his journal:

"Watching Jeff skillfully start a fire with his bowdrill was amazing. This wasn't on TV or in a book. It was right here in front of me. Jeff actually started a fire using everything from

the land. He went from around 5'10" to 10' tall. AMAZING!"

This would be his third expedition with me. The other trips were both in the winter. For dinner we cooked up the crayfish, snails and some rice. I ate a few crayfish simply cooked, but otherwise cracked open most of my share and mixed the little bits of crab-like meat into my rice, along with the rubbery snail bodies plucked out of their shells with a small, pointed stick. The snails were a little bit gritty, but actually much better than expected. I must have eaten about thirty of them with my rice and crayfish.

The sun was down and the moon was out by the time we finished eating and packed up to walk again. We headed downstream along the river bank through the grass and cottonwoods and swamps by moonlight, hoping we would not walk on a rattlesnake along the way. We didn't. Jeff wrote in his journal:

"It was an amazing wonderland of wildlife and activity. Every minute or so another animal was seen or heard nearby. We encountered a couple of playful beavers, countless species of birds and deer at every corner. At one point, Tom wondered aloud whether we were in Montana or in tropical Africa. The birds especially were amazing as they would suddenly evacuate a tree in large numbers or fly in such huge flocks that one could hear their cutting of the air above. The full moon, clear sky, and occasional wispy clouds simply added to the magic."

Navigating a path along the river was slow and often challenging. We walked for several hours, but didn't cover much ground. Finally we grew tired and plopped down for a nap on a sandy beach beside a log for a windbreak. We figured we could rest until we got too cold, then move on. A resident mouse scampered across each of us as we slept, or tried to sleep. I think Jeff and Dustin each slept for a short time. I was never convinced that I actually fell asleep.

We continued on our way, bushwacking through the willows, sometimes getting our feet wet crossing small channels along the river's edge. Finally the bushes and swamps became so thick that we had to walk up into the bone-dry hills away from the river to get anywhere at all. Late into the night the moon began to set and we knew it would be pitch black until dawn. In these severely desertified, almost grassless hills, it wasn't hard to find a gravelly gully where we could safely light a fire. I don't think we could have started a wildfire there if we tried. There simply wasn't anything to burn, except the cottonwood branches we carried up from the swamp at the end of the gully. We slept around the fire for warmth until morning.

Packing for the trip was a bit unusual, mostly due to the extreme fire danger. There were not any fire restrictions on the river, but there were up in the National Forest, where we would be towards the end of the trip. Fires were limited to established campsites, plus we were required to carry a bucket and a shovel. These restrictions seemed very reasonable

given the circumstances. So I strapped a five-gallon bucket and a fold-up camp shovel onto my packframe, then put all my gear inside the bucket. Although the bucket was a bit heavy, it was really handy to have along, partly to use as a seat at camp, but also to thoroughly drench our fires as we left each site.

Without the fire restrictions I think we all would have packed about half as much food and gear and possibly just used fanny packs instead of pack frames. However, we also had home-built alcohol-fueled camp stoves, plus lots and lots of food-- at least for three guys who are supposed to be living off the land. It's kind of like rocket propulsion I guess: the more mass we had the more fuel (i.e.: food) we needed to propel it. Adding more fuel adds more mass and therefore requires more fuel. So we brought even more food. We walked only about three miles that first day, but burned up lots of fuel in the process-- mostly trying to consume our extra trail mix to lighten the load. Our packs must have weighed fifteen to twenty pounds apiece when we started.

Anyway, after a night of limited sleep we lollygagged around camp in the morning, then cooked up a wheat cereal with trail mix blended in for flavoring. We also harvested a nice pot full of purslane greens and cooked those too. That was a treat. It's been years since I've eaten purslane.



Getting to know each other takes a bit of time on these trips, especially since we are often walking, or working on certain skills, or simply engaged in solo time to explore nature on our own. Jeff, I feel like I know quite well from our previous trips and through continued correspondence via e-mail. We were both raised in suburban environments within a culture disconnected from the natural world. The wiring in our brains was patterned for suburban life, not for living outside or for using our hands and pocketknives to make useful things like bowdrill fire sets and packframes. I know how difficult it has been for me to learn most of these skills, and Jeff's journal notes ring very similar:

"I find that in the first few days, my mind fights everything. I am not able to eat whenever I want, nor can I follow the schedule I'm used to. Also, I am constantly doing activities on these wilderness walks that I am not very good at. Many times on this trip and others, I asked why I wanted to spend time this way. And yet, when the calm divinity of nature breaks through and my mind finally surrenders to quiet, I know the reason. Days seem like months, smells and sounds are sharper and the soul is singing."

Dustin did grow up in the outdoors. Living in a rural place and with very little parental

supervision, he and his friends turned to nature for entertainment. Camping, fishing and hunting was a part of every day life. Dustin told us much about his wild childhood and things like the way he and his friends would remove the lead tips from bullets and replace them with spitballs-- which they then shot at each other. He went on his first solo camping trip when he was nine years old. As an adult he has become a serious rock climber.

Dustin grew up camping with inadequate gear, a practice which he carried over into adult life. On winter trips he always kept his water bottle inside his sleeping bag at night to keep it from freezing. He kept his first worn-out old sleeping bag up until one cold night when the water bottle froze right inside his bag.

For a person who is accustomed to adventure and living life on the edge, I was concerned that this trip would be a bit slow and boring. I know he was surprised at how much gear and food we brought on this "survival" trek. But Dustin was hardly the odd-man-out in the group. He and Jeff had a lot in common from their highschool and college experiences--mostly recounting some of the wild parties--plus sharing tales from international travels to South American and Asian countries. Both of them were accustomed to a lively social life, and they found much to talk about.

I'm a bit more introverted. All I ever wanted to do as a teenager or young adult was to go to Grandma's house. That was the extent of my social life.

Although I enjoy these kinds of expeditions, I have a tendency to exist in my own space. My comfort zone is about fifty feet away from anyone else, especially when walking. I have to remind myself periodically that each of us have a different experience of the same time and place, and I should at least share a little of what I know about the local plants, nature awareness and primitive skills. I was even more distant than usual on this trip, just burned out I think after a very busy year. I enjoyed being around Dustin and Jeff as much as an introvert possibly can. I truly thought they were great company, and yet I still found myself day-dreaming about going on a solo expedition.

After breakfast we packed up and started walking again. Jeff brought his water filter along, and refilling our water jugs was the first order of business when we reached the river. I was glad Jeff brought his water filter; it is a lot more efficient than mine.

Our intent on this trip was to walk right down the river, but there is only so much walking on river cobbles or wading through moss and muck that a person can handle. We gravitated towards the grassy banks, mostly following cow trails through the willow thickets. We found a beautiful bush loaded with buffaloberries and picked several cups worth to take with us. The berries are extremely tart fresh, but surprisingly addictive when you eat one at a time while picking.

We walked to the mouth of Hell's Canyon before stopping, but that was still only about six

miles from our original drop-off point. There we took naps, went swimming, exploring, made bowdrill fire sets, saw a rattlesnake, and cooked dinner. I choose not to kill rattlesnakes, partly because there is not enough meat on them to justify it, but also because there are not nearly as many rattlers around now as there once were.

I did catch a couple large crayfish and several smaller ones too. I figured the small ones were tender enough to eat shells and all, at least after pulling off the legs and claws. We made an all wild soup with the crayfish, goosefoot leaves and seeds, and purslane. Jeff exclaimed that it was delicious (but gave the crayfish to me) while I thought it was sufficiently palatable to call it food. Dustin never did express his opinion of it.

Then we boiled up the buffaloberries with sugar and used pancake mix with a small amount of water to make a thick dough for ashcakes. We made some ashcakes plain, cooked as flat patties on the coals, then poured the buffaloberry sauce over them. We also made buffaloberry turnovers. These were made by pouring a little berry sauce in the middle of a patty and then folding and pinching the patty closed. We cooked those in the coals too, and poured extra buffaloberry sauce on afterwards too. This desert was enjoyed much more enthusiastically by everyone and certainly provided the bulk of the calories in our meal. I'm not sure how many other skills Dustin took home from the trip, but he never stopped talking about ashcakes after that. We brushed our teeth before settling down to sleep around the fire.

Our planned route for the expedition spanned sixty miles, none of which really mattered, but at our pace of three miles a day it would take a very long time to get anywhere, so we were feeling the need to cover some miles. We especially wanted to get to a favorite camping spot downstream. However, we knew it would not be sustainable to pack up and start walking in the beginning of the evening, so instead we decided to sleep until we were cold or just awake, then we could depart in the middle of the night.

We slept soundly around the fire until about 3 a.m. The night was still remarkably warm. By the light of the moon we tied our gear to our packframes and walked the dirt road beside the river. It was still night when we reached the highway and crossed the bridge. We refilled our water jugs there by moonlight and checked the map with the aid of a nearby yard light, then headed out across the fields in search of the railroad bed. With the setting of the moon, the night just got darker and darker, but the way I figured it, there should have been just flat fields and a few fences between the river and the railroad. So I was suprised when we walked right into a swamp.

The water wasn't very deep, but the uncertainty of what lay ahead was a definite problem. Here we were in the middle of a drought sloshing through a field of grass or sedges flooded with water. It may have been flood irrigated, but there seemed to be too much water for that. Navigating through this swampy land in the dark made me think of the Allied pilots downed behind enemy lines in World War II and how they had to sneak back across unfamiliar country, sometimes crossing hundreds of miles in secret. Of course they

were doing it for real. This was recreation for us.

Finally we found the railroad bed and turned to walk down river on the rails. One thing that has to be said for human-made rails, trails and roads, is that you can really put the miles on in a hurry. We walked until dawn, then walked some more.

I really expected that part of the land to be just open fields or sagebrush pastures, but in fact it was all very green, lush and often swampy and brushy along the railroad. In the early morning light we could see that it was a beautiful place and the whitetail deer bounded out right and left every where we went. We were definitely not hidden walking along the railroad bed, but not usually very visible either. A school bus stopped by each of the nearby houses to pick up the kids. We stopped for a morning snack of buffalo berries and trail mix. We blended them together to make sure we ate more of the wild foods and to extend our trail mix, which was by now running low. Of course we ate rosehips everywhere we went.



One house near the tracks had a beautiful apple tree all loaded with fruit. I looked at it longingly, but kept walking. Moments later we found another tree next to a dirt road beside the tracks. That one looked like fair game. We must have eaten a dozen apples between us as we quickly picked fifty more and stuffed them in our packs and pockets. As we continued down the rails munching on apples, Dustin commented that the trip description should include "hobo skills".

Farther down the railroad we found some very out-of-season asparagus growing beside the tracks. There were tons of old stalks lining the fences, but these were closer to the tracks and just ripe for picking. The normal season for asparagus is in May. I thought this was odd, but also so tempting that it could not be refused. Setting reason aside, we picked the stalks and ate them right there. I thought about it some more as we walked, and concluded they must have been sprayed with herbicides, which are usually some form of growth hormone. Another patch of ripe-for-the picking asparagus confirmed it by the tell-tale curly tops of the plants... they too had been sprayed. Yuck!

Dustin seemed to enjoy the walking, since we were doing something active. The miles were harder for Jeff, but I usually try to push his buttons a little anyway. We covered about fourteen miles by mid-morning when we arrived at the river and stopped for a longer rest.

The trout seemed much happier in this part of the river. Perhaps the overcast skies of the last twenty-four hours helped to keep the water from getting so hot. The deeper channel through this section must have helped too. With all the trout jumping for flies, the water was not still for a moment. Some swam close by our viewing rocks. We jumped in for a quick swim too. The water definitely seemed cooler.

We napped, snacked, and made a small amount of dogbane cordage before continuing on our way. Soon we found a small swamp with cattails and pulled up a good crop of roots for dinner. That is a surprising thing about the Jefferson River, that there are not more cattail swamps along the way. Jeff shared these notes from his journal:

"We walked up on a small mud hole full of cattails and Tom suggested we pick a bunch. The hole smelled like bad gas which, of course, was swamp gas. I was very worn out at this point and tired of wet feet, and was therefore about to ask if we would have to step in the mud to get the cattails. I did not ask, however, since I already knew the answer. As I took off my shoes along with Tom and Dustin, I could smell my socks and they stank. We then wallowed in the mud with our legs often sinking up to mid-thigh. We dug way down to retrieve the cattails, roots and all, and finally pulled out a large pile. We were laughing at the squishy noises of our legs in the mud and at one point I thought a full-out mud fight would ensue. We soon got out and washed off by the nearby river where we proceeded to weave visors from the cattail leaves."

We bush-wacked another four miles to a wickiup shelter I saved from a previous trip. The whitetail deer seemed to bound out from behind every bush as we traveled. My view of the place has changed since I paddled down river just a three months earlier.

At that time I saw what a wonderland of wildlife the Jefferson River was, and added the entire river to my "shopping list" of special places that should be saved from development. Not only did I want to save it from development, but it would also be nice to keep the entire river system-- plus the swamps, cottonwood groves and meadows-- open to public and wildlife use. I realized that a piece-meal approach would never get the required action or results, that the project needed a vision that people could grab on to, a project I now call 3Rivers Park. Eventually, through both private and public means, I would like to create this park following the entire length of the Jefferson, Madison and Gallatin Rivers. It will take more than my lifetime to complete, but it has to start somewhere, or we lose the river forever. As we traveled along the river on this trip, I found myself thinking of it as a park already.

We arrived in camp in a wind storm, and rain seemed to be falling farther up river, but the storm only spit at us. We moved into the wickiup left-over from my May canoe trip. It is basically a tipi-like structure built of poles and debris scraped off the ground. Immediately we collected firewood and started a small fire inside. For dinner we ate the starchy cores of the cattail roots, plus ashcakes with instant green pea soup mixed thick enough to be scooped onto the ashcakes like refried beans. We slept soundly around the fire, adding

small pieces as needed to keep the shelter warm through the night.

It was nice to stay through an entire night in one place. After walking eighteen miles yesterday, this would be a sort of "day off" to work on skills before emarking on the hike back over the hills to Pony. For breakfast we cooked oatmeal loaded with apples and buffalo berries.



One problem that needed attention was the cattail straps on Jeff's backpack. We improvised those straps from cattail leaf cordage on an earlier trip, and they worked great for awhile, but finally wore out. One of the straps actually came apart on the first day, about fifty yards from our drop-off point. I had an extra strap of buckskin and reinforced the strap to get by until we got around to replacing it. Later we had to reinforce it more with our bandanas, so this seemed like a good time to upgrade to newer straps. But instead of using cattail straps we experimented with clematis vines and twisted them into cordage. The clematis rope was easy to make and seemed like it would function well as a rope swing, or in any application where the rope was straight, but tying it into knots proved to be a real problem. Some of our knots were more than six inches in diameter. Cinching them down any tighter caused the vines to start snapping. Jeff

managed to get by with the clematis straps for the rest of the trip, but they were problematic and not very comfortable. I guess we will stick with cattail straps in the future. Dustin and I were also able to finish some working bowdrill sets on that day, since we were otherwise borrowing Jeff's to start the fire.

Throughout the day we collected wild foods like rosehips, chokecherries, goosefoot leaves and wild sunflower heads. I must have eaten about a hundred rosehips every day of the trip. The chokecherries we brought back to camp and pounded to break up the pits. Being related to the almond, the nut in the pit of cherry is very almond-like. You just have to break the pits open and cook or dry the mash to destroy the cyanide content. Of course the pit shells are a bit crunchy, but still edible.

The sunflower heads we rubbed on a rock and tore apart to knock the seeds out, which we then winnowed clean, but we never got around to actually using them. For dinner we "batter fried" the goosefoot greens, apple slices, and cattail shoots. Really it was more like pancakes loaded with greens, but it was really good. For desert we boiled up the "chokecherry-almond" mash with loads of sugar and served it on ashcakes, much like we did with the buffaloberries a couple days earlier. Although it tasted good, neither Jeff nor Dustin seemed to like the crunch of the pit shells.



Somehow we entered into a conversation about time and space and related topics. I pointed out that time is an illusion both real and not real and that the future and the past have both happened but still remain in flux. After all, time did not exist until the big bang expanded enough to create space. Rates of time remain variable, depending on mass and speed, so it is hardly a "universal constant". For entertainment I've been working on ways to alter the past--as if I don't have enough to do in the present already.

So far, I have to admit that there seems to be a growing number of unexplained anomalies in my childhood, but it seems impossible to prove where they came from. Anyway, I gave an example of premonitions, such as when someone senses that their end is coming and they speak of their last thoughts and wishes to family members, just before being pancaked in a car accident or something on the way to work the next day. It could be said that the accident happened in the future and an "echo" of the event traveled back in time to be picked up by the subconscious mind in the present, causing them to describe their last thoughts and wishes to family members. Since the present is in the past relative to the future, then you could say that the future event altered the past.

Dustin mentioned some related anecdotes, such as when he and his friends were headed out for a winter climb and his intuition screamed at him to not go. Although annoyed by his behavior, his friends did not go either, and they all went back to town for something. When they returned later that day, they saw that their climbing destination had since avalanched and they would have been buried in it if they had climbed it that morning. In that case, Dustin intuitively picked up the echo of an event that happened in the future, and subsequently altered the past for himself and his friends.

Part of our mission on this trip was simply to focus on being aware in the present, so we worked on that too. That night we settled down to sleep around the fire in the wickiup again, with the intention to rise in the middle of the night to begin the climb over the Tobacco Root Mountains towards home.

We arose and packed before dawn on day five of our trip, but not nearly as early as we planned. Hiking over the mountains from down on the river meant lots and lots of climbing uphill. We followed a road to start with, until it faded out several miles up. I forgot my topographic maps at home, so we did our best to navigate using the much less-detailed public lands map. I usually don't care exactly where I am at, as long as we are headed in approximately the right direction. Along the way we worked on plant identification skills and harvested some sizable wild onions, but mostly we just walked. I enjoyed seeing a part of the Tobacco Root Mountains that was completely unfamiliar to me.

I figured we could follow the ridgelines to cut right through the mountains without climbing up and down so much. But the ridgelines here were very brushy with short Douglas fir trees and mountain mahogany, plus an understory of ninebark. Getting anywhere was a real chore. We finally found a trail and followed it, trying to line it up with the trails marked on our map. Something wasn't right though, so we asked a couple of bow hunters for clarification and we were still a whole drainage short of the point we thought we reached. We hiked up and down and up and down on these trails all day, covering about fifteen mountain miles before making camp in Mill Canyon, on the same side of the mountains we started on, just a few miles farther along the base.

We found just a few wild raspberries along the trail during the day, but discovered gooseberry bushes loaded with their sour fruits right there at Mill Canyon. We honored the fire restrictions and used an established campsite with a picnic table and fire ring. And finally, after carrying our alcohol stoves and fuel for more than forty miles, we set them up on the table and cooked our dinner that way. I was impressed with how quickly our food cooked over the little stoves.

The fire pit at this site was less than appealing. It was a rock ring with an ample supply of ashes. The previous campers were evidently cows, and they successfully scattered the rocks and ashes, making an ash bed about fifteen feet wide and nearly an inch deep. We scraped up all the ashes as best we could and scattered them in the grass, then rebuilt the rock ring. As darkness fell we cut dry grass for mattresses on the hard ground and laid down on our ponchos to stay out of the ashes. Again we intended to depart in the moonlight to walk up over the ridge towards home, but Dustin's knife disappeared while cutting grass. We decided to stay there until morning to look for the knife.

Probably the single most exciting moment of the entire trip happened in the first second of our last day. It was a classical example of Schrodinger's cat in quantum physics, used as an analogy to explain certain aspects of wave-particle duality. The cat is locked in a box when a random event, such as the decay of a radioactive atom, triggers the release of a deadly gas that kills the cat. In the old view of physics something did or did not happen and we open the box to see the result. But in the view of quantum or particle physics,

nothing happens until we remove the lid. Until then there is a wave of quantum possibilities--the cat is in limbo between being dead or alive-- and it is only when the observer removes the lid that the wave collapses into any one particular reality.

In this case, however, I woke up to the realization that my hand was on fire. I began beating the flames out on the ground and then tried to smother them against my wool sweater, but I could not feel my hand. It felt like this numb, charred lump on the end of my arm. By this time (probably half a second into the experience) Dustin was awake and lept across the fire to help me. He couldn't see the flames, but assumed it must have been on my belly because I was holding my hand there and he started reaching for the five gallon bucket of water behind me to douse me with it. Jeff was awake and thought this was some kind of strange wrestling match, or maybe I had been bitten by a snake. I remembered the bucket of water too, and whirled around to dunk my hand into it, beating Dustin by a fraction of a second.

This was all very confusing, because some things just didn't add up, but I quickly plunged my hand into the water to limit any further damage. For an instant it seemed as though my hand was both completely charcoaled and yet not burned at all, so much like Schrodinger's cat, in limbo between one reality and another.

Sitting there with my hand in a bucket of water I wiggled my fingers a little and realized that my hand was never on fire at all, but just asleep under my weight, and the flames were still a few inches away, but definitely crawling across the grass mat towards where my hand was. Then I felt really silly, sitting there with my hand completely unscathed, cooling it in the water! We were all very much awake and the sky was beginning to brighten in the east, so we started packing to leave. Dustin found his knife, which turned up right under his grass mat.

As we walked up the trail in the early morning light, Dustin commented on our conversation of a couple days ago, suggesting or possibly joking that my hand really had been burned in a possible future and what I experienced was the memory of that future event, which jarred me awake so that I avoided the experience afterall. A similar thought crossed my mind, but I discarded it, concluding that my hand was just asleep and I woke up really confused.

Nevertheless, the experience jarred loose some thoughts for me and helped me to resolve a problem I had been muddling over regarding parallel universe theory, a concept in quantum physics which suggests that all possible universes do exist, that in essence, the cat is alive in one universe and dead in another, and not in the box at all in other universes. Applied to every day life it would be a little like saying that in one universe you drive down the road eventlessly to your destination, while in a parrallel universe you collide with a car in the other lane, and in other parallel universes you collide with every car in the other lane. The majority of such universes seem pretty bleak, so how is it that this copy of me always seems to end up in the lucky universe?

I realized that morning that there is a wave of possible universes which are all being sorted out, forwards and backwards through time, essentially "negotiating" different versions of our past and future history to collapse into one coherent time-line. In a non-time sense, neither the past nor the future have completely solidified and the fate of the universe both has and has not been determined. Parallel universes do not exist, but parallel possible universes do. The "echos" streaming back from those possible universes influence our choices and actions, individually and collectively, thus tilting the choice of universe which we ultimately collapse into existence. I really need to sit down for six or eight months of writing to explain that in greater detail.

Anyway, as we climbed up a very steep trail, Dustin taught us the "mountaineer walk" that enables a person to walk slower but much farther and without tiring, basically a matter of taking a few steps then locking one leg straight for a brief, barely visible rest. We climbed over the pass and descended to Rock Creek Lake, more like a mud puddle really.

We originally planned to head deeper into the mountains to camp another night, but realized that we didn't have enough time left to get anywhere before we would have to leave again and head for home. Besides, I knew my extended family would be having a Labor Day picnic in the Pony park with lots of good food. So we cut the trip short by a day and plotted a direct course for home, following Rock Creek down to the South Boulder River, then up Bear Gulch to Windy pass and down Charcoal and Pony Creeks to our house.



Bear Gulch is mostly National Forest land, except for a narrow strip of private land--only a few hundred feet wide--running right up the middle. We took the forest route into the canyon, then walked up the road to the saddle. Bear gulch was loaded with more wild raspberries than any place I have ever seen. To me, this was the real mountaineers walk: go a few steps and eat a handful of raspberries, then go a few more steps. Dustin shared these thoughts from his journal:

"During the week I learned and was shown a lot of new and wonderful things. Both Jeff and Tom had shown me a lot, and not all of it was about living off the land. I had made two new friends. One of the last things I learned from Tom though was about survival. Tom is a very quite, very polite, and very helpful person. A good man, but when it comes to wild raspberries he turns into a pushy, cut-in-front-of-you guy. Jeff and I just stood back and laughed to ourselves as we watched Tom in the raspberries."

Dustin worked as a surveyor for a number of years, so he explained some of the survey markers along the way up to Windy Pass. The pass was definitely windy and practically blew us over the top. This second day of hiking long distances in the mountains was definitely wearing on Jeff, and I was feeling it too, though Dustin seemed to find it easy. One thing about walking is that it seems to encourage the rambling internal dialogue, but I really focussed this time on staying in the present moment and being aware of every step of the way. Jeff shared these journal notes:

"The hiking we did the last day or so actually detracted from my nature awareness and skills because I was too tired to practice them. Looking back, however, I was practicing skills during some of these long hikes such as mental control, endurance, beginning surveying, map reading, and plant identification."

The walk downhill from Windy Pass was easy, and we quickly polished off the lasagna at the family picnic, though we were a bit more dirty and hairy than anyone else there. Afterwards, Jeff reflected on the trip this way:

"My final impression of the trip was different from past trips. Upon returning to Pony, I initially felt a bit disheartened because the hiking seemed to dominate the trip (even though it did not). I wanted to build shelters and do more meditation and sit still more than we did. Despite these initial feelings, this trip deeply affected me and really held the mirror of myself up to my perception. I feel this trip brought on another turning point in my life to be more committed to a still mind and continual awareness. In that sense, it was a deeper experience than ever before. Also, I really learned some things about 'how to learn'. In that sense, this trip prepared me better to learn about shelters and plants and anything else of interest. I feel it is now time to take my own extended trip into the wildernesses of Montana, and continue what Tom has taught me."

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The Jefferson River Canoe Trip Tom's Camping Journal Monday May 14 - Monday May 21, 2001

The two bald eagles flew out of their nest high in the cottonwood tree, circled low and clacked their beaks in alarm, telling us bluntly that we were trespassing on their territory. We circled wide around the tree as we continued our exploration. This was truly an amazing place, packed with wildlife, where the whitetail deer seemed to bound out from behind every thicket. There were ducks and geese in the swamps, sandhill cranes in the nearby fields, wild turkeys in the willow thickets, blue herons nesting in the trees, and song birds everywhere: mourning doves, yellow warblers, and tree swallows, plus downy woodpeckers and magpies. We were on the river for only an hour before we found this site and paddled into the slough to get out and look around. We ended up staying there for the rest of the day and night.



My companions on this trip were Andy, almost eighteen, and his mother Pat. Andy wrote to me from a ranch in eastern Montana a few weeks earlier. Although he lives in California, he chose to take a year off from school to try some other things before graduating from high-school. For the last three months he worked as a hired hand on the ranch, helping out with sheep and cows, plus burning fields and fencing. I was immediately impressed by his writing, and thought to myself, "Here is a person who is

good at organizing his thoughts and knows how to make things happen." Before long I was corresponding with his mom, working out the details of the trip. I warned them both that this would be a "survival trip", without tents, sleeping bags, or blankets. We would endeavor to make ourselves comfortable, but being cold and miserable part of the time would be a definite possibility. I think that Pat looked forward to the break from her work and the opportunity to spend quality time with her son. It was evident that neither of them were intimidated by my description of the trip. I picked them up at the airport the day before the trip began.

We put the canoe into the Beaverhead River in the town of Twin Bridges, here in southwestern Montana. The Beaverhead joins with the Bighole River a few miles downstream to become the Jefferson River. It was my intent to start the trip late enough to take advantage of morel mushrooms and tree mushrooms, but early enough to avoid the high and dangerous waters of flood season. We started a week later than I originally planned, but that worked out just fine. In our second year of drought here, there simply isn't enough snow pack in the mountains to flood the rivers anyway. In fact, the water

level was absolutely ideal for this kind of a trip.

These rivers are wide and shallow enough that there are always places where the canoe drags across the rocks on the bottom. Through much of the summer it is more a matter of walking a boat down the river than floating it. This time there was enough water spilling down those shallow riffles to turn them into moderately swift and very fun rapids. There were absolutely no mosquitoes.

In the Jefferson there are also many deep holes, great for swimming... when it is a little bit warmer out. The most dangerous part of the river are the many downed cottonwood trees that have the potential to suck under a boat or raft and its crew. People die that way every year, even with life jackets on. They get sucked in under a tree, then stuck against a branch so they cannot come up on the other side. Andy and Pat had considerable experience with canoes already, and I was glad for that in the upper sections of the river where the water was swifter and the fallen trees more numerous. If the river was much higher then I would have called off the trip as too dangerous. There is a fine line between not quite enough and way too much!

We expected rain on this first evening of the trip, so we built a small wickiup with its back turned against the weather and the lee side open to our campfire. The clouds rolled by the wind blew in gentle gusts, but the rain never came. Still, it was nice to have a cozy shelter out of the breeze.

Pat later gave me permission to use excerpts from a letter to her friends and family, where she wrote: *"Andy and I just returned from an 8-day Wilderness Survival canoe trip down the Jefferson River in Montana. It was an experience! We were cold, we were wet, we were hungry, and it was good! We were also warm, well-fed and dry. The weather was beautiful most of the time, though pretty cold and windy on some days."*

For our first dinner we ate pigeon. They were not hard to catch... since they were pets. I started raising pigeons many years ago for meat, but never managed to create a sustainable system. They liked to perch on the roof of our house and nested on the ridgepole, crapping all over the porch swing below. After we adopted our children they in turn adopted the pigeons as pets. The kids wouldn't let me eat the birds any more. Felicia wanted to raise racing pigeons for awhile, so we built a cage for the birds in the chickenhouse to prevent them from getting out and roosting on the house. That helped, but once in a while the door got left open and it would take me weeks to catch them all again, to return them to the cage. We tried hauling the pigeons with us on vacation to set them free a hundred miles from home, but most of them still found their way back. Finally we ate a bunch of them in a primitive cooking class one time, sparing only the kids' favorite birds, at least for awhile. Eventually though, the kids moved on to horses and other pets, so no one was left to take care of the remaining pigeons. Besides, we wanted to use the cage as a brooder house to raise chicks. I packed the last six pigeons into a box (except for the two still nesting on our house) and loaded them live onto the canoe. We butchered five at camp, and one got away, minus a few tail feathers. My blunder.



Andy helped with the butchering. It was evident that he has done similar work before. Most people are totally grossed out by blood and guts the first time they butcher something, especially if they have romanticized the idea as part of "living in harmony with nature". The reality is kind of messy, but Andy jumped right into the job. He is also quite the gourmet cook. He brought his own multi-spice container with compartments for eight different spices. No matter what we cooked, he spiced it up just right with salt and pepper, cayenne, curry, paprika and more. He was completely distraught when he realized he was out of garlic salt.

He roasted two of the pigeons over the fire. The others we cooked in a stew with some onions, tree mushrooms, and "Jerusalem artichokes" or "sun tubers" brought from home. We added tender young cattail leaves to the stew and boiled nettle greens in a separate pot. I warned Andy that these were older pigeons, guaranteed to be tough. He ate some, but seemed clearly disappointed that it wasn't more tender. Pat is a lifelong vegetarian, though she did not object to our feathered meal. She left all the meat for us. I thought it was delicious, even the pigeons.

The night was very warm, at least for Montana in May. We slept on grass padding in the wickiup, and stoked the fire intermittently to stay warm. Sleeping around a fire like that can be hard at first, but after a night or two a person grows used to it, or just plain tired enough, to be able to sleep comfortably from then on.



Cool air seeping in the back of the shelter seemed to flow right through my wool sweater until I buckled on my life jacket for extra warmth. I wore the life jacket to bed most nights after that. That made me feel like I was prepared for anything! We disassembled the shelter before leaving in the morning. Then we moved many miles down river.

The Jefferson River wanders through farm lands and passes by several small communities. In places where the river is narrow and deeper, the cottonwoods are fewer and the developments tend to encroach more on the banks. We needed to get past these sections and back into the wild country where the river is more channeled, with sloughs and swamps and cottonwoods for wildlife habitat. Along the way we saw many pelicans, lots of beaver cuttings, more deer, and a river otter! I've only seen one other river otter in my life.

In past canoe trips on the [Green River](#) in Utah or the [Upper Missouri Wild & Scenic River](#) in central Montana, the water moved so slow that we had to paddle to get any where at all. On the Jefferson, however, the river moves fast enough that we usually only needed to paddle for steering purposes. It was truly amazing to pass down river so quickly with so little effort! We floated nearly thirty miles to the "Parrot Castle" fishing access, and still had time to build a shelter and make dinner before dark. The only obstacle was a very dangerous diversion dam built across the river to direct water into an irrigation ditch. We had to get out and portage all our gear out and around the dam. Good thing we didn't have much gear!

I don't know where the name Parrot Castle came from, unless it has to do with the rock formations, also known as "Point of Rocks" beside the river. The river bumps up against the Tobacco Root Mountains here, and it is the only spot where you can get from the public right-of-way in the river up to the public lands in the mountains, without crossing private lands in between.

A few years ago a stone mason spent some time here developing a small hot springs beside the river. The stone masonry is very nicely done, and the pool has a cold inlet to adjust the water temperature, plus drains to flush out the entire pool. It is a very nice hot springs, except for one thing. With easy access by road, the place has become a party spot and there is trash everywhere. We felt awkward walking around all the trash while doing nothing about it, but we just didn't want to take in with us in the canoe. My kids and I pick up trash every where we go, and I expect to bring them by for a camping trip shortly, so I guess we can work on it then.



On the first day of the trip, I made a quick bowdrill set and started the fire, then told Andy and Pat that I expected them to start the rest of the fires for the trip. This was Andy's day to learn the skill. He worked at the fire for some time, while I gave him room to experiment. Intermittently I offered suggestions until he had the basic form down, but he was growing quickly frustrated and impatient with the process. The rock handsocket we found was especially awkward to work with. Finally, I helped steady his hand on the socket and applied the right amount of pressure so that he got a hot coal. This combination of experimentation followed by assisted pressure seems to be a very effective way to teach the bowdrill. On the receiving end, you can really get a sense of exactly how the bowdrill should function. It helped that Andy was especially adept at working with his hands. He started all of our fires after that, usually on the first try. On the last day of the trip, Pat decided she wanted to start a bowdrill fire too, and she did.

We dug three trenches on a sandy island beach, then warmed each trench with Andy's fire. I like building that kind of shelter on sand bars where there is little growing anyway, and the landscape is periodically rearranged by floods.

While waiting for the ground to warm, we cooked a stew of rice and lentils with roots and onions, mushrooms, and wild lettuce greens mixed in. I noticed that the fish were active and threw in a hook with a worm. In only a few minutes I had a nice brown trout, probably 12 - 14 inches long. Andy took a turn and caught another brown trout. We ate them both with dinner, excited that we might be able to catch many fish along this trip.

In her letter, Pat wrote: *"We foraged for our meals, but also took rice, lentils and oatmeal along, and some trail mix too for our midday snack. We ate lots of mushrooms (tree mushrooms and morels); wild greens like mustard, nettles, prickly lettuce, wild onions, lily bulbs (not the poisonous kinds), flowers like violets; and a little wild game like trout and birds and other assorted other stuff (not me, I'm just too vegetarian!) Unfortunately, we all forgot to bring salt. Try to imagine a whole week without salt! Try to imagine lentils without*

salt!"



Later we covered our trench fires with sand, set down ponchos, then made a big haystack of dried grass for insulation. We strung a tarp over the pile to block air infiltration.

Unfortunately we were a bit exposed to the road, so some of the party goes at the hot springs gawked and yelled comments as they drove away in the near darkness. We waited until we had the place to ourselves, then took our own turn soaking in the hot water before turning in for the night. We nearly howled with pain when the hot water

first hit all the cuts and scratches on our legs, but we let in a little cool water, and slowly adjusted to the heat. Now that was survival with style! Through the night in our haystack shelter, I enjoyed the warm sand underneath me and imagined that Andy and Pat were enjoying the comfortable bed as much as I was. So I was disappointed in the morning to learn that Pat's side of the bed never warmed up that much and she was slightly cold all night. Andy was warm enough, but not all that comfortable. Through the trip we each had one night that was clearly our best night's sleep, but they were all different nights in different shelters. We must not have had enough firewood in Pat's coalbed, or maybe too much sand. She tried out my spot after I got up and noted that it was much more comfortable!

We spent half the day exploring the area, climbing the rocky hills nearby, digging wild onions and other greens, and picking rose hips for tea. Pat found a nice patch of morel mushrooms. Andy caught a big bull snake and held it for awhile before letting it go. We liked the place so much that we decided to stay longer, but in another location. We found a secluded spot and built a large and elaborate wickiup with space and height inside to have a fire. We ate ashcakes with refried beans for dinner, plus we ate a nice mess of greens and mushrooms. We slept around the fire and stoked it all night long. A weather front had just passed through, sucking away all the heat as it left. This was the coldest night of the trip so far. The wickiup still had a few air gaps down low, letting cold air into the sleeping area, so it was more 'adequate' than 'comfortable'. Outside, there was frost on the grass in the morning.



We decided to stay yet another night in the area and spent most of this fourth day hiking

up in the Tobacco Root Mountains. It was nice to get up high and see the world from a new perspective. Andy asked about every plant we passed by, wondering if they were edible or not. Almost all of them were edible, but as Andy discovered, most of them don't taste very good. He is very expressive with his face when trying to spit out something that tastes awful!

One thing we found on our hike was a duck nest with nine eggs in it, hidden below a mountain mahogany shrub beside a rock. Those birds do strange things sometimes. On day one we found a duck egg sitting on a log by a pond. I think they just have to lay whether they have a nest or not. Later Andy found a single goose egg floating in a pond. Anyway, the nest we found was nearly a mile from the river or any other suitable water source for ducks. Momma duck would never be able to walk her ducklings to the water, or so it seems. I would like to ask a knowledgeable biologist about that sometime.



Later, as we sat perched up on the mountain overlooking the valley below, I began to wonder about the future of the Jefferson River. I am usually pretty good at leaving work and stress behind on these trips, and sometimes I almost forget that I have another life. But I found myself trying to think of ways to protect what is left of the Jefferson River.

Other rivers that we have paddled were nearly lifeless compared to the Jefferson River. Those were rugged, remote and desert-like environments. They were "wild & scenic rivers" because the land was too harsh to sustain any prior human colonization. Unfortunately, the more biologically rich environments usually go unprotected because they are already settled.

Much of the Jefferson River is still rich and alive, but there are also large portions of its banks stabilized with rip-rap, which kills the channeling that is necessary to germinate future cottonwood trees. There is also the problem of development encroaching on the river, with houses lining the banks. Everyone wants a piece of the river for themselves, and this kind of development is sucking the life out of it.

With the population exploding in southwest Montana, it is just a matter of time before the river is completely dead, when rafters will float down a rip-rapped channel between two rows of houses, under the watchful eyes of homeowners barbecuing hamburgers on their decks. Now is the time to do something, and I would love to see a ribbon of wilderness and wildlife habitat following the river from its start to its end. It would be good for the river and good for all future generations of people to enjoy this not-so-remote, but very exciting river. I spent some time dreaming about the project, and added it to my lifelong "list of things to do". I tried not to dwell on it too much though. After all, this was my

vacation!

Back at camp we added more debris to our wickiup to tighten up the holes. I saw a large rattlesnake and left it alone. Snakes are quite edible, but there isn't much meat on them, and there doesn't seem to be too many snakes left these days, so I don't like to kill them. We tried fishing again and again and again, but couldn't seem to catch any more fish. We ate yet another meal of rice and lentils and wild greens and mushrooms for dinner. Both the weather and our shelter were much warmer, causing Andy to wake up with a cheerful shout in the morning after his best night of sleep for the entire trip. He couldn't stand another mushroom though, which Pat and I put in every meal we cooked, so he took over and made us three great big, delicious omelets for breakfast, loaded with spices of course.

After three nights at this wonderful place, it was finally time to get back on the river. We packed up, soaked in the hot springs one last time, then paddled on down stream. We portaged around another diversion dam and by-passed several islands. One of the islands is about a mile long, and I would really like to spend some time there, but we were not quite ready to stop yet, so we floated on down to a smaller island before making camp on a big, sandy beach. At one point along the river there was a moose just standing there at the edge, watching us float by. Of course we saw more whitetail deer, Canadian geese, and pelicans at every turn in the river. Some of the geese had their goslings with them on the water. At times we felt entirely hot, yet a moment later we would be chilled to the bone. That is the nature of our weather in May.

In her letter Pat wrote: *"The best part was cruising down the river in the canoe -- so quiet, so part of the environment. We saw a lot of beautiful wildlife -- an otter, a moose, beavers, coyote, white-tailed deer, mule deer, muskrats, Bald Eagles -- including 3 inhabited nests, osprey and their nests, sandhill cranes, many ducks and geese, lots of other birds, in fact the morning orchestra was so beautiful that I wished I brought a recorder along to take the sounds home with me. The big sky was a deep blue on most days, with puffy white clouds, cottonwood trees lining the river bank in many places, islands, peninsulas, places to explore."*



We still had much of the day ahead of us when landed on the island, and it wasn't clear what we could or should do, so we focused on some primitive skills to pass the time.

We did a lesson on cordage first, from dogbane and nettle fibers. Then we went for a walk and made toy atlatls with mullein stalks for spears. My cousin Mel showed me how to do that. Finally we were making simple stone tools out on the beach. We had an atlatl contest at camp before making dinner or our shelters, but we

all came in last place.... none of us could hit the cardboard box!

For shelter we dug big trenches in the sand, almost grave-sized. Then we lit fires in the trenches to heat up the ground. After dark we covered over the hot coals with sand, then made a simple roof over the top. I usually use sticks for the roof of these pit shelters and cover the top with earth or sand, but there were not quite enough sticks around, so we just put a log on each side and suspended ponchos across the top to trap in the heat. This is ordinarily my favorite shelter. I like to sleep in the warm chamber, even without any grass for a blanket. At this site there wasn't enough grass for a blanket anyway.

Unfortunately, I really goofed on the shelter this time. It is important to use a stick framework to support the middle of the poncho so that any condensation will run to the sides before dripping down. We draped our ponchos down inward, so the condensation dripped right in the middle of the pits, and there was quite a bit of moisture in the sand we used. That wasn't so much of a problem in Pat and Andy's combined pit shelter, since the drip landed in between them. But in my shelter the drip landed right on me, and every time I almost fell asleep there was a sudden cold splash on my face!



Furthermore, I hesitated to put too much sand on the coal beds, since Pat's bed was too cold the last time around. So I did not put nearly enough sand on, and we all nearly cooked in our shelters when we rested, in between scraping handfuls of cool sand in from the outside.

I finally ripped half the roof off my pit shelter because of the annoying drip on my head, then scrunched down into the bottom half, sitting cross-legged for the rest of the night. I felt really bad by morning for creating such a miserable experience for everyone. I was quite surprised then that Pat slept in and didn't want to get out of bed because she was so incredibly comfortable! She especially enjoyed being mildly steamed all night long and said it did wonders for her skin.

In her letter she wrote: *"We took no blankets or sleeping bags, and packed pretty lightly on clothes, though we prepared to layer for cold. Some nights we kept warm around a fire in a shelter, other nights we dug trenches in the ground, burned branches in them to make a thick bed of coals, then put the soil over it and slept on the warm ground. It was great when it worked, but one night we built into a sand bank, covered it with a tarp and turned it into a sauna! It did cool down, and when avoiding the drips it was pretty cozy. In fact, that was my best night of sleep!"*

We had another long day ahead of us, so we filled in our pit shelters, ate left-overs for breakfast, and paddled on down river towards the community of Cardwell. As we paddled

by the fishing access we found the most dreaded thing of all: a sign with my name on it in big letters.

In small print the sign said, "There's been a family emergency in Pat's family. Call home." Pat and Andy have experienced family tragedy before, in a way that few people could ever relate to. We hitch-hiked to the phone at the Cardwell community store to get the terrible news. We dialed Renee first and she told us there had been a death in the family, but she didn't know who. Renee had been a wreck for the last two days, trying to get this message to us.

Pat called home and learned that it had actually been a close friend of the family, a very kind eighty-five year old woman, Marie. Pat and Andy were saddened by the loss of their friend, but also relieved that it had been a natural death and not a tragic accident of someone else. Since the memorial service would not be until after their scheduled arrival home anyway, they decided to continue the canoe trip. Andy bought ramen noodles and some candy at the store to survive the rest of the journey. Back on the river they told me all about Marie and what a wonderful person she was.

We floated on down river past the Lewis & Clark Caverns State Park. There the river is squeezed between two small mountain ranges, creating a channel that cannot meander back and forth. Under those conditions it is almost impossible for cottonwoods to germinate, so this stretch of the river is mostly barren of habitat and resources.

The wind blew intermittently in sudden gusts, so that it was often chilly and sometimes nerve-wracking to travel downstream. We could never tell if the next gust might be so big that it would just blow us right over, or kick up waves high enough to swamp the canoe. We had to work to keep the canoe pointed down river. The load of dry grass we tied to the canoe for our next camp didn't help matters much, since the wind grabbed at it like a sail.

We paddled downstream to a site where I previously built a small wickiup and kept it for trips just like this one. It was nice to arrive in camp with a shelter already completed. We had some quiet time to ourselves to climb up in the hills, to sit and think and to admire the spring wildflowers. In the evening we added some of Andy's ramen noodles to our usual fare of rice and lentils, wild mushrooms and wild greens. He cooked up two other packs separately, just to have something different. Although the wind blew hard at times, the air was almost still inside the wickiup. Again we slept around the fire, stoking it now and then through the night to stay warm.

With morning came more weather, and it appeared for awhile that we were in for a big rain. We used our grass bedding to stuff the remaining cracks in the shelter for better water-proofing. All we got for moisture was a sleet storm so short that we could have counted the sleet that hit the ground. Still, the weather was cold and windy. We waited as long as we could before heading out.

Our next stop was a favorite hunting ground for me, a place where we hoped to get a rabbit, a porcupine, or some carp, or *something*. Slowly the day warmed up some and Pat read and wrote in her journal and napped, while us boys went out to kill something, anything really. We hunted and fished for hours, but still had nothing to show for our efforts but three little crawdads, which we saved and boiled later on when we arrived at camp.

Our last camp was on a small "island", or at least it was an island on the map, but by now the water level had fallen to the point where the channel was dry around one side. The driftwood pile made a convenient v-shaped shelter between two logs. We added more logs and built up a triangular "log cabin" but without any roof. We had a central fire pit plus separate coal beds under each of us as we slept around the fire. The night was cold, but we were sufficiently warm, at least when the fire was burning bright.

Pat wrote: *"On our last night out we woke up to almost a half inch of ice on our water! We also woke up at 4:30AM, all too cold to sleep. So we stoked the campfire higher, got a little silly, pulled our ponchos around ourselves and dropped off again."*

We had a final breakfast of ashcakes and oatmeal. The sky was perfectly blue and sunny and completely still. We were hot by nine in the morning when we were packed and ready to paddle the final stretch of the river down to Three Forks. I just couldn't believe it when the icy cold wind suddenly kicked up again, and I was especially under dressed for it, with just a T-shirt. We paddled the rest of the way just to stay warm and covered about eight miles in only a couple hours. It was a nice trip, but I was ready to be done! We stopped at my in-laws house by the river and called home for a ride. Pat expressed that how much she enjoyed just floating down the river worry free, and that she wished it wasn't over. Andy enjoyed the trip, but I think he was ready for a change in diet. I don't know if he will ever eat another mushroom. We finished with a nice meal at a restaurant to mark the official end of the trip.

In her letter Pat concluded: *"For me, the whole week was a sort of Sabbath, a spiritual experience filled with a sense of God's presence in nature, a peace and calm away from my busy life -- no phones, no schedules or demands, not much planning ahead and no huge decisions. Time for thought, prayer, writing, and even a little reading. A chance to gain a new perspective, to see new possibilities in old cottonwood trees, to see the river's world from it's surface rather than from the highway, to see food in a weed -- a stinging one at that, a home in a driftwood pile, a friend in a stranger."*

[Go to Tom's Primitive Living Skills Class Schedule](http://www.hollowtop.com/journals/jjeffersoncanoe.htm)

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Thursday July 1st -Wednesday July 14, 1999 Tom's Camping Journal: The Green River Canoe Trip

The sun burned hot on our pale northern bodies; the sudden transition from the cool mountains of Montana to the searing temperatures of the Utah desert cooked us like raw meat in a frying pan. I expected the usual scrub lands of juniper and piñon pine that cover much of southern Utah, but this was a true desert, an endless landscape of nearly barren land, extending as far as the eye could see in every direction. The sheer bleakness of the landscape reminded me of Death Valley.

The Green River seemed almost as out-of-place there as we were. It carries millions of gallons of water away from distant mountains, cutting through this hot, almost waterless landscape with indifference. The river feeds a narrow strip of lush willows and tamarisk along its banks, often no more than a dozen feet wide, before the greenery gives way to the emptiness of the desert.

It had been almost fifteen years to the day since I first came to southern Utah for an expedition. I was sixteen then, and signed up for a 26 day walk-about with Boulder Outdoor Survival School a hundred miles or so to the west. That experience of hiking through the canyon lands was simply the most transformative experience of my life; it helped to empower me to live out my many dreams. Now, as a parent, I wanted to give my kids a similar opportunity for growth. Also, we wanted the family time together, and memories that would last forever.



After more than a day of preparation it was good to finally push out into the river, to join its watery migration across the desert towards the sea. For the next two weeks we traveled with the river, both on it and in it, from the town of Green River down stream for 120 miles to the confluence, where it merges with the Colorado River.

I anticipated that we would float the river in our canoes, drifting along with the current, occasionally using our paddles to steer clear of obstacles and eddies in the water. But a big wind blew up the river immediately upon our departure, transforming the placid waters into rolling waves, almost blowing us back up the river. We grabbed our paddles and stroked the water, working hard to move down stream. We only needed to cover four miles that first day, but we really had to work to get there.

Our hosts for this trip were our friends Bart and Robin Blankenship of the [Earth Knack](#) school, along with their kids Tyree, age 11, Teal, eight and Tikla, three, plus instructors-in-

training Clayton and Nick. The guests on this trip included Steve and Judy, a couple in their 50's from Chicago, plus Renee and I and our kids, Felicia, who turned ten on the trip, Cassie, almost nine, and Donny, age four. Despite the difference in their ages, Teal and Donny are especially close. They met for the first time at Rabbitstick Rendezvous 2 1/2 years ago. They clung to each other like glue that week, and talked about each other for months afterwards. Donny didn't know Teal's name at that time though. He just kept talking about "that kid in the red shirt". They stuck together like glue during this trip too.

Our first camp was Crystal Geyser, a favorite spot of Bart & Robins'. It is a cold water geyser, the "second largest in the world" according to the Blankenships. The geyser was inadvertently created by a man drilling for oil. The pipe is about a foot in diameter, and the water shoots up thirty feet in the air, lasting for a surprisingly long time. The geyser water is highly mineralized, so the land leading down to the river is heavily coated with the orange deposits, several feet thick in some places. Despite the continuous foot traffic from ourselves and other visitors the deposits remain in good condition. We set up our tents in the sand nearby.

The geyser blows about every fourteen hours. For us the show came in the middle of the night. Half of the group rose for the first, false eruption, which was only a few feet high. Only a few adults rose for the real eruption an hour or so later.

Although the emphasis of this trip was on the canoeing and camping, some primitive skills were also covered along the way. Bart brought along a bucket of yucca leaves for making cordage for bowstrings, and taught us how to work with that as we sat on the orange crust of the geyser. Yucca fibers were always tedious to process by the old method of scraping away the green flesh with a sharp blade, but Bart and Robin discovered a much better way to clean them. They cooked the whole plants in a steam pit. The flesh of the leaves could then be easily scraped out with a fingernail, aided by rinsing in the river. Clayton and Nick made bows right away from tamarisk branches for hunting carp. I made bows for each of our kids along the way.

Despite fifteen years of cordage-making experience, I still found it difficult to make a bowstring that wouldn't break. When I asked Bart for advice he said, "I see you still haven't read my book. ([Earth Knack: Stone Age Skills for the 21st Century](#))" He showed me some new tricks to help equalize the strain on each strand of the cordage-a definite improvement.

The next two days of our journey down the river were intermittently windy-usually serene, but without warning we would be besieged by gusts of wind, choppy waters, and sometimes rolling waves. At times it seemed more "like paddling the Atlantic" mentioned Robin. The river is different every year she said.

Besides the four canoes, we also had two kayaks, which were shared between the four older kids. It was a thrill to watch the kids paddle those kayaks down the river. They

seemed to resonate with independence and new confidence. Only it was scary one time when a big wind came up and it took all of our effort for Renee and I to keep the canoe pointed straight into the waves. We were unable to look back to see if Felicia was still in her kayak at all. But after the wind died down she paddled up beside us and mentioned how much fun she had on the waves! When I tried the kayak a couple days later, I almost immediately rolled it upside down and came up wet, surprised, and a little humiliated. Bart explained that adults are top heavy in the kayaks, so the kids are much more stable in them.

The kids unfortunately neglected to tie up one of the kayaks when we stopped to go for a walk to look for agates. It was gone when we returned to the water, but thankfully the wind blew it into a quiet eddy a half mile downstream.

Despite the occasional gusts of wind, the weather remained searingly hot through most of the first week. For survival and sanity we had to jump into the river every hour or two to cool off. Our clothes were always wet, and even at night we would sometimes go for a swim just before crawling into bed to cool off enough to sleep. We usually slept on top of our blankets for several hours until the night cooled down. Renee would cover herself with a wet towel if she was really hot.



Our second camp was under some cottonwood trees where there were thousands of stone cobbles covering the hills along the river. Bart, Nick and Clayton spent hours collecting chert, agates, and jasper for flint-knapping arrowheads. Under the shade of the trees they reduced the cobbles to useable flakes. Later in the evening they buried the stones and built a fire over them. Heat treating the stones this way makes them more glassy and workable for making arrowheads and other flint-knapping projects. Bart speculates that the heat drives off bound water molecules from the stone.

The kids spent hours down by the river fishing for catfish. Teal especially loved to fish, and he would throw in a line almost as soon as we arrived in camp. In one afternoon the kids caught eleven catfish. We gutted the fish and baked them directly on the hot coals. Renee noted that we did not need to bring food-we just needed to bring kids!

But we did bring food, and lots of it. We ate uncountable bags of bagels and cream cheese, cooked pizzas and cinnamon rolls, ate crackers, salami and cheese, cantaloupes, watermelons, apples and oranges. This was definitely not a "primitive" trip.

Each day we would "raft up" in the middle of the river, tying all the canoes and kayaks together so we could pass snacks back and forth. After all my years of experience

traveling by foot, I marveled to see the scenery pass so quickly by, even while we took a break to eat our lunch!



Before starting our journey we heard that the bugs were really bad on the Green this year. We made a special trip to Moab to buy head nets, just in case. But the first few days were relatively bug free. The river was falling with the disappearance of the snows in the distant mountains. We thought maybe the worst of bug season was over with. We were wrong.

I always thought I was "mosquito tolerant", that I could camp with the mosquitoes and not let them get to me. But on this trip I

discovered that I was really a mosquito wimp. The mosquitoes hid in the willows and tamarisk during the heat of the day, and ventured forth only with the cool of the evening. It was so different to me, since I have always sought out the bushes for camping, to choose only the most dead and barren camp sites we could find. Our third stop was along an outcropping of rocks along the water. We stayed there for two nights.

The kids spent hours and hours leaping off the rocks into the water, floating down river with the current. Our kids, especially Cassie and Donnie, were more intimidated by the water at first. But after watching Tyree, Teal, and Felicia leap confidently into the current, they did too. Soon all but the youngest kids were leaping in, even without life jackets. Without really knowing how to swim, they learned the more important skills of how to stay afloat and get where they wanted to go. Renee observed that Felicia was a better swimmer than she.

Later we adults imposed the requirement that all the kids had to wear life jackets every time they entered the water. We knew they could stay afloat without the safety gear, but our main concern was that we would not be able to find a kid in the silty water if they dove into a rock or had some other accident. The kids protested daily, but managed to have a good time anyway.

The most difficult part was keeping the kids out of the sun so that they did not all turn into lobsters. It was a challenge for us adults too. Our camp was shaded by two large cottonwood trees, but it was still stifling hot, located up and away from the river. We stayed cool beside the river while we made pots with a beautiful purple clay we dug up back near the Crystal Geysers. We mixed the clay with powdered deer pills, fine sand, and grit from ant hills for temper to strengthen the clay and reduce cracking. One lone, bug-free tamarisk bush grew out of the rocks there by the water, and all of us tried to huddle under it for protection from the sun. We made clay pots and clay ocarinas, a musical instrument similar to a whistle. By the end of the day we almost welcomed the mosquitoes

that came with the evening, because at least we would no longer be getting charred from the sun. But our evening activities were short-lived before we would dive into our tents, tarps, and bug nets for protection. By the time the sun rose in the morning we welcomed the prospect of being burned, because at least the mosquitoes would retreat to the bushes! Little Tikla had the worst time with the mosquitoes. They always seem to recognize the freshest, youngest meat in a group, and she had lots of bites. Then she scratched the bites until they bled.

I don't mean to make it sound like we had a hard time. It was always fun, even with the mosquitoes and blistering sun. It was simply challenging to stay out of the hot sun and the bugs while we were engaged in other activities.

As we continued our journey down the river the scenery quickly became more and more spectacular. We soon left behind the clay hills and badlands as we paddled down into the red canyon lands. Steve brought along a Native American Flute, and Bart brought an Australian didgeridoo. Sometimes they would play as we drifted along. There is nothing quiet like the gentle sounds of simple instruments echoing off the canyon walls. I played my PVC flute sometimes too, and there were several clay ocarinas, so we had lots of great music.



The fascinating part about the geology along the Green is that it is so easy to see the layers in the canyon walls. Near my home in Montana all the sedimentary layers have been up-lifted at odd angles, so it takes some geologic detective work to figure out which layers are which. But in the canyon lands the layers are still flat, revealing the vast accumulations of sediments from ancient seas in chronological order, visible where the river has cut a deep and vivid cross-section back through time. Each day we would float millions of years farther back in time, usually seeing two new layers of sandstone or siltstone and shale per day.

There are many "tourist stops" along the river which are marked on the river maps for all to see. One of those spots is called "Register Rock", basically a section of canyon wall where graffiti is considered acceptable. River runners have stopped there for decades to carve their names and drawings into the sandstone wall. But our group was much more interested in the "whirlpool" we found in the water there. A large boulder in the river created a whirlpool effect as the water broke around it. Kids and adults alike slid off into the water to be gently sucked down and twirled around in the water. The river carried the swimmers downstream until they swam a few strokes to catch the eddy behind the boulder, which carried them back up stream to do it again.

One particularly awkward custom of life on the river is that it is standard practice to urinate in the water. At home we've always been very careful to protect the quality of the water, and we've taught our kids to walk up and away from the water too. But along these desert rivers there is a problem when too many river runners stop and pee on the shore. It is too much for the desert soils to handle, and the entire shoreline can smell like urine. Peeing in the river makes sense, because the river is so big and dilutes it so well, and it is not particularly clean anyway. Ultimately the water is all siphoned off down stream and channeled over land to LA for drinking water, but I guess that's their problem!

For defecating the standard practice is to leave it high and dry and smear it into the sand with a stick, a technique called the "desert smear". The hot desert sun sterilizes it in a few days. Rocks make decent toilet paper. As an alternative, Bart and Robin rented a box with a tight lid, called a "groover" since the original boxes were army ammo containers, which left a groove on your behind when you stood up. The new ones even have a plastic toilet seat. It was especially helpful for the kids, but sometimes we all used it when we were camped on sand bars and could not get up away from the river.

As we descended still deeper into the canyons we found fewer good places to reach land and explore or camp. The band of willows and tamarisk along the rivers was virtually unbroken-you might call it the "great wall of mosquitoes". We did find some nice sand bars to camp on, but I always felt stranded because we were confined to the open areas. If anyone walked to the edge of the thicket they would bring back a horde of blood-thirsty mosquitoes, and soon everyone in camp was swatting vigorously. The bushes were simply off limits.

I always enjoy camping and primitive skills because it gives me a chance to connect with the natural world, but on this trip I sometimes felt alienated from nature. I think it was mostly due to my botanical interest; I wanted to look at plants, but could not get any where near them. The experience reminded me a lot of Kevin Costener's B-grade movie, *Waterworld*, where the greenhouse effect melted the polar ice caps and flooded the world, so everyone lived on water. Our life seemed a lot like that as we floated down river. There were several different groups that we met along the river, usually seeing each other on and off for a few days. It felt like we were all little communities, living on the water, eating there, playing music, bathing in it ten times a day to stay cool, and peeing in it. We were surrounded by water, yet drinkable water was also precious, since we did not want to drink river water. We carried as much water onboard as we could, enough to last about five days, then treated the rest with iodine tablets.

At times I also felt I was on an alien planet, where life on land was just getting established, as if it had barely crawled up out of the river of life, and had yet to colonize all the barren ground of the planet beyond the water's edge.

At other times, the land simply seemed ancient, given the millions of years of sedimentary layers we floated by. I wondered about the native peoples who once called this river

home and found sustenance there. They must have connected with this land in a much deeper level than I.

But life also seemed precarious on this trip, when we made camp on exposed sand bars in the changing weather. I am accustomed to taking cover in the rocks and bushes from inclement weather, so it was very different to simply stake ourselves down to the open sand, and to let a brewing storm blow right over us, literally. This sand bar was a narrow point, just downstream of an island. The sandbar was already caving off into the water along one side when we arrived, but it was the best spot we could find for camp. Besides the weather was still calm then.



Renee and I rarely staked our tent down; it just seemed unnecessary. Instead we would weight it down with heavy gear in each of the corners. That was sufficient most of the time, but not nearly good enough in the wind we discovered. We were never in danger of the tent blowing down, but we learned that the corners had to be staked out for the fiberglass rods to work properly. When the wind did come it flattened our tent, splitting apart the fiberglass support rods, and breaking one of the metal couplings.

With some effort, and good help, we were able to wrap the rods with tape, and tie a wooden splint across the broken coupling. We cut big wooden stakes and drove them deep into the sand. Although the tent was sad looking and not very strong, staking it out made it strong enough to last through the rest of the night and the rest of the trip.

But the wind blew hard that night, and we could hear the sand bar getting smaller and smaller outside our tent. Much of the sand bar was gone by morning, and we had only a foot of ground outside our tent door. One corner of the Blankenship's tent was already at the water's edge. Nobody slept much that night in the wind. I think this whole first week of the trip was especially difficult for Judy, who did not have as much camping experience as her husband Steve. Besides that, they were sleeping under tarps, and did not have a safe refuge to hide from the bugs.

We all packed a little slowly in the morning, but soon enough we were once again paddling down the river. We passed through a section called "Bowknot Bend" where the river loops out first to the west and then to the east, almost coming back on itself each time. The first loop is five miles around, but only a quarter mile across. The second loop is seven miles long, but comes back to a point that is only 600 yards wide. Most of our group got out at this point and climbed up over the saddle and down the other side. Renee and Robin tied all the canoes and kayaks together, then paddled around the long

way. Donny did not like the hike up the steep slope in the hot sun, and screamed for all of Creation to hear it, but he was fine when we got to the top. We stayed up there for a while, then climbed down a precarious "trail" to the river on the other side. Donny rode on my back for much of the trip down, since I could keep my balance better that way, than by holding his hand. Once at the bottom we swam in the river until Renee and Robin picked us up.

By mid-afternoon we reached Mineral Bottom, nearly seventy miles down stream from where we started. Prior to the trip we shuttled vehicles down there, so we could get out and resupply with water and food for the second half of the trip. The road-or rather the trail-out of the canyon is etched into the side of a cliff. There were crumpled car bodies laying on the side of the mountain there, though I never heard if they were accidents, or merely someone's idea of disposal. In any case, the first trip in didn't bother me, but with each successive trip in and out to shuttle the vehicles back and forth, I was more and more eager to put that stretch of road behind me for good. Renee especially doesn't like roads like that, but she carefully puts herself into "an altered state" for the duration, so it is not so bad after all.

We returned to the town of Green River, where our trip began, and stayed at the campground there. Despite numerous bathings in the river each day, we were still dirty, mostly full of river silt, so it was good to take a real shower, and go out to eat.

The following day we drove into Moab to restock for the second half of the trip. Steve and Judy bought a tent so they would have real protection from the mosquitoes. I led a brief botany walk through a park. In the late afternoon we loaded up our fresh food and water and drove out to camp. Bart took us to a special place he calls Gypsy Camp. A group of "gypsies" used to camp there through the summers. They dug in stairs, lined the camp with rocks, and circled some of the plants with stones. A young girl painted faces inside a nearby cave. Mostly it was just a beautiful spot, with an endless view over the canyon lands to the west, and sheltered from the morning sun by high cliffs to the east.

The clay pots we made earlier in the week were now dry, and in pretty good condition, thanks to the padding of lots of bagels. We painted designs on the pots with a thick, dark dye made from boiled prince's plume, a type of mustard. Bart started a fire around the pots to warm and dry them for a couple hours, then built the fire right up over the pots to fire them. Nick got us started on a game where we had to figure out whether to pass a pair of sticks crossed or apart to the next person. We could choose to pass the sticks either way, but our legs had to be crossed or parallel like the sticks. Despite great efforts to give away



the secret, the kids never figured out the game. Later we passed the talking stick, and each of us expressed our thoughts and feelings; the tired kids fell asleep in our laps and on the warm ground.

In the morning the kids scavenged several partial sheets of plywood from the brush and built a fort. They used the screwdriver bits on their pocket knives to remove sheetrock screws from the wood, and to reattach it how they wanted it. Tyree brought along a deck of cards, and the kids played card games in the fort, and at each of our other camps too.

We stayed at Gypsy camp all that day and a second night. Most of the group practiced flint-knapping under the shade of a juniper. Judy and Steve each made stone knives with wooden handles, attached with pitch and yucca fibers. I mixed up more clay and made another pot.

I spent as much time as I could exploring the local flora, since we were miles away from the water and the mosquitoes. I was especially thrilled to learn the chaparral ash. It is always fun when I can use my own book, [Botany in a Day](#), to identify plants I do not know. After dark we held a discussion on the origination of consciousness.

In the morning we broke camp and headed back to the river. But we stopped along the road and picked the seeds of the Indian rice grass for food.

The river was absolutely red when we arrived back at Mineral Bottom. The storms of the last couple days missed us, but rained nearby, sending the red desert sands flooding down into the green river. The water was so muddy that we hesitated to jump in and silt up our still clean hair. But as a matter of survival, we soon jumped in the water just to keep cool. The water looked like hot chocolate as we paddled down the river into Canyon lands National Park. For this part of the trip we left the kayaks behind. The kids were no longer interested in paddling them, and it was extra work for us adults to tow them behind the canoes.

The canyon walls in the park were not necessarily any taller than that which we had already seen, although we were clearly descending deeper into the rock layers. But sometimes we could get a good vantage point to see that above the canyon walls there were benches leading up to still higher and higher cliffs. It was quite magnificent. This was new territory for Bart & Robin too. They had often canoed the upper section down to Mineral Bottom, but had never been this far down.

We camped that night on a narrow strip of sand between two large thickets of willows, tamarisk, and the mosquitoes, or "whistling zonabees" as they are called in the legend about their origination.



Nick, Clayton, Bart and the kids started a game of "double ball" out on the beach. The game is also known as "buffalo balls", since that's literally what the ball look like. There are two small pouches filled with sand, connected by a strip of buckskin. You pick the double ball up on the end of a stick and fling it across the playing field to other team mates who try to catch the balls on their stick, or sweep it up off the ground. The objective is to move the balls down the field and touch the opponents goal stick. It is a very wild and fun game, although it was a bit out-of-control at times.

When we were still up a gypsy camp, Steve started telling the kids a story about Lea and Catria and the "City of Steel", about a couple girls growing up on an "ark ship" bound for another planet. The story continued on for the rest of the trip, ending on cliff-hangers each night. Steve

was such a good story-teller that it wasn't long before most of the adults were also crowding around to hear the story too. We had the biggest tent, so the whole group would crowd into it for protection from the evening mosquitoes while Steve told his story.

I was concerned at the start of the trip that it would have been too much for Steve and Judy to be surrounded by these six kids for the duration of the trip, but fortunately it all worked out okay. They've raised children of their own, and Judy works as a Montessori teacher with kids similar in age to our own. There is an old saying that "it takes a village to raise a child", and that was really how this trip went. The adults out-numbered the kids by eight to six, and everyone offered guidance and parenting where ever needed. Clayton and Nick were especially good with the kids. Tikla thrived with Clayton's attention.

As we paddled down river again, ever deeper into the canyon lands, we began to see signs of Indian ruins. We wanted to get out and hike to some of them shown on the map, but we could very rarely find a safe place to dock at the edge of the river, without being consumed by bugs. But we did find one nice shelf of white sandstone "slickrock" at the water's edge, so we were able to get out and walk for a little bit. The kids caught a lizard and learned how to hypnotize it by rubbing it's belly. It just laid there like it was dead. The weather was much cooler on this second half of the trip, so we did not have to dive in the water nearly so often. Still the kids would sometimes jump out of the canoes and float down river with their life-jackets on, for as long as we would let them.

Since the river was so murky we could never tell what was ahead of us.. Sometimes we would be paddling along and suddenly find ourselves stuck on a sandbar, hidden just inches below the surface of the water. And while there were no rapids and the water remained mostly calm, there were always these "upwellings" where the water would seem to boil up around us, as if some Green River monster were swimming underneath the

canoes.

Throughout the trip we hunted the murky waters for another kind of beast, one with orange lips that sucked at the foam swirling atop the eddies. We found groups of up to twenty carp feeding like that, but we never did catch any. I came within about four inches of sticking my finger right in the mouth of one, but they were feeding underneath the branches of a tamarisk, so it was hard to get to them. Crashing into the brush with the canoe unleashed a swarm of mosquitoes so thick that Renee insisted we would not do that again! Nick and Clayton hoped to shoot some carp with their arrows, but never got just the right chance for it.



One beach we camped on was "invaded" by crickets during the night. In the morning they hid under our tents, tarps and other gear, so we caught a nice batch and cooked them with a little hot pepper sauce for a snack. When the sun came out I dried and started winnowing the grass seed we collected near gypsy camp. The kids built sand castles along the edge of the water.

Another camp was at a place called Jasper Canyon. There were large chunks of the deep red, glassy jasper laying all over around there. We even found a fossilized sea shell, turned to jasper. But the really neat thing about this place was the "amphitheater". A quarter mile up the canyon from the river there was a bowl where the water fell from more than a hundred feet up. It was just dripping while we were there, but it was a fantastically beautiful spot. Judy especially liked the canyon amphitheater. She seemed much more at home on the second half of the trip, thanks to the bug-proof tent. There was a pool of water there in the canyon, only about three feet deep, but the kids were soon leaping off the rocks from a dozen feet up. The sandy bottom of the pool helped to absorb some of the impact.

In the morning we went back to the bowl for a jumping contest, and a musical presentation. Nick and Clayton beat on pans and water drums to add to Steve's flute and Bart's didjerido. I enjoyed the sounds the most from outside the bowl, where the music echoed down the canyon.



This would be our last day paddling down the river. We arrived at the confluence where the Green joins the Colorado river early in the afternoon. Although the rivers are very similar, there were very few bugs on the Colorado this year. However, there were many motorized rafts, so we were glad for the peace and solitude of the Green. The river was very shallow along the beach, so the kids spent hours jumping into the current and floating down as far as they could. Then they got out and ran as fast as they could back up

to the beginning.

In the evening Steve made up a new story, called the Green River Monster, although it was different from the one I imagined under the water. His story was about a Canyon lands tour guide who ate his clients. The story was supposed to "give the kids nightmares for a week", but they thought it was funny.

In the morning we packed up our gear for the last time, and awaited a jet boat to carry us up the Colorado River to Moab. There are no roads down that far into the canyon lands, so the jet boats are the only way back up river.

This was the 14th of July and the birthday for both Felicia, now 10, and Steve, now 56. Renee and the kids baked a cake for the occasion. Nick and Clayton offered a class on basketry, and later did flint-knapping.

Clayton gave Felicia the basket he made as a birthday present, and Nick gave her and Steve flicker feathers for presents. Tyree gave Felicia the deck of cards they had been playing with throughout the trip. Felicia seemed to grow a little bit with these gifts, apparently realizing that gift-giving could be deeper and more sentimental than just giving or getting stuff. Then she took the skin off her nose by diving into the sandy bottom of the river!

At noon the jet boat arrived, already loaded with four canoes and eight passengers, ready to take our group of fourteen people and four more canoes. We sped up the Colorado at about 30 miles per hour, quickly ascending through time back to the present age. The scenery was similar to the Green, but with more open vistas and more rounded rock formations. Donny told me he had to go pee, and the guides said I could walk him along the rail of the boat to pee off the back, but Donny was terrified of the idea. He grabbed a metal bar near the floor and clung to it for dear life when I tried to pick him up. Instead the boat pulled over and let us off at a sandbar.

Once we were back in Moab we still had to make the shuttle run back to Mineral Bottom

to get the vehicles. I was glad when I drove up out of that steep road for the last time. Clayton took Steve and Judy to Grand Junction, Colorado to get a motel and clean up before their flight back to Chicago. The rest of us went out to dinner. Felicia got a dish of brownies and ice cream with a candle in it for her birthday. We ordered two plates and all shared.

After so much anticipation and preparation, the Green River Canoe Trip was already behind us, a memory that will truly last forever. The kids did seem much more confident and capable now than before, and we all shared some truly quality time together. Even before it was over we began discussing ideas with Bart and Robin for a new adventure, possibly in Montana, for next year.

Late that evening we drove out of Moab, headed home. Rain poured down from the sky as we drove away. There were flash floods in many canyons, and road damage across much of the area. I was glad at that moment to be in the car, and no longer in the canoe!

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Missouri River Canoe Trip Tom's Camping Journal Sunday July 2nd - Friday July 14th

The kids seemed quietly shocked and dismayed when we handed them the paddles. A year ago, almost to the day, we began a two-week canoe trip down the last 120 miles of the Green River in Utah, to the confluence with the Colorado. But there were eight adults and six kids on that trip, so the kids were passengers, paddling mostly for fun. This time it was just Renee and I in two canoes with our three kids, Felicia (10), Cassie (9) and Donny (5), plus our nephew Jeremy (11) from Connecticut. Donny was the only real passenger. The older kids had to paddle, with only one of them taking a break at a time, vying for the fold-up aluminum chair in the middle of the canoe.



According to literature from the Bureau of Land Management, most people average twenty miles a day through the Upper Missouri National Wild & Scenic River, completing the 108 miles from Coal Banks to the James Kipp Recreation Area in just five days. We allotted two weeks to the river, to travel at a slower pace with the kids, to spend some time and get to know the place, and to just enjoy being together as a family with few distractions from the modern world. At first the kids lifted the paddles with limp arms, but by the time we reached the end they were really pulling their share of the load.

Renee's mom and dad caravanned with us for the five-hour drive from home, helping to transport kids, gear, and one of the canoes to the river. We camped out on the night of July 1st at the city park in Fort Benton, along with many other floaters, then drove to Coal Banks Landing and launched the following day. We started in the afternoon and paddled only five miles before camping at the Little Sandy Recreation Area.

Given that the Green River Canoe Trip was our first canoeing adventure and this was only our second, Renee and I naturally compared one river to the other. On the Green we continuously endured searing hot temperatures and sunburns that penetrated our SPF 45 sunscreen, plus vast clouds of mosquitoes in the shade and after sunset. We expected a similar treatment on the Missouri, and planned to endure the worst. In reality, this river was a cakewalk compared to our experience on the Green. Okay, so maybe we didn't sleep for several nights in a row through terrifying lighting storms while the rain poured down all around us and bits of the tent blew away in the wind while we tried desperately to hold the rest of it together, but the rest of the time, yes, it was a cakewalk.

The Missouri, we decided, was wider but more shallow than the Green. Through the muddy water we could never tell if the river was ten inches or ten feet deep until we struck a paddle into it, but more often than not it was surprisingly shallow. Although both rivers are considered Class I, without any whitewater, the Missouri was even more gentle and easier to navigate than the Green, fortunately for us and our young crew. Other floaters indicated that the river was running about half its normal flow, due to the especially dry conditions this year. We really expected all the vegetation to be burned to a crisp by the dry weather, so we were pleasantly surprised to see how green it was. But we were especially delighted at the virtual absence of mosquitoes through most of the trip. Even when we did encounter a few bugs near the end, it was quite tolerable compared to what we expected.



We decided that the Upper Missouri Wild and Scenic River was not nearly as wild and scenic as the endlessly eye-popping red sandstone canyons of the Green, but after we got over the comparisons, we found that the Missouri had its own continuous subtle beauty and a few spectacular moments. Perhaps the biggest surprise was the pristine park-like quality of the Upper Missouri and the developed campsites built and maintained by the BLM for floaters along the river. We wondered what Lewis & Clark would have thought if they paddled up to a campsite with metal cooking grills and all new concrete outhouses with bright white walls inside, comfortable seats, and (usually) an ample supply of toilet paper! Canoe camping, we decided, was a lot like car camping, traveling from one campground to the next, except that we didn't have the problems of four bored kids confined inside the car and wanting to stop at every fast food restaurant and candy store!



Indeed, it was our intent to minimize distractions, so that the kids would find ways to entertain themselves, as kids have for millennia past, by playing in the natural environment. Keeping busy was no problem for the kids. The Upper Missouri was a hundred mile long swimming pool to them. I'm not sure there was ever a time where all the kids got bored and came out of the water on their own, without us having to go tell them it was time to be done. On the very first day they were already having mud fights, throwing great globs of mud at each other and bathing in it from head to toe. We found turtles, toads and live mussels at that first campsite, which we took pictures of and turned loose. I played tourist and shot up five rolls of film during the trip.

On Day 2 we paddled only six more miles

downstream. The kids were largely uninspired with the paddling, but we are all Star Trek fans, so the traveling became intermittently much more interesting when we adopted the lingo like "port and starboard", "warp speed", "come about" and "ramming speed", and then tried to overtake and ram each other in the canoes. The paddling seemed to stop whenever the games stopped.

For several days we tried fishing every chance we got, from shore or in the canoes. On the Green River the kids kept everyone fed on catfish using "dough bait" which we came to know as "stink bait". The Missouri also has catfish, and we brought along dough bait hoping for similar results. We really didn't care what kind of fish we caught, but we were really looking forward to catching something. We tried the dough bait and an assortment of other things we had along. Unfortunately, after several days of effort we only had a few bites and no actual fish. We finally gave up and existed on the river for two weeks with no fish other than the canned tuna we brought along.



The gray shale hills and sagebrush gradually gave way to white sandstone formations as we drifted downstream. We stopped to explore around some beautiful white cliffs that rose straight up from the water's edge, with a ravine cutting through between them. Meanwhile, an afternoon thundershower was building overhead. Lightening and rain soon followed, and we took refuge below some sandstone formations in the bottom of the dry ravine. Just when we thought the storm was ending there came a bigger more intense shower, and a small rivulet of water made its way down the ravine to our shelter.

Fortunately, the kids found a better shelter higher up in a wall of sandstone, so we all moved into that shelter to wait out the rain. Soon the ravine was awash with a "flash flood" although the flood was only about four inches deep and three feet wide. As soon as the storm passed we rushed to the canoes and headed down river to find a suitable campsite before another storm hit. We didn't get very far.

It was evident that another storm was coming, so we stopped at the first site we could find, about 1/4 mile downstream. Much of the land along the Upper Missouri Wild & Scenic River is private, but the BLM has easements to use some of the private land for campsites. Floaters are encouraged to camp at the designated campsites, or at least on public land, but it is okay to stay on private land too, provided it is not posted and you take good care of it. This camp was on private land, and a magnificent site too, with many castle-like sandstone formations. We set up camp as quickly as possible before it started raining again.



All of us brought books to read, and I read Grandmother's Grandchild aloud to the kids. The author, Alma Snell, is a Crow Indian and a friend of ours. Her grandfather was one of Custer's scouts. Alma was raised by her grandmother Pretty Shield. Kids that were raised by their grandmothers usually learned more life skills than other kids, partly to help out, but also to be able to take care of themselves if the grandmother died. The Crow have a special name for a child raised this way, "k̄ʔalisbaapite" or "grandmothers grandchild", hence the name of the book. I read the book Pretty Shield by Frank B. Linderman to the kids a few years ago, and bought Alma's autobiography as soon as it came out. The kids especially liked the part where Pretty Shield chased the school principal around his office with a hatchet after he whipped Alma's hands with a length of rubber hose! We read a chapter or two each day until we finished the book.



As soon as the sky cleared in the evening, the kids ran back down to the water for another swim while I started the fire and Renee prepared burritos for dinner. She carefully planned out all of our meals before the trip, using fresh food for the first few days and dried and canned foods for the rest of the trip. We cooked over the campfire or on our propane stove, as seemed appropriate to each time and place. The tent was a little damp around the edges after the rains, but our sleeping bags and blankets were nice and

dry.

Our Day 3 was the 4th of July. But we had our celebration with ice cream sundaes and fireworks at home on the night of June 30th, before our trip. Fireworks are not allowed on the river. I awoke early and went for a walk, hoping to catch some carp feeding on the foam close to shore. I botched one attempt to bomb a carp with a rock, and never got another chance for the rest of the trip.

The kids were playing in the water again, just as soon as we would let them. I've been studying birds intently this year, so I sat in the thicket of snow berry bushes below the ash and cottonwood trees and watched the birds. What a thrill to sit and do almost nothing! That is exactly what I needed from this vacation.



Most of the land here is covered in grass or sage, with only a narrow band of trees along the river, so that is where all the birds congregate. From the trees they can head out over the water for bugs or over the prairie for bugs or seeds. At times there were a half dozen species of birds within a single small ash tree. I recognized the yellow warbler, mourning dove, and the redwing blackbird. The kingbird was new to me, as was the northern oriole, and some others which I was unable to identify. The oriole was bringing food to its juvenile young, which were out of the nest and already flying some, but not going out in search of food. We found the nest of a redwing blackbird in the snowberry thicket, with two newly hatched chicks inside. I also found a morning dove nest, but did not look inside. High up in the branches of a cottonwood tree we could see a porcupine resting for the day.

Together we went for a hike up through the sandstone castles before eating lunch,

packing up, and heading out. A mere three miles downstream we made camp at the Eagle Creek campground, possibly the most spectacular scenery of the entire trip, where both sides of the river are lined with white sandstone cliffs and dotted with short, scrubby ponderosa pines.

As often as possible through the trip I took the kids on a walk with their journals. Each of us found a "secret spot" to be by ourselves to observe nature. I feared that the kids would think it was a stupid idea, but actually they really liked it. The journals took several forms. Mostly the kids just listed everything they saw, heard and smelled, but sometimes they wrote poems, stories, or drew pictures. I sat with Donny and we worked together. At this place we saw two rabbits and a deer, plus many birds. We arrived back at camp by dark and celebrated the 4th of July by roasting marshmallows over the fire. Here is a poem that Cassie wrote:

A Secret Poem

by Cassie

I am sitting here on a sandstone and I see all the fluffy clouds. I see some ants, some sticks, some leaves. I feel the wind beneath my wings. There are hundreds and thousands and millions of bugs. I hear the crickets singing for love. I wonder if the mourning dove is mourning for someone above, for they will be resting forever over above, yes, forever above. I hear the birds chipping in trees and up there is the Lord praying on his hands and knees.

In the morning I grabbed the camera and headed up Eagle Creek to take pictures in the early light. The stunning beauty of this place was first revealed by Lewis & Clark in their journals, and later through many famous paintings and well-taken pictures. All that publicity gives the illusion that the sandstone formations must extend for fifty miles along the river. In reality there is more like five miles of truly stunning geology. The rest of the hills certainly make nice scenery, but the climax of the show is certainly at Eagle Creek.



There are unmistakable sedimentary layers all along the river, mostly bands of shale with a few bands of sandstone in between. The layers were formed when the region was under sea water from 80 to 70 million years ago. The shales formed at the bottom of the sea, while the sandstone layers formed along the shores and deltas. Changes in the sea level left alternating bands of one and the other. As you float down the river it seems that you are traveling deeper into the layers and back in time, but that is not so. Through

the process of building the Highland and Bearpaw Mountains nearby, volcanic activity lifted the land and tilted the sedimentary layers, so that you travel through the oldest layers upriver and travel forward in time 10 million years as you go down river.

Another effect of the volcanic rock was the massive walls of black stone that run across the land starting shortly after Eagle Creek. Molten rock was forced up through cracks in the sedimentary layers. As the softer sedimentary layers are worn away the harder volcanic rocks are left in place. These natural stone walls look entirely human-made. We floated by many such walls on the seven-mile journey downstream to the aptly named Hole-In-The-Wall campground.

The other campgrounds are all placed in groves of cottonwood trees, but Hole-In-The-Wall is a developed site on a sagebrush flat. However, recent improvements to the site include new outhouses and some log cabin-like shelters that are entirely closed on three sides, with the fourth side open and a roof overhead. There are also about fifty newly planted cottonwood and ash trees. A hand pump at the site produces alkaline water which also contains bacteria, so it is not suited for drinking, but there are two five gallon buckets at the pump and a sign asking for help watering the young trees. The kids watered a few trees closest to the pump. I watered several trees near our tent, farthest from the pump. Later we would get so much rain as to make all our efforts quite unnecessary.

In the afternoon it was just plain hot, as it always is before the storm, so we hid out in the shelter, reading, snacking and doing projects. I brought along flint & steel kits for the kids to practice starting fires. All of the older kids have started fires that way before, but they've never been in a situation like this where they could practice it every day and develop some proficiency with it. They all banged away with the steel on the flint rocks until someone caught a spark on a piece of char cloth. Then they transferred it into a tinder bundle and blew that into flame, adding sticks to make a real fire for cooking. They started just about all of our campfires during the trips, and usually started three or four extra fires each time, just for fun and practice. Cassie is especially proud of her fire-starting skills. Donny started a fire with a magnesium & steel kit. He was really thrilled about that.



The first cloudburst came before dark, while we were still hiding out in the shelter. When the kids had to go to the outhouse we didn't know if it was safe to make the run over there with the lightning crashing all around. We were probably not any safer in the shelter anyway. It was nice to have some moisture to wet the dry land, but we were glad when the storm passed.

We learned a few things about tents on the Green River. We were a little lazy about driving in the stakes there, but just held the tent down with lots of gear in all the corners. That mistake helped lead to a collapsed tent and shattered fiberglass rods. Partly it was the tent though, a cheap Walmart product, designed more to sell than to function. It was more like a kite than a tent, and it amplifies the wind so that from the inside every storm seems like a tornado! The zipper and the rods were toast with less than two weeks total use.



Unfortunately/fortunately, Renee's parents bought the same tent. I say "unfortunately" because of the flaws in the design, but "fortunately" because we already had a source of spare parts. We borrowed their tent for the Missouri River trip, since ours was no longer useable. One of the fiberglass rods was already cracked on their tent too, from the only time they ever used it, but we were able to patch it together sufficiently with duct tape. On this trip we drove in every stake, the way it was supposed to be done, plus we

added our own guy wires to the top, staking it out forward and backwards. We still had to jump up in the night to hold the tent together in the wind.

The rods normally arch outward, but in the wind they bend completely the opposite direction, almost folding the tent inside out with us inside! That's the kind of wind that destroyed our tent on the Green River. With all the racket of the wind and lightening I couldn't hear which one of the kids was sobbing maybe all of them but it must have seemed like the end of the world to them. Nevertheless, we survived the storm intact to see another bright and sunny dawn. There were bigger storms yet to come.

Day five brought the need for speed. We covered only twenty-one miles in our first four days, so it was time to do some serious paddling, or we would never get to the other end. We set a course downriver fourteen miles to the Slaughter River campground.

The kids paddled a little in the first four days, sometimes with a burst of energy for a few minutes, but usually only half-heartedly. That was okay when we were just traveling a few miles. But this time we needed everybody to help out. Jeremy acted like he still wasn't quite sure what to do with the paddle, as if he didn't have a frame of reference to begin from. I suggested that he should try paddling ten strokes on one side, then switching and paddling ten strokes on the other. I was steering from the back, so it didn't matter too much which side he paddled on in the front.

So he started counting and paddling 1...2...3... up to 10 on one side and then 1...2...3... up to 10 on the other, until pretty soon it became this kind of hypnotic rhythm that we all paddled to. Jeremy became a real power paddler, setting the pace for the rest of us all day. In the days to follow he kept counting and paddling. He started counting how many paddle strokes it took to get from one point to the next. He counted to 1,200 in just four miles one afternoon. All of us were tired when we finally arrived at camp.

Like many of the other campgrounds along the river, this was a site used by Lewis & Clark on their journey of discovery nearly 200 years ago... only they were moving farther upstream each day than we were moving downstream!

Evidently, the rain that hit us at Hole-In-The-Wall the day before was only the edge of the storm. The campers at Slaughter River must have been miserable, judging by the water still on the ground. There was hardly a dry enough place to set the tent. The mud was three inches deep on the path to the outhouse, and any tent placed in the wrong spot (just about everywhere) would have been sitting in a mud puddle. The clay soils swell up when wet, so that no more water can penetrate, so it just sits there on top. Of course the kids actually liked all that mud. Donny especially, would get a running start and slide through the mud into the river. Jeremy also liked to play in the muddy water, and he was often the last one out of the river.

Later in the evening I walked up in the hills with the kids to find our "secret spots". I thought Cassie's spot was especially neat. The white sandstone rocks looked just like cloud castle, kind of like a petrified cloud. The shale mound beside it had bands of white and red and black, so that it looked like a volcano with lava flowing down the sides.

A college class also camped at Slaughter River, as did many other people that night. The river seemed to be getting more and more crowded all the time. We were eager to move on down the river.



Day six on the river would mark the end of the first half of our trip. Our rations for week two were stored in the van, so we paddled the twelve miles downstream to Judith Landing. Renee's mom and dad delivered our van to Judith Landing after seeing us off at the beginning of the trip. Although tired, the kids paddled very well all the way there. We raced part of the way. Every day we switched the seating arrangements to keep things interesting for the kids, but usually Renee and I stayed in the back of the canoes to steer. Our early experiments at letting the kids take the back and steer proved positively exhausting as we weaved back and forth across the water, hardly going downstream at all.



There were many rapids along the river, but none of them are whitewater rapids. It was always fun to find these fast-moving sections of the river. We expected the rapids to be shallow, where the water ran downhill over rocks, but surprisingly, most of the rapids were three or four feet deep, often the deepest parts along the way.

We arrived early at Judith Landing, but it was hot out, so we set up camp in the shade of the cottonwoods and did very little. Each of us brought along at least two or three books, so there was always plenty to read.

I continued with bird-watching and read to the kids from Grandmother's Grandchild. For my personal reading I selected the most boring looking book I could find on any of my shelves- something that I would never be able to slow down enough to read at home. If I got part way into it and didn't like it, then I would just throw it away and be done with it. My candidate for

most boring book was Mark Skousen's *Economics on Trial*. In fact, it was incredibly tedious and boring to read, but a few ideas were sufficiently useful that I made myself read it all the way through. Reading was much easier once I got in the groove, about halfway through the book. I didn't feel like I compromised my vacation by bringing just one work-related text.

Our camp at Judith Landing was about a block from the parking lot. We resisted bringing the van over, or the kids would just want to play in it. But when evening came Renee and I felt like it would be nice to have a break from cooking, and we needed more water and to make some phone calls, so we loaded into the van and drove the twenty-six miles of winding dirt road south to Winifred. Of course we forgot to bring any money or checks from home, and nobody in town took credit cards, so we had to drive on to Hilger, and then all the way to Lewistown, sixty miles from the river, to get a hot meal and water, but we all enjoyed the night out very much. It was 11:30 before we made it back to camp and piled into the tent.

In the morning we needed to sort all our gear and get our rations for the second week. But it was very quiet at Judith Landing, and the kids were reading books and climbing trees. Felicia stalked up close to a rabbit. We spent half the day lazily cooking pancakes, with each kid making their own. It is kind of difficult to cook good pancakes on a propane stove, we decided.



I dug up some clay a few days before, which we mixed with some black sand Felicia gathered, plus some ground up cow manure to reduce cracking. The kids and I made some pots. The clay seemed to be a very high quality. There was no reason to bring the pots down river, so we packed them in crumpled paper for padding and insulation to slow down the drying process, then left them in the van. We will fire the pots at home sometime.

Finally, about midafternoon we got ambitious and loaded the canoes, parked the car, and headed downstream, just as a new afternoon thundershower was brewing. We made it three miles down the river, but that was probably farther than we should have gone. With the storm right on our heels, we all worked together as fast as possible to set up camp and transport the gear up the bank from the canoes. The kids always helped with some of the packing and hauling gear to camp and back to the canoes, but this time they were truly needed and they knew it. They were already wet from their swim and shivering from the cloudy skies and wind. Lightning lit up the sky and we felt the first drops of rain. We

were in the tent in less than ten minutes. That's when a sudden blast of wind ripped the fly right off tent.



Renee and I rushed outside as the rain started pouring down, and we tied a tarp over the tent to keep it dry, but soon discovered that the tarp was no longer waterproof, and the rain was still coming through. We rushed back out and reworked the tattered fly and fixed it up over the tarp. We were soaked by the time we got back into the tent, but that was just the beginning of the storm.

So much lightening flashed across the sky outside just as it was otherwise getting dark, that it made a strobe-light effect inside the tent. We counted after the flash, "one-one-thousand, two-one-thousand, three-one-thousand, four... until we heard the crack of thunder. I always thought the distance was a mile per second, but Renee later read that the number of seconds should be divided by five to get the right distance. If there is five seconds between the flash and the thunder then the lightening was just a mile away. It was even closer than we thought and moving closer. The kids huddled in their sleeping bags on the floor as the wind whipped the tent back and forth and Renee and I tried to hold it together from inside.

Finally there was a brilliant flash of light and simultaneously a crack of thunder so loud that I instinctively dived for the floor. That didn't help the kids, and Felicia started wailing, sure that we were all about to die!

Eventually the storm subsided and we all went to sleep, a little damp and a little exhausted, but still alive. We awoke to a partly sunny day and took some time to dry out before packing and moving on. We were pretty lucky with our placement of the tent. Most of the ground around us was an inch or two deep in standing water and muck. Cassie found a rattlesnake curled up under a sagebrush, also drying out.

We might have stayed there longer, but it was evident that the afternoon would bring yet another storm, and we wanted to be ready for it. We looked for blackened trees nearby that might have been struck, but saw no evidence at all. Another group of floaters passed down river as we packed. They had a stream running through their tent in the night. We were on the water shortly after them. The water was as thick as mud. We were using it for cooking, but now it was just too soupy, so we cooked with our jugs of clean town water for several days.



Most floaters on the Upper Missouri go only as far as Judith Landing, after seeing the spectacular sandstone cliffs around Eagle Creek. There were fewer people and more primitive camping facilities as we continued downstream into the badlands. But the badlands are quite stunning too, and consistently so, for most of the sixty miles down to James Kipp Recreation area.

We covered 11 1/2 miles that day to stay at another Lewis & Clark campsite. There were many rapids in this section, so we moved along quickly. We crossed under the cables of a ferry, still operating as a free service to haul anyone across the river that comes driving down the dirt road.

The kids had a good swim at camp, then spent most of the afternoon playing in a fallen tree. We found another rattlesnake in the sagebrush. We used up most of our fresh foods during the first week, so Cassie cooked up a batch of ashcakes over the hot coals. We had some after dinner, but saved most for lunch the next day. Through part of the night we sat up once again, trying to hold the tent together in the wind and rain, hoping the cottonwoods overhead would not break off and fall on our tent.

On day nine we awoke to mostly sunny skies, and we needed it. All our gear seemed to get more and more damp each day, so it was good to put it out in the sun to dry. The kids were playing war, shooting each other with laser guns from handy branches all over the ground. Renee and I were right in the middle of all this, but I guess we were out of phase and therefore safe. I don't think there was ever a moment on the trip when they were bored or didn't know what to do.

But Renee and I were exhausted from all the packing and unpacking and taking care of everyone and especially from holding the tent together through those night time storms. I think the kids were ready for a break from paddling too. We decided it was time to find a more primitive camp and stay for a couple days. We traveled twelve miles down river, looking for good campsites along the way. But those sagebrush flats that looked bone dry

from the river were more like sagebrush swamps with an inch or two of standing water and mud all over the ground. We feared that we might yet get eaten by bugs hatching out from all the stagnant water before we finished this trip.



We found a lone cottonwood tree that was high and dry, with an established fire ring below it. For fear of lightening and wind, we pitched the tent a safe distance away from the tree, surrounded by tall sagebrush for protection from the wind. As usual, the kids started the fire with flint & steel. Overhead there was a nest of yellow-breasted chats. The young were pining away for food and the mamma kept bringing it as fast as she could.

I swore I would always take good care of my back, using good form at all times to avoid injury, but I did one dumb move while emptying water out of the canoe and felt something pop in my back, and then pain. I feared that I had ruined my back for life, like so many other 30, 40, and 50 year old men I have met. But I rested for most of the afternoon and the next day and felt much better.

Fortunately, all of our injuries on this trip were minor. Felicia had a scratch on her leg that opened up and got infected after she spent several days continuously in the water. We soaked a rag in a tea of sage leaves and strapped that on to her leg for part of the afternoon. She said it hurt, but her leg was looking much better by the morning. My feet also started to "rot" after being wet so much. A colony of bacteria were literally eating the skin right off the bottom of my feet. Sage leaves in my shoes killed the bacteria, but also turned the bottoms of my feet all yellow.

Sage leaves make good toilet paper. It is best to avoid using real toilet paper in the backcountry, because it makes such a mess. Most people are not very receptive to the idea of giving up toilet paper though, so the public agencies advocated burning it for awhile. However, there have been many wildfires started by people trying to burn up the t.p., including two fires along the Upper Missouri just this year. These days people are asked to just bury the toilet paper. We didn't bring any toilet paper, so at least one aspect of the trip was truly primitive. The sage leaves also make a good disinfectant to kill bacteria on your hands after a potty break.

The kids brought a deck of cards and started playing a game Jeremy knew called Egyptian Rat Screw. I learned it too. It is a pretty good game. We also played Casino.

A giant moth landed on Renee, and she screamed, not knowing quite what it was until she got a good look at it. We set it carefully on some sage, but it didn't seem too happy there in the sun, so we moved it to a branch in the shade of the cottonwood and watched

it all afternoon until it disappeared at dark.

I awoke early and took the camera up into the badlands. I found an easy route to the top and took a few pictures. In this place the tops were green with junipers, ponderosa pines, and lush grass. There were many birds and deer. I could not find a safe route back down though, and finally had to follow my original trail back to camp.



For our day off we mostly played games. The kids played war again, until it started becoming less of a game and more like the real thing. Then we all joined in a game of capture the flag. It was difficult sneaking back and forth in the sagebrush through the mud and cactus in broad daylight, especially not knowing if we might crawl face-first right into a rattlesnake. After more than an hour of play, Cassie captured the boys flag, just moments before I would have gotten to the girls flag. The kids wanted to continue their stalking skills, so each of us took turns playing deer, with everyone else stalking up to see how close they could get.

We also brought along some sheep wool for felting projects. Jeremy made a felt ball. Felicia and Cassie made potholders, but the wool wasn't felting together very well. Possibly we did not have enough soap in the mix. I made a felt bomb at Donny's request. The day was dry and warm and not too hot. It was nice to dry out a little.



After a day of rest we had the ambition to put on some miles. We put Felicia, Cassie, and Jeremy together in the red canoe, to give them a chance to work together. Renee and I and Donny drifted along in the green canoe. We watched as the kids paddled back and forth and back and forth across the river. If we did not paddle at all, then they could almost keep up with us. But I think they learned something about working together. Seven miles downriver we stopped near an old homestead for a lunch of summer sausage,

crackers and cheese.

The day was very hot and all that stagnant water seemed to just disappear, leaving

ground as hard as concrete. After lunch we explored the old cabins, which have been fenced in to keep the cows out. We made a big circle on the way back to the river, but by then the kids were all wilting in the heat. Both Cassie and Donny were turning bright red. We got them to the water as quickly as possible to cool them off.

We switched seating arrangements and paddled into the evening. I gave Felicia a turn steering in the back of the red canoe. I gave instructions from the front to help her along until she got the knack for it. We covered a total of sixteen miles by the time we reached the Lower Woodhawk campground, just as another storm was brewing. But this storm never materialized. There were a few mosquitoes and biting flies at this site, but certainly within tolerable levels, especially after the kids started a smoky fire to keep them away. It was nearly dark when we ate our meal of tuna casserole. Afterwards we went straight to bed.

On day twelve we moved a little slower. I guess we paddled so hard getting to Lower Woodhawk that we were ready for a break. We cooked pancakes over the fire. That worked much better than our last attempt on the propane stove. The morning was intensely hot. We let the kids go swimming for a "few minutes" to cool off, but then we let them stay out until they were sunburned. It didn't take long in that hot, hot weather.



Finally we packed up in the afternoon and headed downstream. Cassie steered the red canoe with me in front and Donny in the middle. She seemed to have a real skill for it.. However, it was so hot that we just couldn't stand to be in the canoes. Getting wet only helped for a few minutes. After only five miles we got off the river into the shade of a cottonwood tree and set up camp. We had a fancy French vanilla-scented hand and body lotion and used it on everyone's sunburns. In the hot wind our whole camp smelled just like a cake ready to come out of the oven. After the trip we heard that the temperature was more than 100 degrees that day.



When the sun disappeared behind the clouds we allowed the kids to go back into the water to cool off. Jeremy discovered many, many mussel shells living in the mud near shore. All the mussels stood on end, half buried in the mud. I had no idea they were so acrobatic! There would have easily been enough mussels there to feed all of us, but mussel populations are at risk in Montana due to agricultural runoff, so it is illegal to harvest any.

A storm threatened overhead, but passed by with only a huff of wind and no rain. A second storm came in the night and kept Renee and I up until dawn. There was no rain, just wind. It blew and blew and blew, but we were too lazy now to get up and hold the tent together, so we just laid there wide awake and hoped for the best. As is often the case, the last gust was the strongest. It came right at dawn. Two of the fiberglass rods shattered into tiny splinters, collapsing the tent, and that was it, the storm was over. We wondered why we hadn't just collapsed the tent on ourselves hours before. Then we might have gotten a little bit of sleep!

We were ready to leave camp the moment the storm ended. We could see another hot day was looming, so we wanted to finish our trip and get off the river before it got to hot. The kids played inside the flattened tent for a few minutes, then we loaded everything up as quickly as possible and paddled downstream just as the sun was coming over the horizon. There were thirteen miles to go to get to our end point at James Kipp Recreation Area, and we wanted to get there in record time.

Jeremy, Donny and I took the red canoe, with Jeremy steering from the back. We activated our secret weapon, the felt bomb. Soon we were engaged in a full-scale battle, paddling up on the girls canoe at warp speeds and launching our water-soaked ball of wool at them (it was really a photon torpedo). Then we had to use evasive maneuvers to get out there before they launched the bomb back at us (it was an environmentally friendly warhead, 100% recyclable). Unfortunately those girls have good aim, so we took some bad hits, but we went a few more rounds with some phaser fire (paddle splashing) and a few canoe rams. We covered eight parsecs of galactic space in record time without anyone realizing how hard they were working! Finally, when everyone was hot and ready for a break, we launched our reserve missiles.



That would be Donny and Jeremy cannon-balling out of the canoes into the river.

The last five miles were a piece of cake, and we made it into camp before noon. Speaking of cake, this was also Felicia's eleventh birthday, so my mom met us there later in the day and brought cake and ice-cream and presents. Wow! What a way to end a trip!

Renee and I made the four hour trip over to Judith Landing and back to get our car. We were very tired when we made it back to the group at 11 pm, after getting essentially zero sleep the night before. On Saturday the fifteenth we tied the canoes on the cars, loaded up all our gear and headed for home. On the way Cassie confided in Grandma that she was sorry the trip was over with. That's kind of funny, because she complained the most about going on it before we left!

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Thursday November 30th - Monday December 4th, 2000

Jeff's Camping Journal

**A Wildlife Sanctuary in the Land of Cold:
Primitive Camping Along the Jefferson River**

This past weekend, I ventured on my second ever winter primitive camping trip. My friend Tom Elpel and I journeyed down near Harrison, Montana on the Jefferson River to an area rich with wildlife and abundant with natural resources--even at this time of year. Tom has been practicing primitive outdoor skills since he was a kid. Many of his skills revolve around wilderness survival in adverse conditions and trying to stay comfortable with little gear on one's back. More importantly, they revolve around one's participation and awareness in nature. In the sense of awareness, these trips are very spiritual for me--the wilderness, plants and wildlife are my cathedral, my church and my scripture.

Primitive trips are always very challenging because one brings very little gear along. Imagine camping without a tent, sleeping bag, matches or lighter, and without much food. That would be difficult in itself. Now, try this in winter! The challenge with winter primitive camping is that one spends a lot of their time trying to stay warm and find/prepare food. To make matters more interesting, there are only about 7-8 hours of daylight to work by and impossibly long nights. I knew from my first trip of this type back in February that this would be a hard trip.

The area we were to camp in is located in some fairly remote hills bordering the Jefferson River between Butte and Bozeman. Lewis and Clark went up this stretch of river in 1805 on their historic journey across America.

Expecting temperatures between about 10 and 35 degrees, we each armed ourselves with some warm clothes, one wool blanket, some primitive fire making tools and a few utensils. We had little food, no sleeping bags, no tent, no fancy equipment and about four days and night to enjoy (or suffer through!).

My wife Becky dropped us off along the side of the highway in the dark. We were in the middle of nowhere with gentle hills on all sides, no houses anywhere and lots of empty, snow covered fields. We walked a couple of miles on the train tracks until we came upon the Jefferson River and into a swampy area. It was pitch black with no moon and we constantly heard wildlife scurrying as we approached their hiding spots. Several deer bounded across a field and many ducks took off from a spring-fed pond on our right. We eventually veered off the tracks and into a seemingly forgotten niche of ponds, cottonwoods and willow thickets, plus a little canyon full of juniper trees, sage and rock.



The two of us walked up into a little canyon in the dark looking for a campsite. We decided upon several spots. The spot we finally choose was near a cliff face and under a mountain mahogany tree (*Cercocarpus ledifolius*) which provided some minimal shelter from any precipitation. I started a fire with a bowdrill set (by wood friction) on some bare ground and then we stoked it until it grew to sufficient size. We each stretched out in our blankets on a bed of surprisingly comfortable rocks and tried to sleep with the fire warming us. The temperature was less than twenty degrees and was fine when we were walking, but started feeling cold as we lay still to sleep. I was wearing five layers of clothing on the top half of my body including thermal underwear and three layers on my legs including some Chinese Army wool pants leftover from the Cold War. I had two hats on my head.

As I fidgeted in and out of sleep that first night, trying to stay warm and feel my frozen feet, I wondered what the

hell brought me out on these trips. Why did I take my weekend and a vacation day to suffer this discomfort? For one, I felt that I needed to get back some inner purity and quiet into my life. I was weary from office politics, Florida's 'Electile Dysfunction' and other things busying up my mind. Another reason perhaps could be found in my memories from nine months ago on my first winter camping trip of this sort. (see [Missouri Moonlight](#).) I remembered that first trip, when four of us including Tom (who was now asleep on his rocks, lucky guy) walked from Canyon Ferry Lake about 40 miles south to Toston. On that trip, I had been ready to walk out after a day or two and hitchhike home. I had felt that I couldn't take the cold and hunger that these trips impose on a person.

Before quitting that trip and walking out, however, I had broken down and cried my eyes out. After crying, I had felt instantly better and greatly enjoyed myself the rest of the trip. I had broken through my comfort barrier and realized that the cold and hunger I felt were mostly psychological as opposed to physical. It is true that one is out in the cold and does not eat much food on these winter trips, but one also finds that discomfort is a very relative thing, often conditioned by expectations. If we make \$50 K a year, we want more. If we have two cars, we want three--even though most don't need these things. Breaking through that comfort zone of mine back on that first trip and letting myself be a bit hungry and cold was one of the most powerful experiences of my life and made me stronger back in my daily life. It was also powerful to gain such a strong connection to nature that comes when one is living off the land. That trip nine months ago changed my life and really encouraged me to start looking at everything as holistically as possible. It also increased my love of the outdoors. I wanted such an experience again on this trip. That was why I was shivering on this pile of rocks in Nowhere, Montana.

As I shivered next to the fire, I really wondered if the same powerful experience would happen this time and if it would take two days to 'break through that comfort barrier' like it had the first time. A few hours later with a couple hours of fitful sleep, I finally got up and walked around. Tom joined me and agreed that we needed to eventually find warmer shelter than an exposed pile of rocks and small fire! We walked around some more until the morning light finally came up. At this point in December, there are about 13 hours of pitch black in Montana and 7 hours of true daylight. Even then, the daylight is pale, the sun very low on the horizon, and the air still chilly during the day.

As the sun rose, we ate a breakfast of gruel (oatmeal-type stuff) that I had brought and moved our gear about a mile down the canyon away from the train tracks and river. Being a bit hungry, any food we ate tasted good. Gruel was gourmet. After moving our gear, we went back down the canyon towards the river to practice some primitive hunting. We fashioned spears out of willow branches using our pocket knives. We found ourselves in some cottonwood trees in a fairly rich area for wildlife and plants. Tom has been to this area several times before, so he knew what was here and showed me some previous shelters he had stayed in. One shelter he had stayed in was a ground cavity under a huge fallen tree with some tree bark to cover the back end and some brush to hide the shelter opening.

In the cottonwood trees, we walked towards the river and identified the tracks of coyote, bobcat, pheasant, various birds, raccoons, deer (of course), and finally porcupine. We had decided to hunt porcupine and find ourselves a meal. Tom tracked some prints into a thicket which produced nothing. He then tracked the prints into a smaller thicket of bushes and sure enough, there he was trying to hide. Tom pinned the porcupine with his willow spear. By this time, the creature had his quills straight up, so we kept our distance. As Tom told me to jab my spear into its side, I felt sick because I have never hunted before. Still, I went around to the side



of the little guy and stuck my stick into the critter's side. He shrieked as I and Tom kept sticking our spears through him. Tom finally pulled him out into the snow from under the thicket and finished him off with two thrusts to the heart. Each time, the Porcupine would curl up his little furry body to try and avert the blows which made me feel bad for doing this. I thought of our cats at home! On the other hand, we said thank you to the animal for giving up his life and planned to use him for a meal. To me, that is hunting with respect.

That afternoon, Tom and I found some bare rock by our first shelter and sat warmly in the

sun, knowing that we should cherish the few short hours of day. I started making some natural cordage (twine) out of dried stinging nettles and then helped Tom skin Mr. Porcupine. Skinning him involved dealing with skin, blood, guts and Porcupine shit as we cleaned him out. The awful smell from its punctured gut was something I will never forget. We decided that our dinner needed some further cleaning before going over the fire.

So, we walked back down the canyon to one of the spring-fed ponds by the train tracks and washed our kill, and collected some veggies and roots for our dinner meal. This included cattail roots and some green Watercress that was still growing in the winter cold pond water! In fact, there was an amazing amount of life living in this area during a cold Montana winter. We saw snails in the water, looked for fish, saw watercress growing, and watched a sandpiper in the pond edge. There were birds and ducks everywhere. Part of the reason for this is that the surrounding ponds are fed by warm springs that stay ice-free year long. Suddenly, a train rolled right by us probably without seeing us as we were below the level of the tracks down in the cattails. We brought our 'loot' back to camp to cook.

We took the coals from the still smoldering fire at our first camping site and started cooking dinner. Our dinner consisted of all natural things we collected, including roasted Porcupine stuffed with Watercress and roasted cattails roots. We boiled the legs and arms of the Porcupine in a stew with cattail shoots and watercress. After cooking, the cattail roots were eaten by peeling off the blackened skins and taking the stringing insides into one's mouth and pulling the starch off. The porcupine tasted like pork with a gamy aftertaste. It was a good dinner! What interesting new tastes! One appreciates what they eat after having to collect it, prepare it and cook it. Our food today in supermarkets is so convenient, plump, big and artificially flavored that we just shove it down our gullets often without thinking. I know I do. In nature, everything is smaller with more bones, work, etc. and one really gets into the process of eating and savoring.

We walked to the second campsite further up the canyon and I started a flint and steel fire with some help from Tom. I took a steel file and forcefully hit it on the sharp end of a quartzite rock creating sparks. A piece of charcloth was set on the rock with my thumb in order to catch a spark and light. Once a steel spark caught the charcloth on fire into a slow burn, I took the smoldering charcloth and stuffed it into a bird's nest made of cottonwood bark. I blew the charcloth coal in the bird's nest and it began to catch the nest on fire as I blew. The key was to get the nest to ignite into flames. Once the nest ignited, the next step was to put small kindling twigs on the flaming nest bundle to catch them on fire and then increase the size of kindling like any other campfire. Twice, my bundle ignited into flames, only to die again and finally go out. I grudgingly tried a third time with a dried grass bundle and got it.

This evening, we were going to try to make coal beds to sleep on. The idea of a coal bed is to dig a trench several inches deep into the ground and about 6 feet long or as long as one's body. Then, a fire is built the entire length of the trench and is kept burning strongly

for two or more hours. Finally, one fills the trenches back in with dirt to put out the fire, and the surrounding ground has now been heated up after several hours of fire. A poncho or some type of air seal is put down over the filled trench, and the person lies wrapped in a blanket on the poncho and a second air seal goes over the person--usually the other half of the poncho. In this way, heat radiates up to the person from the ground for the whole night, hopefully. The trick is to keep a six foot long trench fire going for two hours so as to generate enough heat. However, one must make sure the ground is not too hot or else they might set themselves, their blanket and their poncho on fire. I almost gave up keeping my damn fire going at one point and Tom helped me out. He is good at sensing other's frustrations!

Building the coal bed, I was getting increasingly frustrated with this trip. I knew that I had to break through my comfort zone to enjoy the trip and knew it would take some time, but I was really tired. Twenty-four hours into the trip and I had not broken through yet. I was lacking sleep from the night before, pretty hungry, getting cold, dirty and wanted to be back on my normal daily schedule. I was also dreading sleeping during the long, cold night and waking up cold. Why was I so dissatisfied with this camping trip when this is what I had intentionally asked for?

We finally got our coal beds ready and bedded down. Immediately, my top was too hot and my feet were freezing. Here goes another sleepless night, I thought. About five hours later, we both woke up cold because our beds had lost most of their heat. So, we took a hike simply to warm up. We figured it was about 3 a.m. when we started hiking. During this trip, we used the constellation Orion as kind of a clock. Orion was about halfway down the horizon to the West so we figured it was about 3 a.m. We hiked up to some surrounding hills and warmed up. On top of a high hill, we saw the lights of Three Forks off in the distance and several meteors.

Back down in the canyon after our hike, we waited until morning. We took it easy Saturday morning, and cooked some ashcakes right on the fire. The cakes were made out of water, white flour, crushed pigweed seeds (*Amaranthus* spp.), crushed bitterroots (*Lewisia rediviva*) and reed-canary grass seed (*Phalaris canariensis*). To drink water, we took our cups and scooped up snow. The snow-filled cup was then put near the fire and heated up until the water was warm or boiling. As this took a while to do, even getting a drink of water was a chore. Dammit all! AHHHHHHHHHHHHHHH! I want to go home.

The ashcakes were quite delicious along with the trail mix I had brought along and I felt a bit better. I think we also had some rice and lentils for breakfast boiled in our cups. I would have eaten anything at that point--roadkill, tree bark, whatever! Not only did we eat little, but we were exerting a lot of calories staying warm and hiking. I kind of rested in the morning and Tom went off to hunt. Going to the bathroom was hysterical, especially with snowball and dried grass toilet paper. I ended up getting snow and grass stuck up my ass. That afternoon, while Tom was tending fire, I took a hike. The sun had gone behind a cloud as had my mood again, because our precious few hours of warm daylight were

being taken from us.

I started practicing my speech to Tom about how I wanted to end the trip that afternoon (a couple of days early) because my body temperature seemed to be so hard to maintain out there. An alternative speech to Tom was to tell him that maybe we could at least build a better shelter the remaining two nights so that we wouldn't have to freeze. I just did not want to face another long night being cold! With that said, I vowed to talk with Tom about my wishes and then began to release my annoyance with constantly being uncomfortable.

I took an afternoon hike up to some surrounding lonely hills and I noticed a brightening in my mood. After another potty experience, I eventually made it back to camp. I amazingly ended up pottying at the same tree I had earlier as evidenced by some previous disgust piled near the trunk. Tom and I agreed to set off that night for a new site about six miles away to a place where he had built a wickiup shelter that might be warmer (I hoped).

First, however, he wanted to show me something in the area before leaving and we walked down to the river. We followed the train tracks and passed between two sheer cliffs attached to two mountains that rose abruptly out of the landscape. Along the way, we identified all sorts of animal tracks. The train tracks were like a super highway for coyote, bobcats, raccoons, birds, pheasants, rabbits, deer, etc. It was an animal tracker's dream. We finally came to a place where warm water spilled out a pipe from the side of a mountain. We toweled off with the water and I was feeling better. Tom saw some animal scat (poop) and asked me to identify it. After a few guesses, I arrived at the right answer-- a bird that had eaten a lot of juniper berries.



Before we headed back toward our new site several miles away, I spotted a rabbit on a pile of rocks. Tom chased it, following its tracks into a big bush. He asked me to get some rocks to kill it with, and by the time I did, he had a dead rabbit in his hands. He had cornered the rabbit in the bush, hit it in the side with a rock and then grabbed the stunned rabbit by the hind legs and smashed its head on a rock. We thanked the rabbit and took it along for a future meal. Some of you reading this

may feel that our killing of small game was cruel, but remember that we used these animals for food, gave them the utmost respect and thanked them for giving their lives. Whenever you eat meat or veggies or breads, some living thing has died to fill your gullet. Plants and dinosaurs died a long time ago to put gas in your car. It is a part of life. That is why we should each give thanks before a meal to the things that died to provide it. And,

we should use what we kill and not waste it.

By the time we got our gear around and set out for the new site, it was almost dark. "Only 13 hours till sunrise", I joked. We walked to the highway and rested under the bridge. Tom and I confided in each other that it was often hard to find male friends of our age (around 30 years old) that had the same interests as we did. We agreed that our friendship had really started to develop in something beyond just learning these outdoor skills. We could talk philosophy and discuss personal issues without feeling embarrassed. We each have wives and Tom has three kids (with number four due soon), but both of us really feel the need to hang out with men in a deeper way that just drinking beer, lighting farts and watching football (although I appreciate all three of those activities). I think fondly of the Men's Club I have joined in Helena, where several men hang out in a ritualistic and supportive environment doing activities from meditation to drumming to outdoor activities to singing, etc. (where one doesn't have to hear another male call you a "fag" or a "pussy" if you divulge something sensitive or show emotions--This is the male bonding I often had to endure).

By the time we left the bridge and continued to our new site, I knew I had FINALLY broken through my psychological comfort barrier. I really felt alive and was enjoying myself, now, without feeling cold or hungry. It took about forty-eight hours from our initial drop-off to reach that good state. Yup, about the same time it took on that first trip back in February--two days. This good feeling is why I chose to endure the discomfort. The feeling is one of always being in the moment with a very clear mind and almost no distraction or schedule.

We continued along the river about five more miles until we got to an abandoned house in a grassy field surrounded by hills. Along the way, we stuffed our clothes with dried wild rye grass for insulation (in order to endure the cold night) and walked the rest of the way to the shelter looking like over-stuffed scarecrows. I got very tired and barely made it into the shelter.

The wickiup shelter was hidden well in a thicket of willows and clematis vines right near the river. It was built with old boards from the abandoned house stacked up in a tripod, like a wooden teepee. We built a fire and slept fairly well in the wickiup until the early morning. Although I slept better, both of us still had cold feet during the night and we figured there were several leaks in the wickiup wall causing this. One of the discomforts with primitive camping is that one constantly is inhaling wood smoke. My throat was getting a bit sore in the wickiup after three days of inhaling. However, the heat and great aroma was worth it. Tom suggested that we not burn too much cottonwood, as that smoke is more irritating.

The next morning, we ate more ashcakes with some instant bean dip mix. It was great. We also polished off the trail mix. We spent the third day of this trip shoring up the shelter with old wood from an outhouse and plugging the air leaks with dried grass, bark , etc.

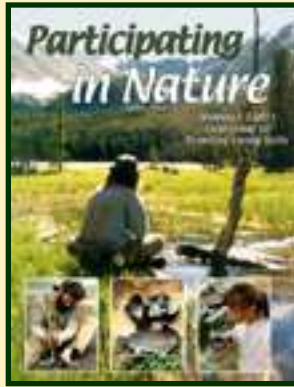
We collected cottonwood root along the river to make bowdrill sets (to start fires). Tom cleaned and skinned the rabbit and we collected a lot of firewood for cooking dinner and to get through the last night out of the trip. As the light faded, we ate a dinner of rabbit and rice and lentils. The rabbit meat was delicious and tasted like top quality chicken with some other flavor I couldn't place. That small rabbit filled both of us with a surprising amount of meat! No wonder the World Health Organization said that raising rabbits could solve world hunger.

Although I am mostly vegetarian, I really like wild meat that was hunted by someone. It tastes better, is not pumped full of chemicals and is very humane in that the animal was free right up to its death. The food we were eating was so natural and nutritious the past few days, that my belly burned a bit from its high nutrition. That night, both Tom and I hiked back to the spot with dried grass and re-stuffed ourselves. We also collected straw to put down on the ground to insulate our bodies. We slept quite well that night, our fourth night, waking up at about 4 or 5 a.m. to pack our stuff and start walking towards a different road where Tom's wife Renee would pick us up later that morning. We followed a spur of the railroad track through some beautiful country, talking about some projects we were working on at home, plus joking about the elections. We finally arrived at our destination point, and we both slept in the sun until Renee drove by and picked us up.

After this trip I felt that I could walk back into my daily life with a renewed sense of energy and hope and that I could better accomplish my goals from the persistence I gained. I discovered a lot about how I learn and what my main obstacles are to achieving what I want to achieve. I felt refreshed after the trip and anxious to jump back in to life as I sat down to a large meal at Tom's house. Tom and I then drove to Helena.

That night, I had to lead a Helena Outdoor Club meeting where Tom was the featured speaker. I had to change from 'bushman' mode to public speaker mode, and was very overwhelmed. It didn't matter. Over 50 people showed up to hear Tom's great talk and he referred to our trip several times, selling some of his books there. Through the last four days I had been used to quiet and focused attention on simple activities and now people at this meeting were asking me questions and moving/talking VERY quickly relative to our camping trip. At one point, someone asked if I had heard about Gore's latest appeal to the Florida Supreme Court for re-counts and Bush's reaction. I smiled back and said, "today, I don't really care".

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Missouri Moonlight
Tom's Camping Journal
Thursday February 17th - Tuesday February 22nd

Renee dropped us off on the snowy road. We said our good-bye's and she drove away, back home. The rest of us, Mike, Barb, Jeff, and myself, put on our pack frames and immediately started looking for a place to make camp. It was only about 11 o'clock in the morning, but for us, that was bedtime.

I truly expected to go on this camping trip by myself. After all, who else would want to go on an expedition in the middle of February in Montana, walking at night and sleeping by day, with minimal gear and a weird diet? We planned to travel in light hiking boots, or warm tennis shoes, but I also promised to cancel the trip if severe weather, deep snow, or frigid temperatures came just before hand. I was surprised to have three people eager to go with me. Fortunately, we were lucky and the weather was beautiful all week long.

This was an unusually warm winter, even warmer than all our other recent warm winters. The temperature never did drop below zero all season long. That could be a first in recorded history, I don't know. The temperature rarely even dipped into the single digits, and thus far, we only had three snow storms of any substance all winter. The first part of this camping trip was the coldest, with night-time temperatures in the teens, but before it was all over we stripped down to T-shirts and even went barefoot around camp.

Our starting point was the Confederate Campground of Canyon Ferry Lake, a man-made reservoir created by damming the Missouri River. We explored through the woods along the creek bottom where Confederate Creek spills into the lake. The ground was still covered in patchy snow from a recent storm, and most of the bare ground was sopping wet, but we did find one warm, dry space on the side of a hill, tilted at just the right angle to the sun. We called it "camp" and spread ourselves out in the sunshine to nap. Despite walking only a quarter mile, we all needed to rest.

Jeff arrived at our house early in the evening the day before, but Mike and Barb's flight was delayed. It was 1:30 in the morning when we finally got home from the airport and went to bed. We were up by 6:30, awoken by the kids' alarm clock, as our girls had to go to school. So we started our journey with less-than adequate sleep, considering we planned to stay up and hike all the next night. Mike and Barb easily fell asleep and napped for hours in the sun, but neither Jeff nor myself proved to be very adept at sleeping in the day time. Mike shared this passage from his journal:

"I lay back against the hill and tried to suck up sunlight like a fleshy solar panel in pants. Patches of snow spot the palomino hills with white and the only sound is the ringing in my ears left over from too many months of freeway frenzy and hurrying cities. I bite into a dumpstered pear and reflect on how far my life has come in the last twenty-four hours. Yesterday, the pear and I were being wasted. We were both unwanted and

unappreciated. I don't belong in LA or airports. My existence and everything I stand for seem to sicken some. That's all right because the feeling is mutual. Here, however, I sense that I am welcome. Cottonwood and juniper greet me with out-stretched limbs. Here the pear tastes sweet and I am grateful for each gritty, juicy bite."

I always debate whether or not to bring blankets on this sort of trip, and this time it seemed like a good idea, for three reasons. First, it is hard enough to sleep in the day time if you are not used to it. The blanket is a small luxury that makes it much easier to snooze when everything else is so unfamiliar--such as sleeping in the sun on the side of a hill in the middle of February. Second, three of our blankets had a slit in the middle to poke our heads through, so they could be worn like a coat while we hiked at night. We would cut a slit in the fourth blanket too, if necessary. Third, these simple blanket coats did not make much extra weight in our packs, since we traveled mostly at night when we were wearing just about everything we had.

We stayed on the side of that sunny hill all that first day, right up until the sun dipped below the horizon. Immediately the temperature plummeted, and we could hardly put on our other layers fast enough. We bundled up our gear in our arms and carried it into a nearby ravine. I'm not sure, but it seemed to be an old irrigation ditch originally designed to take water out of the Missouri River to nearby farm lands. The ditch may have been only five or six feet deep originally, but apparently a breach in the ditch led to a major washout, creating an extended section of artificial ravine roughly twenty feet deep, now occupied by twenty to thirty-year old cottonwood trees, small junipers and a carpet of grass.

We moved into the ravine for protection from the wind and made a temporary camp on a patch of bare and dry ground. Like our previous space in the sun, this spot was dry because of its angle to the sun. Although it was steep, I chose it as a potential campsite because we could have a good-sized fire there without killing any grass or other living plants. Besides, we didn't plan to stay there long.

With crude sticks we dug out a trench on the slope, then started a fire with flint & steel. One thing I always enjoy about these trips is that I don't ever have to start the fire, since everyone else needs the practice. Starting a fire is usually either a race to see who gets it first, or a cooperative group effort to get it before everyone freezes their fingers off. It is an excellent way to learn fire-building skills, by working in a real-world situation to get warmth from the available tinder and kindling materials.

Camping on the steep slope was hardly comfortable, but we melted snow in our pots and made tea. Making tea is probably the most important activity of each day, since otherwise it is hard to drink enough cold water to stay properly hydrated in the winter. Mike tended the fire while the rest of us walked out into the moonlight to pick rosehips for our tea. Jeff brought along a schedule indicating when and where the new space station could be seen in the sky, so we got to see the little blip of light racing across the southern sky for

all of half a minute. He later shared this entry from his journal:

"It is funny how this trip is not what I envisioned. As Barb just said, one has to get used to discomfort (e.g. cold, hunger) out here. Despite the discomfort, I feel that this is very important for me in some way."

We brought two large enameled cups to cook in, plus my usual stainless steel can and a goldpan for mixing ashcake dough. I also brought a primitive ceramic pot for the first time. I made the pot on the Green River Canoe Trip last summer, but did not have the chance to fire it with the other pots we made. Instead I fired it at home in our fireplace. I was timid about putting the snow-filled pot on the campfire, as I understood it needed to be warmed slowly and evenly, lest it might crack.

After tea we cooked a simple meal of rice and lentils, but my dinner took at least an extra hour to cook in the ceramic pot. It took me a few days to get good at cooking in it. While waiting we went for a short walk to explore the night. Jeff practices and teaches Yoga, so he led us through a series of Yoga exercises on top of the hill. It was awkward doing some of the maneuvers dressed in everything we had, but it was fun just the same. I ate immediately upon returning to camp, then we packed up, reclaimed the campsite as best as we could, and set forth on the first leg of the expedition. Our basic plan was to hike along the reservoir, back upstream along the Missouri River as far as we could reasonably get during the week.

Our first stop was the creek, a few hundred yards away to fill our water bottles. Our tea from melted snow was wonderful, but it is difficult to melt snow fast enough to meet all of our water needs. Some of our water bottles were still nearly full from home, but the smaller ones like mine were already empty.

All of my life I have been accustomed to drinking out of just about any creek, river, lake or other water source I could find, even downstream from cow pastures and towns, but other people have some obvious reluctance to following my lead. I've never been sick from drinking any kind of muck before, but then my immune system is well trained for it too. Nevertheless, I finally acknowledged the times and bought a high-tech ceramic water filter for the benefit of my guests. The threat of Giardia I'm not so worried about, as it can be treated with antibiotics if necessary, but there is also a genuine threat of more serious ailments like hepatitis.

Of course I had never actually used the filter before, so we stood out there in the moonlight reading the directions, trying to get the device to work. My initial efforts failed to produce any water, and I thought I must need a deeper water hole to work from, so I jumped out to a gravel bar in the middle of the creek to reach a better spot. Unfortunately, it was only gravel on top, and everything below was soft mud. That could have been disastrous! I sunk in to the tops of my hiking boots, but got back out before any water came inside. The night was very cold and the water froze to my boots within a few steps

on dry land. I've always heard that the Eskimos did that too. They would dip their boots in water immediately before stepping outside, to cover them with a protective layer of ice. I was very lucky the water didn't soak all the way through. However, Jeff's bag of peanut butter granola mix fell out of my coat into the water and turned to peanut butter goo. We still ate it.

As for the water filter, the problem was that it was just too cold to use it. It froze before we got any water out of it. Jeff brought a water filter too, and we had the same problem with it. Later in the trip on warm, sunny days we were able to intermittently filter some of our water, but we never got to the point where we liked the confounded gadgets. For the moment I just filled my water bottle from the creek, and at last we were on our way. Well, almost.

Our backpacks were the Roycroft-style "A"-frame packs. Mike made his packframe last summer when he stayed with us as an intern. He stayed with us for nearly three months, helping out in exchange for learning about plants and primitive skills. I would have preferred if Barb and Jeff had the chance to make their packframes too, but that would have taken too much time for this trip, so I provided them with some of our extra packs.

With a packframe you put all your gear in a bag or roll it up in a poncho, a blanket, or whatever you have and tie the bundle onto the frame. Learning to tie it tightly takes a little practice as Jeff and Barb discovered. Hardly had we left the creek when Jeff's gear toppled out of his pack onto the ground. We took a break to tie his pack then walked no more than twenty feet when Barb's pack fell apart too! But this time we tied everything securely, and finally, finally began our moonlight walk.

We walked for hours along the shore of the frozen and snow-covered lake. Most of the shore was bare, angled just enough into the sun to melt off all the snow. The rocks clinked like glass beneath our feet with every step. Sometimes we moved up higher onto the grassy fields for a change. Although the trek was relatively uneventful, the night seemed to pass by quickly. We must have used up a large part of the night back at and around camp, and only a few hours actually walking. Time can become somewhat surrealistic after disrupting normal cycles to move by night. We covered about six miles before we stopped. We stopped because we came to an interesting bay of the lake, where a creek came down out of the mountains. The area was thick with brush, old farm equipment, with lots of driftwood along the shore. It seemed like a good resource area, an interesting place to spend some time.

The exposed lake shore is hardly the most ideal place to camp, but we found a good sandy spot with lots of firewood where we could light our fires without permanently scarring the land or killing any vegetation. Immediately we got out our flint & steel kits and started a fire, then we picked up sticks and started digging four trenches for hot coal beds, making a square around the central fire. The purpose of a hot coal bed is to heat the ground to make a warm place to sleep. The fire heats the thermal mass of the ground,

then you fill the trench with dirt or sand and let the heat radiate up underneath you. The sandy beach was frozen, but with sticks and rocks we chipped out shallow trenches, then started fires in each trench. We were no more than eighteen hours into the camping trip, but already this was the third time we stopped to "make camp". Barb peeked at her watch. It was 4:30 in the morning. We hauled a giant log over and plunked it down on the lake side of our camp for a backrest and minimal windbreak.

I've slept warmly through many winter nights on coal beds. Usually we heat the beds for one and a half to two hours, so it seemed a single hour would be more than sufficient to get us through until dawn this time. It wasn't!

In retrospect, I think that the willow wood we were burning just wasn't putting out as much heat as other fuels, or we didn't really burn the beds for a full hour. After all, we were existing in an odd sort of time-warp, making shelters after being out all night. We awoke cold before dawn came and rekindled the central fire. By now I was concerned that my entire group might be ready to up and leave me, and I wouldn't have blamed them if they did. Barb and Mike said the trip was harder than they imagined, and I'm sure it was, especially after flying in from warm California to go camping in the middle of February on the shore of a frozen lake! Jeff later said that he seriously considered walking out. As he wrote in his journal:

"The first day of this trip has broken down the first layer of my habits. These habits consist of things that make me comfortable (for example, eating sweet and blasting my stereo) and routines based largely on clock time (for example, I wake up at 5:30 and have breakfast at 6:30). These habits are obviously very strong, because I constantly think about them today. I really want to eat a big meal, do my usual yoga routine, check my e-mail, etc. but cannot do so."

One thing about hot coal beds is that you have to do some of them wrong to learn how to do the others right. Our initial efforts thawed the sand, so that we could easily dig the trenches deeper and wider than before. We built our fires bigger and burned them longer. We cooked a breakfast of hot cereal while we waited, then covered the coal beds and finally went to sleep, snugly tucked inside a sandwich of warmth from the ground below and warmth from the morning sun above. We slept for hours.

We stayed at this simple campsite all day long. Sleeping, drinking tea, and eating were the highest priorities, as they always are on these kind of trips. We all napped intermittently throughout the day, although neither Jeff nor myself could fall asleep too easily during the day. Everyone in the group except myself brought journals and spent much of the day writing. We also worked on fire-starting skills, mostly building bowdrill fire sets. Jeff recorded in his journal:

"I can see why Tom refers to trips like these as a metaphor for living. As these layers of habit and routine peel away, more of my core self and core issues become apparent."

While this is uncomfortable, there is also a very strong power in it as I live more and more in the moment out here."

The rose bushes in this place were covered thick with rosehips, more than we could ever possibly eat. Rose hip tea was easy and delicious. We also tried tea from Russian olives, but it wasn't very good. The Russian olive isn't at all related to true olives. It is a cousin to the buffalo berry, a shrub native to this area. In Arabia the Russian olives were ground and used in bread, so we did some experimentation with them. The fruits were best right off the tree, but quite astringent. The acid taste really made our mouths pucker up. I crushed some of the gray-sour fruits on a metate, but couldn't break up the seeds enough to use them in any recipe. However, I had a bag of dried chokecherries brought from home, so we crushed those on a metate, then ate the fruits, nutmeats, and shells as a trail food. It was crunchy, but tasty. Two bald eagles landed in a nearby tree.

Winter days are short, especially when we spend a large part of the day sleeping, so it wasn't long before the sun began to set, and we started packing to move camp. We ate another meal of rice and lentils before we left.

The in-flowing creek melted the ice in the bay, but out farther the lake ice was much more solid. There were many people out ice-fishing during the day, so we knew it was plenty strong. We walked back along the shore a safe distance, then took the short-cut on the ice across the bay. We walked through the sunset and into the night, once again plodding step-by-step through the clinking stones of the beaches. We stopped to talk about a few plants in the moonlight, but mostly we just walked. There were many good places to camp behind protective walls of driftwood, where we could have easily made very warm hot coal beds in the dry, stony beach. But the night was early, so we kept walking forward. After several miles we came to the Duck Ponds, a series of massive dikes built on the shallow end of the lake, apparently to create habitat for ducks and geese, although it was hard to imagine spending that much money on habitat development. The dikes were at least twenty feet higher than the lake, and nearly ten miles long, if stretched end-to-end. I wondered if the dikes might have some other use I wasn't aware of. We took the shortest route across, traversing about six miles of dikes. Barb and Mike sang songs as we walked.

One of my concerns before we entered the system of dikes was that we might not find decent shelter until we were beyond the dikes. If we became too tired to walk any farther, we would have little choice but to keep plodding along anyway. At best we found one ample pile of driftwood, but it was completely exposed to the wind. The night was cold, so we could not stop to eat and drink cold water without a fire. We kindled a fire by the driftwood pile and made some tea. For a snack we had pine nuts leftover from my last camping trip, which we combined with the chokecherries we ground on the metate stone. We also had some jerky from a goat I butchered in the fall, plus some gorp-- a trail mix of nuts, dried fruits, and chocolates. Then we continued on into the night. Jeff shared this passage from his journal:

"I can see that the Tao notion of going with the flow really applies out here. Tom Brown himself has said repeatedly not to fight nature but to go with it. I find that if I accept the colder temperatures, they are not so cold. If I accept the hunger pangs, I actually enjoy the fasting and the meals taste absolutely delicious. The best shelters are often already mostly 'built' for us and thus less manipulation of land is needed. It is quite amazing how nature does provide. I would never have thought so before. I saw this same idea in Tom's Direct Pointing book involving Succession and Tilting things the way one wants them to go. In America, we use so much brute force!"

The Duck Ponds consist of three "C"-shaped dikes separated by small creeks entering the lake. We crossed the ice over another bay of the lake to get from the first to the second dike, but had to place a log across a creek to get from the second to the third dike. The straps on Jeff's pack failed there, so we took a short break for some make-shift repairs. Later in the night the group saw three moose, but I unfortunately missed them while trailing behind at the moment. Mike desperately wanted to see a real wild moose when he stayed with us last summer, so he was quite thrilled to finally see some. He wrote in his journal:

"Ours is a frozen world, sparkling like magic in the moonlight. It's a world of solid white lakes which we can walk upon. A world of moose and elk and coyotes. It's a world of feeling--cold toes and warm comforting fire, of fast and famine, of risk and reward."

Soon we were off the system of dikes but getting progressively more tired. Mike laid down on the ground and fell asleep every time we stopped, if only for a minute. We considered hiking all the way through the small community of Townsend before camping, but decided we had better stop as soon as we could find a decent place to camp. Besides, Barb and Jeff were starting to get blisters on their feet. We covered about twelve miles in the night. At last we found a dry space beneath a canopy of Juniper trees beside the Missouri, with an abundance of firewood and good insulative dry grasses. Once again we were making camp at about 4:30 in the morning.

There were many styles of shelters we could have built there. We collected great big arm loads of the tall reed canary grass while we deliberated over which shelter might be the easiest to construct to give us the best sleep with the least work. The most comfortable would have been to build some hot coal beds to heat us from below, with a blanket of insulative grasses above us. But we didn't want to take that much time and the ground may have been too frozen to dig there anyway. Instead we attempted a grass sandwich, with grass above and below us, warmed by our body heat and our shared blankets in the middle. We put ponchos over the top and weighted down the edges with logs to block the flow of cold air through our bed. Our upper bodies were sure to be warm, all mashed together in one bed, but I was concerned about our feet being warm enough. Only later did I realize it may have been possible to equalize the warmth by flipping two of our bodies the other direction, so we would have had our feet warmed by each others' torsos.

I fell asleep in that sandwich bed and thought I slept for hours before we were all awake with cold feet, but more likely it was no more than half an hour. We tore apart the bed and used the grass for insulative mats to keep us off the cold ground. We slept the rest of the night around the fire for warmth. Of course it was only a couple hours until dawn anyway. As Jeff later wrote:

"We were all tired, irritable and very cold and hungry. The sandwich type of bed was not quite adequate for our bottom halves and Mike got up to thankfully start a fire early in the morning. I was not feeling great today and was getting frustrated with fire-making. I finally broke down and really bawled my eyes out in private behind some dried grass. After that incredible release, I took the pressure off myself to master any of the skills and came back to the group where I successfully made a bow-drill fire in just a few minutes. Time out in nature always seems to give me that opportunity for emotional cleansing and release. The other stuff, deadlines, obligations, etc. are not there to get in the way. This feels like a turning point in the trip."

A tasty meal seemed like a good idea to boost morale, so we cooked up a batch of ashcakes, basically thin flour and water biscuits cooked on the hot coals, then spread a thick mush of instant split green pea "soup" on top. We added just enough water to the soup mix to give it the consistency of refried beans. It was quite delicious.

I really liked this place. The trees were covered with a blanket of frost until the sun burned it off. The ducks and geese seemed to favor this stretch of river and I loved to hear them talking in the water or flying overhead. There were many birds here, and I liked to whistle back and forth to the chickadees.

Jeff and I did yoga exercises in the morning sun. We all slept intermittently throughout the day, although Barb seemed to get the most sleep. Mike needed some alone time and spent much of the day exploring on his own. We worked on bowdrill fires and cordage. The challenging part to doing any sort of group workshop is that at any given moment at least one of us was always asleep. In the late afternoon Jeff and I went for a walk to pick buffalo berries. We ate the sweet-sour berries right off the bush.

On our way back to camp we sat down for a moment on the bank of a shallow river channel. At that instant a beaver surfaced nearby and swam in circles and back and forth in front of us. We sat quietly and watched it until it swam upstream and disappeared under water. For dinner we ate rice and lentils again. I guess I brought a lot of those!

On this trip we found that it was too difficult to hike all night only to build our shelters in the predawn when we were the most exhausted. Therefore we decided to switch and build our shelters in the afternoon or evening, to sleep as long as we wanted. Then we would start our hike closer to morning and walk into daylight.

We harvested many more armloads of grass and made an insulated wall of "waddlework"

around the fire. Basically we made a circle of willows in two rows and stuffed grasses in between them, to make a grass wall up to about thirty inches high all the way around the fire. The wall served as a fire reflector to hold the heat in, and we hung our ponchos above the wall to block more of the air flow. We slept on grass mats around the fire. Sometimes the grass would work its way into the fire and flare up, but we all slept "with one eye open" alert even in our sleep to the danger of being burned. Mike was especially good at leaping straight up from his sleep to stamp out any fire that started. I've spent so much of my life sleeping that way that I hardly wake up to beat out the flames. We all slept reasonably well, at least as well as can be expected. The fire hazard was especially great because I had been extolling the benefits of stuffing grass inside our clothes for extra insulation, so everyone was stuffed like scarecrows.

Towards morning we packed our gear, destroyed the shelter, and hit the trail once again. It was almost dawn, and I would have rather moved out sooner, since our trail took us right through Townsend on the railroad tracks.

Based on prior experience closer to home I really expected to see porcupines just about every night out in the brush and fields here along the river. Mike and I made spears the first day and carried them along in order to kill a porcupine when the opportunity arose, but we saw almost no sign of the nocturnal animals at all. We saw only one bush that was gnawed on months ago, and we found the quills of one corpse smashed into the railroad bed, but no other signs of the animals through the entire trip. We still had a sufficient supply of food to eat two decent meals each day, but I would have packed a wider diversity for the trip if I had known we would be so unsuccessful in our hunting efforts. Mike wrote in his journal:

"Tom seems to enjoy starving on these trips. It's an important primitive skill for us suburban kids who've never missed a meal to learn. We eat meager amounts of rice and lentils and skip meals until we can hunt or gather ourselves a banquet. I'm impressed at how quickly my regular activist, subpoverty lifestyle trappings become luxurious. I long for a dumpster to pull food from and my greasy old sleeping bag to crawl into in the cold."

Mike is exceedingly resourceful. Like myself, he grew up in the Bay area of California, surrounded by a meaningless material life. Despite having access to money and college, pretty much anything he wanted, he chose to leave it all behind to live in the "real world". He learned to forage in grocery store dumpsters, not because he had to, but because he wanted to. It is against his principles to support the industrial culture that is rapidly consuming the entire planet, so he forages in dumpsters for most of his food and other necessities. I was constantly amazed when he stayed with us through the summer. Every time we went to town he would load the car with gourmet breads, sacks of flour, blemished fruits and vegetables, and odds and ends like dented cans of pop, all scavenged from the dumpsters. I always thought these goods were being utilized in food bank distribution programs to the needy, but that was not the case. On the way to a summer gathering we stopped at a dumpster behind a bagel shop and packed the car

with more than thirty bags of gourmet, day-old bagels. We didn't have room in the car for the rest.

Anyway, he set his pack down beside the railroad track and bounded off across the street to a grocery store dumpster, bringing back about a dozen perfect sweet potatoes and a five pound bag of sugar. One thing about these trips is that there are no rules except for the ones we make for ourselves, so I thought to myself, "Why not?" It is an easy food resource to exploit to keep our packs light as we travel from point to point.

It was almost light and the traffic was increasing on the road. We had to walk a couple miles beside the road before disappearing into the woods along the river. I was glad to finally get away from the road. At least it was a beautiful morning. Mike wrote:

"Walking along the road, I fantasize for a moment about some benevolent motorist pulling over to offer us a ride. I quickly realize how ridiculous it would be to drive to our week's end destination in a matter of hours. The journey is all we have. The end is arbitrary. It's how you get there that matters. And we'll get there faster, I'm convinced, if we take it slow."

Walking is always a good stimulus for thoughts, especially walking on a trail, a road, or in this case the railroad tracks beside the highway. Jeff wrote:

"My spirits are very high as we walk along the train tracks past Townsend. I am more and more amazed at the things I notice out here. Looking at plants and actually LOOKING at them, their patterns and uses is a divine experience because I interact with them. This type of learning through direct participation/interaction and through a systematic building of pattern recognition is really effective for me. The memorization in most of my education did not give me much to be interested in and thus I did not always learn effectively in school. A teacher of mine about two years ago was working on a similar concept in teaching called Planning and Implementing Instruction which talked about learning at different levels through doing. On this trip, we learn outdoor skills and also learn about ourselves, about the land and about connections between all of these components."

When we finally left the tracks we found ourselves at the edge of a field of beans and wheat. the wheat was mostly gone, but there was the equivalent of hundreds of sacks of pinto beans still left in the field, missed by the harvesting equipment. We gathered both beans and wheat to process later, and we looked at some of the weedy edibles too, like the amaranth and goosefoot plants. We had plenty of goosefoot seeds with us already, which we ate with our cream of wheat cereal and added to our ashcakes. We wandered along the river for another mile or two, looking for a good, out-of-the-way place to make camp. At one point I tried pole-vaulting across a small stream, but my pole sunk deep into the mud, without swiveling over, and down I went into the creek, sinking in up to my shins.

I should point out that my shoes were "Air Jordans", or something like it--fancy basketball shoes picked up at the thrift store for a few bucks. It was an odd shoe for camping, but incredibly well insulated. Even when full of water, my feet were not too cold. I found a beam and placed it across the creek for a bridge for everyone else to cross. Then we hiked onward until we came to a state fishing access on the river, where we could build a fire and spend some time cooking food and drying out my clothes.

Fortunately, this day was not like days past. The sun shone very warmly on us, and by the afternoon we were all going barefoot, at least for a little while. We had a feast of sweet potatoes, ashcakes, and refried beans there by the river. We napped in the sun, winnowed our wheat, wrote in journals, and did a brief plant walk to work on identification skills. We cooked some of the pinto beans and ate those too, before we packed up and left in the late afternoon. We still had to find a place where we could actually build a shelter and camp. We hiked another couple miles until we found a really exciting place full of cottonwoods, willows, junipers, thickets of rosebushes and buffaloberries, with lots of ducks and geese in the water nearby. The place was vibrant and alive and we decided to stay there for two nights.

Barb and Jeff and I camped on the dry ground under a juniper. We dug out three hot coal beds beside each other and spread all our blankets above us for better insulation. We slept warm all through the night. Mike built a reflector out of logs nearby and slept by the fire. The next day was even warmer and more beautiful. We explored the area and worked on more fire starting skills, but mostly the group hung out to cook, eat, sleep and write in journals. The top inch of my ceramic pot snapped off, but it was a clean break and the rest of the pot was still usable. All in all, I was quite pleased with the success of the pot on this trip. Jeff's packframe straps had almost completely deteriorated, so we needed to make new ones from scratch.

In the past we've made the packframes at home and improvised straps from scrap materials on hand, but I had been wanting to try making some decent straps in the field. This was a golden opportunity. We harvested dried out cattail stalks and worked together to cord them together into a thick rope. I've always made two-ply cordage in the past, but for this project we made three-ply cordage, twisting together three bundles of cattail stalks to make a rope. The rope started out and ended skinny, but we made it good and thick through the middle where it wrapped over the shoulders. The rope turned out great, but just a few inches too short, so Jeff still had to sew it on to remnants of the old straps to make it reach. That day he wrote:

"After several days out here, I begin to see how valuable these experiences are. I am more persistent in trying new things, more compassionate and more aware of the others in the group. I see what is meant by addressing one's weakest link, which often for me has been trying new things for fear of failure. Out here, I begin to see the river and tree lines and animal trails as the highways and man-made things as kind of in the way or just sitting there. Usually, major routes to me are man-made interstates, streets and clean,

wide trails. Perspective changes! Have been hearing lots of amazing birds today and noticing how time is so slow out here. It is great when one is living each of their moments in the present."

In the evening we decided it was time for yet another new shelter. We stacked up logs in a square to make a hogan-like structure, about three feet tall, partly shingled over with strips of bark to better hold the heat in. It was snug, but we made a small fire in the middle, sang a few songs, and fell asleep. It was a comfortable shelter, but a short sleep.

I'm not sure if we had some bad water, or if it was just some kind of flu bug, but Jeff woke in the night with serious gas and stomach upset. He later wrote:

"Drank some bad water and puked early this morning. The others got some good entertainment as I swore that I had found religion. With all the cow poop out here, it is a wonder that we have not all been sick. I guess our careful boiling of water has paid off. I am pretty tired out from being sick and still have a bit of the bug. This coming day is our last on this amazing trip. While this six days has not been a vacation in the traditional sense, it has been a vacation in the spiritual sense. I realize now that I sometimes put myself in challenging situations to knock myself out of ruts and habit that can hold one back."

None of us got much sleep that night, but we sang more songs and recited poetry around the fire, before breaking camp and moving out just before dawn. This last day of the trip was especially hard for Jeff, since he wasn't feeling good. Mike was also not feeling so well, and seemed to be running a fever part of the time. He thought it was from the stresses of our weird sleep schedule and our strange diet. Whatever bug Jeff had, I got it too, but not until the next day while at home. It probably wasn't giardia, since that has a longer incubation period. If it really was something we got from the water then it would be ironic, since in all these years I've never before filtered the water until now. Anyway, it was a thoroughly purgative experience, probably as healthfully cleansing as it was miserable to experience... just looking at the bright side, I guess! Barb finished the trip feeling really good.

Our last day was very warm, although it clouded up and rained in the morning. We found shelter beside a massive cottonwood tree and made a fire and some breakfast. Mike experimented with the bones of some nearby dead cows to see what kind of shape the marrow was in. The marrow of the first bones had been completely consumed by worms or maggots that tunneled inside. The next set of bones he tried still had good marrow in it, although there were worms in it too. We cooked up some of the marrow for a taste, but it was less than appetizing. I brought a small vial of vegetable oil, so we mixed up more dough of flour and goosefoot seeds and made scones. We also brought along some dried, candied currants leftover from making jelly at home. With a little water and some of the sugar Mike found, we made quite the delightful treats to celebrate our last day on the trail. By the time breakfast was over, the sun was out and before long we were all

stripped down to our T-shirts.

On this kind of walk we travel with the pattern of nature, in this case following the river, like a thousand generations of our ancestors would have done. Unfortunately such idealism doesn't always mesh with civilization's notion of land ownership and private property. That is one reason to hike at night, when the rulers of the landscape retreat to lighted houses, giving nature temporary reprieve to reclaim rights to the land until morning.

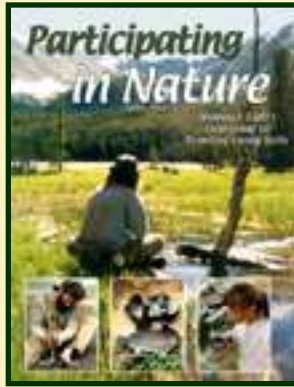
Legally speaking, the edge of the river is state land all the way up to the high water mark, but we did not always stay down by the river. On one farm we passed a massive pile of cow manure disposed of at the river's edge where it was illegally polluting the water with nitrates. The rancher caught up to us in the next field over. He was quite upset to find us on his land. Mike wrote in his journal:

"What use have I for a world that would throw away fruit and friendship? A culture which lays waste to everything which is wild and true, everything I admire, all in exchange for laws and clocks and a rumor of convenience. I give thanks that that world does not exist here except in opposition (or as the occasional supply of dumpster yams). It's only present in the over-grazed and roaded landscape, the pollution in the stream, the harassing cop, and an angry, guilt ridden rancher, afraid that we will witness his shit stacks on the riverbank, piles of dead calves or perhaps that we will damage his fences as we pass."

More than anything, I thought the manure pile by the river seemed like a tragic waste of a valuable resource. Anyway, the rancher said he was concerned that we might do some damage to his \$200,000 worth of irrigating equipment. But we were courteous, and he let us go on our way. We've never had trouble with land owners in the past, even when Renee and I walked all the way across Montana. People can see that we are pretty harmless, so they really don't mind too much. This time of year there really isn't anywhere else to go anyway, when the mountains are all covered with snow, so I took the chance that it would be okay, crossing miles and miles of farmland along the river. We did not run into anyone else all day.

We walked all the way to the little town of Toston and called home from the bar, about thirty-five miles from where Renee dropped us off six days earlier. Renee brought us back to Pony and we finished the expedition with a big meal out at the local diner.

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Thursday October 19th - Saturday October 21st, 2000 Tom's Camping Journal: Camping with the Kids

In the pre-dawn darkness I reached over, still half in my sleeping bag, and held my hand over the fire pit searching for warmth. I blew at the warmest spot, pleasantly surprised to see a few live coals respond and glow, giving faint light to the lodge. Adding a handful of needles and twigs, I blew again, bringing forth flame, warmth, and bright light.

The lodge is a wickiup, a tipi-shaped shelter built of many dead spruce poles and covered over with bits of rotten wood, needles and duff from the forest floor. The older spruce trees long ago took all the light, choking dozens of their younger kin in the darkness below. We put the dead trees to use, cleaning up the previously impenetrable spruce grove to build our shelter. That was six years ago. It doesn't appear that anyone has disturbed the shelter in all that time.

Today the spruce poles still have short stubby branches attached all the way up. From inside the lodge it looks like we are in the forest, as if all the trees leaned their tops together to shelter us below.

Stoking the fire woke the kids. It was probably only five in the morning, but soon we were all awake and sitting by the fire, with the kids dressed in as little as shorts and tee-shirts. That is one of the remarkable things about camping in a primitive shelter like this, is that it can be so comfortable. In modern camping the fire is normally outside, so that you have to bundle up in all your clothes to stay warm. Then you leave the fire and crawl inside a cold tent and sleeping bag. It is a real thrill to camp in a wickiup and sit by the fire in shorts, a tee-shirt and bare feet high in the mountains in the middle of October. At night I put a long slender branch under the sleeping pads at the edge of our beds, to prevent anyone from rolling into the fire during the night.

There is something very primal, almost genetic, in living this way--something learned and passed down from generation to generation through 200,000 years or more of our ancestors building similar shelters and cooking over similar fires. In town I have the home of my dreams and everything I need, but still, there is something about living in the ancient way that I simply cannot survive without.

This year was the Summer of Fire, when drought conditions led to massive fires across the West and here in Montana. There was not a cloud in the sky, yet we could barely see the sun as the smoke settled in for days at a time through most of August. Each day I went out and dragged the hose from tree to tree. It felt like we were trying to build a homestead and establish life on an alien planet with a toxic atmosphere. Ironically, the one thing I wanted most was to go camping and to cook over a fire. Like being on the ocean with nary a drop to drink, we were surrounded by fires, yet could not have fire. It was neither safe nor legal to go camping or to build fire to cook by.

September rains and snows squelched the fires and brought the land back to life. With winter closing in and hunting season only a few days away, now would be my last good opportunity of the fall to take the kids and go camping. They had two days off from school plus the weekend, so we cleaned out the refrigerator, threw our clothes and food in the back of our 1973 Jeep pickup and headed up the South Boulder River to the wickiup. We keep most of our camping gear in the Jeep anyway, for lack of any other place to put it, so we had just about everything but the kitchen sink. We sorted it out when we parked and only carried what we needed the last eighth mile to the shelter.

Felicia started the fire with flint & steel when we arrived, after we worked over the shelter. Many times during our stay she marveled that such a tiny spark could start such a big fire and keep us warm and cook our food and still keep burning from day to day.

While waiting for the morning light, I took the opportunity to read to the kids. I read a chapter from Tom Brown Jr.'s book *The Search*, which was about an encounter with a raccoon, but also about fire, life, death, and renewal. There is nothing the kids love so much as to be read to. Stories reveal opportunities which they may have never considered, and each one captures their imaginations about new possibilities in life. Ghost stories capture the imagination too, and they read those to each other night and day, every chance they got.

Shortly after dawn we ate a simple breakfast of yogurt and cereal, then made sandwiches for lunch and headed out for a hike. All their shoes were sopping wet from playing in the snow, but Cassie brought her Sorrel boots, and Felicia is such a big kid now, that she wore mine. Donny wore his wet shoes, but didn't seem to mind.

Hiking is still relatively new to the kids. It has been more than four years since the adoption, but we always had other priorities besides hiking. Our family camping trips have been mostly by canoe, so they haven't yet learned to do long hikes, just lots of short walks. When it comes to outdoor skills, Renee and I are faced with the parents' paradox. On the one hand we want to give the kids the freedom to make their own choices and follow their own inclinations. On the other hand, kids usually want to do whatever they are familiar with, so it is helpful sometimes just to take them and go, whether they want to or not. Hiking is one of those situations. But I have learned a few things.

First, I brought along our boomerangs, so that the kids would have something to do along the way. Second, I made two sandwiches for each of us, so that we could eat lunch when the kids reached the point where they could not walk another step. Then we could walk some more before we ate lunch for real and turned around to go back. Next time I think I'll make three sandwiches apiece!

The kids used the boomerangs to slice blocks of snow from the snowbanks, then nibbled away at them as they walked. The scenery was simply stunning every step of the way-- the water rushing downstream, the snowy peaks, the evergreen trees, the patches of

snow and the now-barren aspen trees. The fall colors were mostly over, yet there were still golden leaves on the ground and a tinge of red in the shrubby roses. Even the brown leaves on the path were vibrant in their own way. This fall has been more spectacular than any I could ever recall, and it makes me wonder: is this year different than others, or have I changed?

As a writer I spend much of my time deeply immersed in my thoughts, trying to translate subtle feelings of the subconscious mind into tangible words and meaning. It was immensely frustrating to me as a kid to be able touch immensely powerful ideas about ecology, economics and life, while being helpless to communicate anything intelligibly. It took more than ten years of staring at the computer, trying desperately to write, before something snapped into place and allowed my thoughts to coalesce into the words I wanted.

Now writing is relatively easy, but I still experience it like being in a swimming pool, diving into my subconscious for substance at the bottom, then swimming with a morsel of inspiration back to the surface. I spend days, weeks, months at a time in this altered state, cycling between the bottom and the surface. Sometimes I wave to people that are only fifteen feet away, because everything seems so distant when I am inside the pool looking out. My office is right smack in the middle of the house and I am around the family every day, but it is like looking at them from under water. We talk and interact at the dinner table, but it is like talking through water. I don't dare break the spell, as it can take me a week or more to return to it. But this year it seemed especially hard to get out of that space. I worked on my writing from November all the way through until May, often twelve to fourteen hours per day. Writing is my passion, but it also makes me crazy.

I don't write or teach much in the summer, from Memorial Day to Labor Day, in order to spend lots of time with the family, yet it was only in July, after spending two weeks canoeing the Missouri River, that I felt like I was returning to normal space. By the middle of August I felt caught up, and by September I felt relaxed and "awake".

But there is more, because I feel awake now in a way that I have never experienced before. Through all of my life I have been so stuck in the swimming pool of my subconscious that it was a challenge just to focus on anything around me. I remember going on walks with my Grandma. She noticed everything. She commented on the sounds of the birds, the look of a tree, the feel of the breeze. Grandma was more aware of what was going on all around her than anyone else I have ever met. She didn't need a TV. She could watch the peacock in the yard or a dead tree on the hill every day and be completely absorbed by it. I believed religiously in nature awareness and nature appreciation, and Grandma made me so mad, because no matter how hard I tried to appreciate nature, she always did it better.

Of course, she wasn't in competition with me, she was just enjoying the incredible beauty of every day. Trying to compete with her was a distraction for me, but not the only one.

Breaking out of the soup of my subconscious mind was the bigger problem.

Each day that I have been out this fall it feels like the first time I have broken free, to see the world clearly for the first time. I find myself marveling at every leaf, every rock every tree, appreciating it just as Grandma did. Well, almost.

It is interesting that the kids seem almost oblivious to the beauty of the place, although they are absorbed in a world of their own, eating the ice off the mud puddles. They asked if it was clean enough to eat. "Probably not." I responded. "Can we eat it anyway?" they asked. "Sure." Donny said he was eating glass, as he carried his frozen window pane along the trail.

The one thing I am most proud of is that they ate just about every rose hip we found along the way. They didn't do that when we first introduced them to wild edibles four years ago. But, like I said, people do what is familiar, and by now rose hips are very familiar.

I learned to eat rose hips from Grandma. Maybe that is why it feels so good to go on a walk, since I eat a week's worth of vitamin C every time I go out. The kids and I also ate "lemonheads" along the trail, actually a plant called sheep sorrel, but the name fits the taste.

I don't think we could have walked any slower if we tried, but then again, we were hiking uphill high in the mountains and the girls were wearing those heavy boots. They flopped over into every snow bank along the way. After lunch (our second one), it was all downhill and the kids commented on how much fun it was. "We should do this again!" they said.

The other thing I've learned about doing outdoor skills with our kids, is that they are much more sociable than I ever was. Primitive skills with Dad is ho-hum, but primitive skills with their peers is a chance to show off how much they know.

A year ago we brought Felicia's 5th grade class to our place for half a day of primitive skills training. I set up a tripod a couple blocks from our house, and the kids gathered the rest of the poles and put them in place to build a wickiup. I expected them to get bored easily, ready to move on to something else. In actuality, they would have spent the whole time working on the shelter if we let them. With flint & steel we started a fire inside that skeleton of the lodge and cooked up a pot of rosehip tea. Half a day, we decided, was not nearly enough.

Later I hauled in some bales of straw, and with the aid of neighborhood kids filled in all the gaps to make a well-insulated and waterproof wickiup. We camped in there several times last winter with our kids and their friends. We left our sleeping bags there between trips, so it was easy to go camping any time we wanted.

This year Cassie is in the 5th grade, so we brought her class up for a whole day of

outdoor skills. They were reading a story about Indians, so they all had Indian names and they were very eager to learn the skills. Four inches of snow fell the night before, and some of the kids were under-dressed for the outing, but all had a good time. We managed to squeeze all fourteen kids plus Renee and I and the teacher into the lodge around the fire pit. Cassie started the fire with flint & steel, then all the other kids tried it to. We cleaned out a pumpkin, filled it with cabbage, onions, bouillon and Jerusalem artichoke roots and cooked it into stew with the aid of hot rocks. "Stone soup" we called it. The pumpkin seeds we roasted in a pan and ate. The kids mixed up some ashcake dough, just flour and water, and we cooked the patties on the hot coals. I still had wild gooseberries in the freezer from last year, so we boiled them with sugar and put it on the ashcakes. That was a big hit.

The kids had a lot of fun just running around in the snow and starting a new shelter of their own. The coldest kids spent more time in the lodge by the fire. The others I took out for some stalking exercises and stalking games on the hill.

The steepest trails near the wickiup turned to pure mud, and some of the boys were sliding down the trails on their butts in their snowpants. Even the kids who were not playing in the mud seemed to be covered from head to toe by the time we left. I hoped their parents would not complain to the school or the teacher about the ruined clothing! We spent the last hour with the whole muddy bunch in our family room, playing primitive musical instruments from our collection: drums, rattles, rainsticks, flutes and ocarinas.

Felicia's sixth grade class came up next, partly because they wanted to see the finished shelter, and also because the teacher wanted to have some fun too. We did many of the same skills, but it was a lot warmer that day, so we had more time for stalking exercises. We practiced fox walking, coyote running, hopping like a bunny, and jumping like a cat. We ended with a game of follow-the-leader through the bushes and a stalking game. Renee and I are always exhausted after those events. I don't know how teachers do it every day.

Anyway, the kids and I finished our hike in the mountains, minus one boomerang lost in the top of a tree. They played for an hour on a piece of old mining equipment near camp, pretending it was a battleship, a tank, an airplane, a submarine, and a spaceship, and well armed too. They talked me into a re-enactment of the Battle of the Bismarck, from a Johnny Horton song they have heard too many times. I got to be the British ship the Hood, which they promptly sank with a barrage of snowballs. The Bismarck is supposed to go down at the end of the song, but it didn't work that way this time.

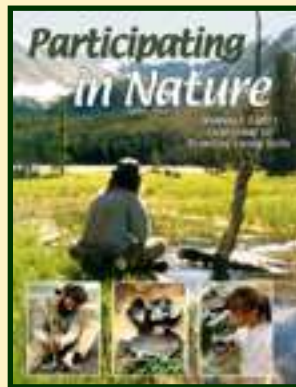
My mom drove up the canyon and joined us in the evening. We cooked hamburgers over the fire, and for the second night had "raw smores" since the miniature marshmallows were too small to bother roasting.

The kids made a giant snowball, so we rolled that in front of the door at night to help reduce air flow through the lodge. The wind kicked up as we settled into sleep, announcing the coming storm, but we were well protected. The lodge has enough gaps between the poles that we would have been soaked if it were built out in the open. But this lodge has an extra roof in the form of the spruce trees overhead. The trees break the fall of the rain, allowing it to mist gently over us, easily deflected by the wickiup. It rained for nearly half the night. With the light of dawn the rain turned to snow and started to pile up.

I read another chapter out loud, cooked instant oatmeal and scrambled eggs for the kids, and then it was time to split. If the snow fell hard for an hour or two we could have been snowed in, with no easy way to get the vehicles out. Besides, my Jeep has no windshield wipers, no heater, and the windows don't roll up. We packed quickly, rolled the giant snowball into the fire pit, and hauled our gear to the Jeep. I was glad the kids rode back with Mom, since I was driving blind all the way. I took the short cut on dirt roads over the hills to avoid creating a hazard on the highway. Mom took the long way, drove several times farther than I did, but still walked in the house minutes after I did.

It was a short, but good camping trip. We cleaned up in the afternoon and attended the annual community spaghetti dinner and music night at the Pony School.

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The Tobacco Roots Trek II Backbone of the Mountains Tuesday September 28 - Saturday October 2, 1999

We sat on the hillside welcoming the warmth of the morning sun, peeling back the scales of the pine cones and popping pine nuts in our mouths. We competed with the bears and the squirrels and the Clark's nutcrackers for the tasty nuts, but we took no one's meal. There were acres and acres of pine nuts, more than all of us together could ever eat. It is the mother lode of wild edible plants-nutritious, tasty, and super-abundant--at least as if you are in the right place and the right time.



The whitebark pine starts at about 8000 feet in these mountains. The other pines and firs have edible seeds too, but only the whitebark pine is readily harvestable, starting in early to mid September in this region. Here the squirrels have clipped the cones from the upper reaches of the trees, littering the ground with thousands of cones. Like a man who has found a field of gold, the squirrels seemed to have gone mad, shuffling the pine cones from place to place, stacking some here, burying one there, caching some in holes under logs, picking up one pine cone only to put it down and run to the next.

The ground was littered with bear piles too, clearly packed with hundreds if not thousands of pine nut shells in every pile as the animals stuffed themselves with the oil-rich food, putting on layers of fat for winter hibernation. We crossed paths with one bear on our way into camp last night, and found another just beyond our shelter this morning.

I felt like we were squirrels too, stuffing ourselves with pine nuts. We ate as many as we could, then quickly filled two big bags with pine cones to take back to camp, but there were so many more. Like the squirrels, I wanted them, I wanted them all!

The premise of this trip was to take advantage of the key crops of the season, to forage while the eating was good, then to walk back over the mountains towards home. We started down in the valley, in the swamps where there are acres and acres of cattails with starchy, abundant roots. We harvested more than enough roots for the journey home, plus rosehips and dried, shriveled gooseberries, before starting the walk into the mountains.

The adventure was originally intended to be a week long, but we shortened the beginning to better accommodate each of our schedules. Even then, Steven and I were in the field for almost twenty-four hours before David caught up with us. He had been trapped in

another range of mountains by a sudden snow storm, and couldn't drive out until the snow melted. He stopped by the house and Renee gave him directions to find us in the swamps on the other side of the mountains.

Both Steven and David were experienced travelers. Steven, thirty-seven, came the night before the expedition, after driving in from North Carolina. He was an experienced backpacker and traveler. He has backpacked the Appalachian Trail, plus many areas of the west, in addition to traveling and living abroad. He was used to carrying a sixty-pound backpack. He came on this trip to learn how to travel lightly, leaving the tent and sleeping bag behind, and how to forage for wild food. He made a Roycroft-style packframe at the house on the morning our adventure began.



David, twenty-six, was from California. Like Steven, he has traveled and lived abroad, learning foreign languages and experiencing other cultures. This year he has taken primitive skills classes at several schools in the west. But backpacking across the mountains with no trails was a new experience, he said. He started a Roycroft-style packframe at Rabbitstick Rendezvous in Idaho the week before the trip, then finished it after he found us in the swamps.

Our first campsite was at a favorite spot in the swamps. There was a hut at this camp, which I built with a group back in August, but now there was two inches of water in it. I knew there would be water there at least part of the year, but didn't expect it until spring. We built the hut there only because it was completely invisible. It was no great loss with the water in it. Steven and I just pulled the dried cattail and sedge leaves off the hut and used them to make an insulating blanket over our hot coal beds nearby.



We dug a shallow trench for the beds and started a fire with flint & steel, then collected cattail roots from the swamp to supplement our rations. Steven shared this entry from his journal:

"We shed our pants and boots and stepped into the frigid water and slowly walked through the calf-deep silky mud feeling with our feet for the horizontal roots of the cattails. When we found one we'd stick our hands deep into the mud and slowly pluck the root from its moorings. We did this for a while until we'd gathered quite a few and then took them over to another area of the creek to wash them in running water. Later, we cooked some over the fire. I found them easily palatable. We would peel off the sides and stick the middle of the root into our mouths chewing up the starchy strands (which to me tasted a little like potatoes) and spit out the fibers. The provided a good

addition to dinner."

One thing I learned this year is that the bland, starchy cattail roots are much more palatable if you combine them with berries or some other kind of tasty food for flavor. We cooked the cattail roots on the coals, then ate them with rosehips. For our first dinner we ate rice and lentils plus goat jerky I made a couple weeks before. It was edible, but definitely not first-class fare. The rosehip tea was the highlight of the evening.

Our fire warmed the ground until dark while the air around us grew colder and colder. Finally we covered the fire with dirt, a poncho, and a big pile of cattail insulation. The loose cattail stalks allowed air to infiltrate through, so we put our other poncho over the insulation to block out the cold air. Then we wriggled underneath the insulation. The warm ground beneath us felt nice, but unfortunately both the coal bed and the poncho over the insulation were a little short. We were perfectly warm except for our frozen feet! In the middle of the night we took the poncho out from underneath us and put it up top, to help block the cold air, then weighted it down with sticks and rocks. That made the bed a lot more tolerable, but still we went through the night with little sleep. Sometimes it takes a couple nights to fine-tune a shelter. Steven was very enthusiastic for the skills, but unfortunately, a night without sleep gave him a horrible headache. He took several naps during the day.

I half-feared that Steven and David might bail on me, like my group did in August, when they were not quite as comfortable as they expected to be. That was my fault really; I should have warned them that it would not be easy. People often get into primitive skills with the romantic notion that you can go out and live in bliss and harmony with nature. They don't realize that on the path to harmony you have to morph into a half-wild creature that loves heat and cold and wet and strange foods and weird sleep. This time I warned all

the interested parties before the trip, yet Steven and David were still eager to go.

Steven wrote: *"In the afternoon David and I practiced starting fires with a bow and drill while Tom went over to the edge of the stream to prepare food for dinner. That evening we had a tasty stir-fry of cattail shoots, mustard greens, and duckweed along with ashcakes (wheat flour with grass seed and poppy seed made into cakes and thrown into the ashes to cook) and rose hip tea. The meal was more than satisfying and not long after eating I became exhausted and was ready to collapse due to lack of sleep. David made an additional coal bed, and Tom and I extended ours so our feet wouldn't be sacrificed during the night. But it turned out that the night was warmer than the previous one and after a few hours I found myself deburrowing. I had to get out and shed some clothing to dry and cool off. The few modifications we made to the coal bed proved overly sufficient. Eventually I laid back down for a short sleep."*



Our night was short, but not because it was cold. We were all on our feet by three o'clock in the morning to start hiking up into the mountains. David was behind on his sleep too, from staying up nights for the last week. But we packed our gear, cleaned up camp, and ventured forth into the moonlight. The night was remarkably warm and beautiful.



The reasons for traveling at night were several. First, there is a certain ambiance to walking in the moonlight. The distant noises of civilization fade away, leaving behind a very quiet place—the seeming reemergence of the ancient world from which we all came. The moonlight is a gentle light, not at all glaring like in the day time. I love to walk and watch the clouds pass by the moon, taking us from moonlight to near darkness and back again.

We moved at night also because our path took us across roads and farms on our way into the mountains. It was nice to pass by invisibly, like the many other creatures of the wild that come out to play when humans disappear into their holes. It was a peaceful and uneventful walk. We searched in vain for berries, but harvested some watercress along the way. Eventually the bright light of Venus emerged atop the crest of the hill, and we knew daylight was close behind. The night grew colder and colder right up until dawn. By first light we were ready for a break and some sleep. We laid down in the shelter of the junipers and took a short nap. We awoke

probably twenty minutes later, and already it was fully light out. We shouldered our packs and set forth deeper into the mountains.

The other reason we started our journey at night was because we had a long ways to go to get up to the pine nuts, and fall days are just too short. Starting early in the day allowed us to move through the mountains at a leisurely pace. We had time to stop and talk about wild plants, to watch the wildlife, and to take naps in the sun.

From Steven's journal: *"We hiked about ten miles that day from lower desert terrain to higher forests filled with spruce, pine, aspen and fir. Along the way we found foods such as the seeds from various mustard plants which were delicious. We ate two varieties of rose hips, more gooseberries, and harvested watercress from a stream to be eaten later. We also munched on leftover ashcakes and buffalo berries. Everywhere we hiked we found water, usually in strong, flowing streams. As we slowly climbed through a sunlit, grassy valley we shared the slopes with moose and deer. We discovered more edibles and healing plants such as Shepherd's Purse and yarrow and then dozed in tall grass on a hillside after lunch. Each day we would come across a new plant, root or weed of which Tom would disclose information on various characteristics and tell us whether or not each was edible or contained medicinal value. His approach to teaching was effectively random and unconventional. Not so much like teaching, but as we moved through the days it was like walking through a continuous open-air classroom where "lessons" in the form of plants, animals, and elements would pop up and present themselves for discussion regularly. It was like walking through an abstract painting where all the elements that make it up, slowly take shape, so when you step out of it the full picture becomes obvious. Yet before we went in, it was just a jumble of attractive colors."*

By the end of the day we had climbed from 5600 feet in elevation up to 8000 feet. We made camp as the patchy clouds began to spit out raindrops and sometimes snowflakes. Shelter was definitely not a problem with so much rotten wood on the ground. The trees gave us adequate cover to start with anyway, so David started the fire with the bowdrill, and we cooked noodles and split-pea soup for dinner, thankful to have some instant foods with us. Later we constructed a lean-to long enough for Steven and I to sleep by the fire with our legs over-lapping in the middle. David slept in the back of the shelter with his blanket. The night was relatively warm with the cloud cover overhead. We slept well in fits and spurts, in between sessions of loading wood on the fire. We feared that the clouds might turn to snow over night, but instead they simply blew away, leaving us with a clear and beautiful, but cool day for our pine nut harvest.



In addition to gathering pine nuts in the morning sun, we took some time for plant identification skills, and we collected wild tarragon and biscuit root seeds to flavor our ashcakes. Steven wrote:

"Hours are required to pluck the pine nuts from the cones through the unavoidable pitch, making it a very sticky task. David took to it well and plucked so many pine nuts that we could have been fed three times over and still had enough to roast up as a peace offering for the squirrels."

The nuts were delicious raw, but heavenly when roasted. I set up a metate stone and processed some to remove as many shells as possible, then we added the nuts and wild seasonings to our ashcake mix, along with grass seed and plantain seed brought from home. We cooked and ate several small meals of rice and lentils during the day too. We ate some of the ashcakes with dinner, and saved the rest for trail food.

By late afternoon the sky was crystal clear and the night threatened to be very cold. We tightened the debris cover on the lean-to, then quickly built two more log walls around the campfire to help capture and reflect the heat. This time we all slept close to the fire. But night was not as cold as we feared, and we awoke to another perfect day.

The weather at this time of year can be difficult to predict. On this trip the sky changed constantly from clear to wispy to cloudy and back again, as successive fronts swept quickly by. We were ill-equipped for snow, and we planned to abort the mission over the mountains if the weather turned bad, but we were very lucky again that day. We ate cattail roots and ashcakes for breakfast, then tore down and dispersed the shelter before heading out.

I'd been toying with the idea of walking the backbone of the mountains for some time. If we climbed up to an elevation of 9,000 or 10,000 feet, then we would only have to walk a few miles along the ridge to put us across most of the Tobacco Roots Mountains, and virtually all the way home. Besides being spectacular, it would save two or three days of hiking up and down the watersheds to either side. I mentioned something about soaking in a hot pot up Potosi canyon on the other side, and taking the guys out to dinner afterwards, and they practically sprinted over the mountains. I intended to camp somewhere after the peaks before the hot springs, but they wanted to do it all in one day. I didn't realize that it was supposed to be the last day of our journey anyway, until we got home and looked at the calendar.



Hiking at high elevations is usually difficult for me the first time each year, but this time it seemed easy. On the way up I picked up one pine cone after another, and popped the tasty nuts into my mouth as we walked. I felt this incredible surge of energy all day, as if I was running on pure pine nut power!

I'm not sure quite how Steve and David walked up the mountains without eating so much as I did, but they said they were motivated by that hot springs on the other side. Every break we took was short. The high elevations were especially hard for David, but he kept charging along anyway.

Steven wrote: *"As we moved through the forest, the honk and squeal of an elk slipped through the trees from an unseen distance. We heard the wings of Clark's*

nutcrackers and crows overhead audibly whirring like machines of brushing wind. We were blessed with another blue day, at least at that elevation. As we climbed higher the trees began to thin out and patches of snow became evident. When the start of the ridge was in full view we stopped for a food break and added a layer or two of clothing. The temperature was already dropping and the sky was turning slate gray as we prepared for a final waltz with the metaphysical. We kept our eyes open for more big animals and watched as the fog bank crept up through the lower mountains like an encroaching specter with nothing but time on its hands. It seemed as if it would eventually overtake us."

We could see first into the Madison Valley, where the thick blanket of fog filled the canyon between the mountains. We watched as the fog lifted higher and higher, but it never dissipated. To the west the Ruby Valley was clear of fog, but hazy. We skirted around the peak of Ramshorn Mountain and found ourselves looking down on South Meadow Creek Lake, like a fairy tale scene with an endless blanket of fog covering the valley beyond it.

Steven wrote: *"Our first hour on the ridge was spent stepping cautiously across a seemingly endless field of rocks on a slope angled at about forty-five degrees. We were now above the tree line and the view of the rest of the world below was expanding. Some time after we'd cleared the rock field we realized a slight miscalculation with the topographic map and had to backtrack a little on to another ridge line. This took us along a grassy slope for some time and the views of the green-blue alpine tarns below were magnificent. These pale, yellow balds were a wind-ravaged, indifferent terrain. The kind of place that sticks your individual insignificance in your face and reminds you of your constant vulnerability. Conversely though, it's infectiously reassuring of the here-and-now."*

I often bring my camera, but usually leave it deep inside my pack. I rarely stop and take the time to get it out. But today I chose to wear the camera on my neck all day long. I shot

up an entire roll of film of the peaks and lakes and the fog along the way. I think David and Steven had more than enough of my picture taking by the end of the day!

As the day continued we passed by Porphyry Mountain and looked down into Lupine Lake, Lilly Lake, Cliff Lake, and Alpine Lake. **(Check out this [MAP!](#))** The terrain across the top varied from rocky and talus slopes to thick, lush carpets of dried alpine vegetation. Two young bull moose sat on the ridge at 9,800 feet, seeming to enjoy the scenery as much as we were. We were sorry to disturb them in their moment of quietude upon their temple, but they did slowly get up and leave when we passed by. I took their picture anyway, from a distance.

"The few times I'd seen moose, they were always among trees. My vision of moose had always comprised of a forest setting and a cautious vigilance against grizzlies and now here were two young bulls high in the saddle of this ridge, sitting long on the ground, their heads up and casually looking about from a timeless perch, on the world below them which at that time they seemed in command of. Their concerns had nothing to do with the cold or the biting wind or even the threatening sky. They knew nothing of borders, of the paradox of governments or the absurdity of land-ownership. They were completely in tune with all that was around them--their senses fully honed and everything in their world, true and deliberate. The only sound up there was the determined wind rushing across the slope. Occasionally these winds would subside and then a burst of quiet grafted into the dimension of the atmosphere and we were as good as prehistoric man."

"As we continued on toward that next peak, passing the moose, we stayed a reasonable distance below them in hope of not disturbing them. They watched us a while and then slowly started for lower ground, exchanging glances with us from time to time. The image of these moose, easy above the world, quickly became an eternal reference for me, epitomizing the power of harmony."

From the peaks we could see that the Gallatin Valley was also fogged in--a fluffy white blanket extending sixty miles across between the mountains. We could see the tips of the Bridger peaks on the other side, like a chain of islands in a white sea. By now the sky above us was partly cloudy, a mix of wispy clouds and thicker cumulus, white but sometimes gray, occasionally spitting out a few white flakes. We seemed to be in a cloud sandwich with clouds above us and below, but none in our space where we walked. I took lots more pictures. As Steven kept saying over and over, "What an incredible way to end this kind of a trip!"

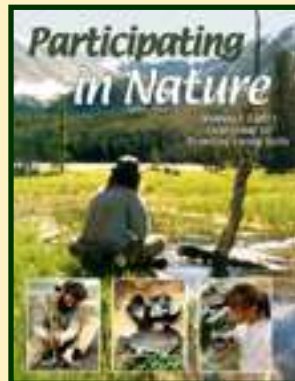


We looked down over the Twin Lakes and the Branham Lakes as we continued to work our way along the ridge, over and around the peaks past Lady of the Lake Peak to the saddle by Mount Bradley.

Steven wrote: *"We studied this last peak, characterized by massive gray concave walls of loose rocks and boulders which had been formed and situated by glacial activity and erosion through time immemorial. Among these rocks were rounded indentions of permanent snow and ice. These spoon-shaped talus walls rose hundreds of feet to form the peak at the top and now we were discussing the idea of slipping into one of the steep breaks in the wall and traversing yet another field of rocks. However, this field bent at an angle of about sixty degrees and a poorly placed foot might easily turn into a rapid and bumpy ride to the bottom of which very few people would survive. But it was too enticing and meant that we wouldn't have to climb any higher, so we proceeded judiciously. As we picked our way across this wall, a lone mountain goat, hundreds of feet below us, foraged on a rise. In less than an hour we were on the other side."*

We felt like mountain goats ourselves, traversing that rocky hillside. But, finally we began our descent into the Potosi drainage. The trip down seemed to last forever. It was not excessively steep, but just went on and on, as we navigated back and forth across the creeks and around the obstacle course of fallen trees. It was nearly dark when we reached an established trail. It was definitely dark by the time we reached the road. There were still miles to go before we would reach the hot springs, and we would be too late at night to use a nearby telephone to call for our ride out. We debated what course of action to take as we tromped down the road. David was nearly ready to fall asleep. But then the lights of a truck appeared behind us. It may have been the only ride out that night. We stuck out our thumbs and hitched back to Pony. We ate dinner at the house and waited until the next morning to eat out and celebrate. It was in every way just the right kind of trip to end a summer of fun.

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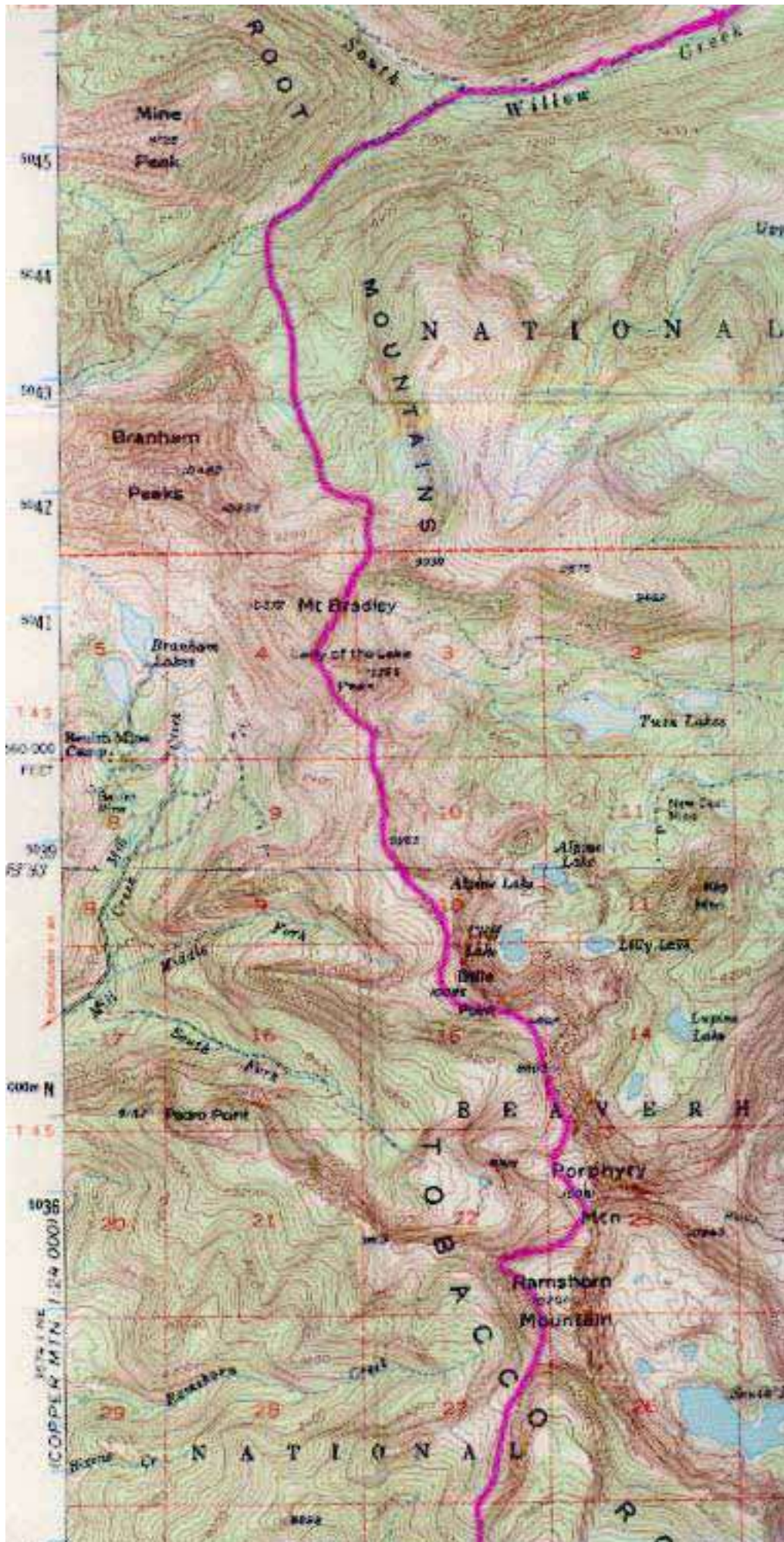


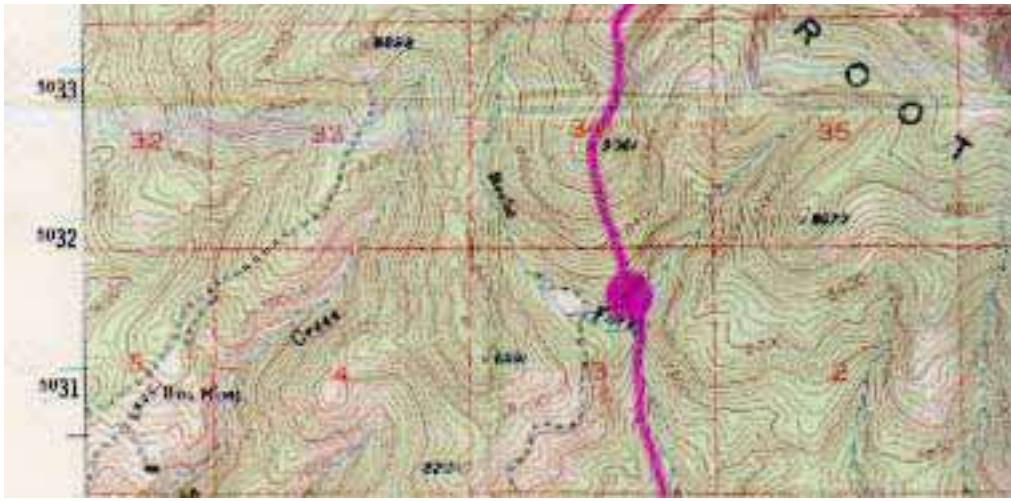
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Saturday February 27 - Sunday February 28, 1999 Tom's Camping Journal: A Father & Daughter Camp-Out

Within minutes of our arrival in camp we were covered with burrs. They were stuck in our shoe laces, our socks, our shirts, tangled in our hair. There were burrs everywhere, mostly the Velcro-like burrs of the burdock, but also the tear-drop shaped "beggars ticks" of the hound's tongue plant. Spiny cockleburs guarded the river's edge. But the field was also infested from end-to-end with spotted knapweed. Knapweed does not produce true burrs, yet the scratchy flower heads still grabbed at our clothes with every move.

Except for the common cocklebur, these plants were all introduced weeds from the Old World. The knapweed is especially a problem. The plant forms an association with fungus in the soil to steal carbon away from nearby grasses. In Eurasia, where knapweed came from, the grasses co-evolved with it, developing defensive mechanisms. But like the Native Americans who lacked immunity to European diseases, the native grasses are now helpless against this European invader. Five million acres of Montana grasslands are infested with knapweed, often in extensive monocultures with little else growing in between. In this field the knapweed has doubled it's population in a single year; it is now the dominant plant in the area. In just a few more years, all the remaining grasses will be gone.

The greater problem is that the land was already stagnating, dying, turning to desert, but few people have yet noticed. For millennia the ecology of this land included the thundering herds of bison. They plowed the soil with their hooves, destroying everything in their way, breaking up hard soils and tramping organic matter and seeds into the ground. The vast herds of bison thundered onward, leaving the prairie to unrestrained growth for months or years until the herd returned. Today, with livestock scattered widely across the fields, the land is both under-impacted and over-grazed. The grasses are already half-dead. Knapweed just finishes the job.

With the aid of livestock it is relatively easu to imitate the roaming herds of buffalo. It is possible to beat back most of the knapweed, to make the grasses flourish again, and to double or triple the grazing capacity of the land, but farmers are often slow to adapt. Many would rather go down bitterly with the ship, than seek out new solutions for a changing world. Anyway, weed education helps keep me busy when I am not out camping. And camping trips like this help keep me inspired on that path. The scratchy weeds and burrs were soon imbedded deep in our clothing, itching at our skin with every move.

Yet, this was a good camping trip, a very good camping trip. On this brief journey I brought along my daughter Felicia, age nine. Renee dropped us off where the railroad tracks crossed the highway, about six and a half miles from our destination. We walked quickly along the tracks, through the canyon, across the many bridges to our camp. Felicia did really well with a pack frame on her back.

The last time the two of us went out without the family was over a year ago, in January of '98. In the midst of winter I brought Felicia out to the windswept shores of a frozen lake, where our only shelter was a simple wind-break we built out of logs and cattails. We did fine, but it was hardly comfortable. I was concerned that she may never want to go camping with me again after that. But kids are adaptable, and she handled that trip much better than most adults would. Still, I wanted to make this trip a lot nicer. We even brought sleeping bags this time, and food she would like!

I've been a dad for two and a half years now, and I am very proud of my kids. In the time since we adopted our three children, we've mostly focused on the contemporary skills, building a family, developing a routine around school, and transforming our primitive skills school from a hobby into a legitimate enterprise.

We haven't emphasized the primitive skills too much with our kids, and frankly it does not matter to me whether or not they ever master the physical skills. The important part is that they learn to be resourceful, able to use their heads to work through problems and find happiness wherever they go in life.

On this trip I was pleased to see how quickly Felicia identified tracks, birds, and even a handful of dead plants, but most of all I noticed that she has become adept at asking questions and gathering information to solve the many little mysteries of life... "What made that sound?" "What caused this [disturbance]?" Sometimes she was asking me, but she was also asking herself, putting her neuro-circuitry to work processing the possibilities, and eliminating the improbable to find the probable.

Partly we have encouraged a mystery-solving ethic at home, encouraging the kids to play detective to uncover the cause of any mystery around the house, or to assemble possible explanations from incomplete information-events like the sound of gunfire in a field, followed by a truck immediately returning to the ranch house. But also, I know Felicia has role-modeled after Nancy Drew, from the many mystery stories we've read together. Nancy Drew is confident, smart, resourceful and pretty, and Felicia has found those attributes to be worth modeling.

As for myself, I've been intensely restless lately. Since becoming a family, I learned to form a routine, to get the kids off to school each morning, to play with them each afternoon, and to buckle down in front of the computer the rest of the time and work,



work, work.

I work the most in winter, so I can play with the kids through the summer. But after months of spending all my time indoors writing, I get desperate to go camping and suffer a little bit. I get moody and irritable until I go on a good camping trip.

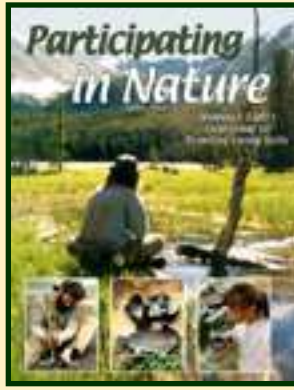
At home I go from meal to meal without ever getting the chance to go hungry. Eventually I feel like the food is killing me instead of nourishing me. I just love our lifestyle and our home, but sometimes everything is so easy and comfortable that I can hardly tell if I'm still alive. I feel weak and pathetic. Hide tanning projects have kept me active this winter, but still I feel like an animal trapped in a cage, with hardly any room to turn around, and desperate to escape! For me this trip was a chance to escape just a little bit, to recharge to face a new day.

We didn't do anything too spectacular this time, except to be together. Felicia was just thrilled to cook over a campfire, to chuck rocks in the water and to toss a boomerang back and forth between us. But we did fix up the wickiup a little bit. A year after I built it it was still bone dry inside, even while the ground outside was mud. We worked together to start a flint & steel fire, and we cooked rice and lentils for dinner. We gathered grass for insulation under our sleeping bags, and we set a single Paiute deadfall trap in an old, abandoned house nearby. We baited it with a strip of strawberry fruit leather.

Felicia was absolutely thrilled to catch a huge packrat overnight, but she let me skin it and eat it. She ate white rice with cinnamon and sugar instead. We both thought we had the perfect breakfast! I intended to tan the beautiful rat hide, but as with many thin furs, clumps of hair started falling out before I could finish.

The morning was beautiful and warm. It was the last day of February and we were wearing T-shirts, carrying our packs two miles out to our pick-up point. Along the way we sat on warm rocks in the sunshine and dipped our toes in the icy water of the river. We chucked rocks and blew on bullet-shell whistles found on the ground. The clouds moved in and the wind blew hard for the last hour before our ride came, but still we were happy campers.

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Island in the Sky Tom's Camping Journal September 29th-30th, 1998

The stars disappeared from the sky, chased away by the coming dawn. I arose from the shelter, dropped the blanket poncho over my head, and slipped on my moccasins and tire sandals. There was not a cloud in the sky, yet the morning remained gray and cold, awaiting the rising sun. The dwarf huckleberry plants formed a soft, yet wiry carpet on the forest floor, the crunching sound barely audible under my foot steps. A familiar trail took me through the pines to a favorite rock above the lake. I stepped out onto the rock and gasped in delight at what I saw. It seemed as though the rest of the world had disappeared, and all that was left was an island of forest, peaks and the lake all floating in a sea of clouds, like a magic kingdom in the sky.

A thin line of trees held the edge of the lake on this island in the sky, but beyond that the soft white clouds stretched to eternity. I scanned the horizon, yet no other mountain peaks penetrated the cloud cover. Ours was the only island.

The sun did not announce it's coming with the gradual brightening of the sky, but rather it seemed to burst over the horizon in an instant. I quickly started back for camp to grab my camera, but then stopped and returned to the rock to watch the show. I did not want to miss a moment, and I knew the magic would be gone before I could get to camp and return.

Only recently I learned from the staff of Wilderness Awareness School about something called "animal forms", where you mimic the actions of specific animals to move more fluidly through the woods. The animal forms include the common stretches used by athletes to loosen up the body, but in this case you visualize becoming the animal that best fits each stretching motion. As I watched the morning drama unfold I circled my arms forward and became the osprey flying out of its nest. I circled my arms backward and became the osprey diving down into the lake to catch a fish. I became a raccoon tumbling rocks over with my hands, looking for crayfish, then turned my wrists the other way, becoming a raccoon shoveling berries into my mouth. I stood on one leg and became the great blue heron in the water, drawing circles with the toe of my other foot. Through the series of stretches I became an owl, an otter, a great bear, and a hummingbird. Afterwards I shook out my feathers like a chickadee, and softly traveled back to camp.



As far as camping trips go, this was a short one, just an over-night trip-no more than thirty

hours all together. But it seemed a sufficient break from the work-work world that carries on each day below the clouds. Richard, my companion, came up to Montana to learn stone masonry, and we just finished a class with several other participants. We put up several tons of wall in one week, and it seemed time for a quick refresher in the mountains.

Our shelter in this case is a little hollow between two boulders. It started out as a mudhole a few years ago, but I make improvements to it each time I come, so it has a mostly dry floor now, covered with an insulating layer of grass and dry, rotted wood fibers. The greatest difficulty with the shelter is the seam between the two big rocks. The rain drains off of both and funnels down into the middle... that kind of defeats the purpose and meaning of "shelter"!



I previously stuffed the narrow crack with armloads of rotten pine needles, but this only slowed the flow of water. Mud might have worked okay to stop the trickle, but I consider this a *permanent* shelter, not just a primitive one, so I made the ethically questionable decision to haul in cement and concrete the gap shut. I mixed the cement with sand and gravel from the lake and packed it into the crack, invisible from either above or below. Although the shelter is very close to the shore of the lake, it is nevertheless in one of those blind spaces that nobody ever walks through. It even took me years to stumble across the site, and I purposely seek out those blind spots. Eventually I would like to turn the shelter into a little stone cottage. It is one of my favorite places.

Richard started a bowdrill fire and kept it burning all night. The heat reflected off the rock surfaces and warmed us as we slept. I once found an old tin can with a lid by the lake, and I use that to cache extra food from my camping trips. There is always an ample supply of food there. This time we used some of the dried vegetables from the cache, and left our extra flour.

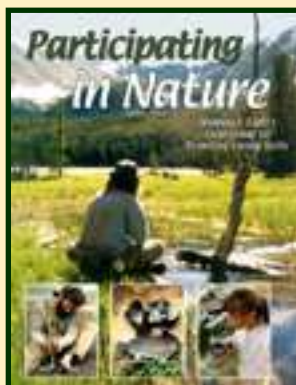
I usually come up to this camp in mid-summer. It is a good place to dig roots and go fishing. I've looked for pine nuts here in the past, but I've always been too early in the season. This time the nuts were ripe, even if the cones were not very prolific. We raided a few squirrel caches and found enough cones to meet our needs. I roasted the nuts, cracked the shells, and winnowed out as much of the garbage as possible. It is very difficult to remove all the shells, but I keep getting better at the process. At least the thin shells are readily edible, even if they are crunchy.

Besides raiding the squirrel caches for pine nuts we also went after the squirrels. Hunting is certainly not my forte, as I would usually rather just watch the animals than kill them.

But this time we were out for blood. On the first day we went after a squirrel that ducked into a hole in an old tree. The tree was hollow, with a cache of pine nuts at the bottom and two different trunks coming up from the ground. We spent more than an hour trying to smoke the critter out of the tree, so we could club it. We controlled all the exits, or so we thought. But I think it is constructive sometimes to hunt with your wits, if only to be outwitted by a creature with a tiny fraction of your brain power. It is humbling to say the least. The squirrel picked just the right moment to dart out of the smudge hole when we were unprepared, and it scampered away right between us. Fortunately we did not club each other in the confusion!

On the second day we did get a squirrel by this technique, and I think it was the same squirrel, but we trapped it in a woodpecker nest high up in another tree. By this time the rising sun warmed the cloud cover around our island, and the clouds surged up through the forest, surrounding us in mist. Richard skinned the squirrel down by the lake while I processed more pine nuts. Eventually the sun burned away the fog, and suddenly we could see across the lake again. We cooked up the squirrel with more dried vegetables and made some ashcakes from flour mixed with ground pine nuts. The squirrel was fat from the pine nuts and the meat was sweet. I still remember looking into his eyes, half-conscious from the smoke, just before I clubbed him. Killing is sobering work, but I would rather do it myself and know the pain, than to let someone else do it and give me the lifeless meat in shrink-wrapped plastic. It was evening by the time we hiked all the way back to town.

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Low, High, Low-Over the Mountains to Pony we Go Tom and Richard's Excellent Camping Adventures Tuesday September 1st - Sunday September 6th 1998

The new road plowed right through my old campsite. Unsure of what to do, we set our packs down to explore this new system of narrow trails carved out of the rock piles. The rock piles are the remains of the Gold Rush. Men ripped up the virgin creek bed in the quest for precious metal, washing the solids through an over-sized sluice box. The tiny flecks of heavy metal sank to the bottom. The other ninety-nine percent of the material was waste. The dredging stole the soil from the land. All that remains now is heaps of rock, one pile after another, stretching nine miles down the stream. Ironically, the barren wasteland is also a wildlife sanctuary.

Dredging may have taken the gold from the land, but the spirit of life still flows there. The creek percolates through the old rock piles, sometimes completely disappearing under the rubble, but always bubbling back to the surface a short distance down stream. Innumerable swamps of cattails and willows are home to all kinds of wetlands wildlife: blue herons, sandhill cranes, ducks, beavers, muskrats, and rainbow trout. Despite being only a few hundred yards wide and right next to the highway, the area is a sanctuary because the rock piles keep people out. It is simply too difficult to get anywhere climbing up and down the rock piles, navigating around the marshes, or bush-whacking through the willows. The cottontail rabbits seem to know this. The coyotes, the whitetail and mule deer, and the moose know too. The animals are safely hidden, while a non-stop stream of motorists speed by on the highway, guided by lines on the road into baited tourist traps ahead.

The dredge piles truly look like a wasteland, and the crude roads through and around my campsite are only the latest endeavor to do something useful with the useless. The roads provide access for the purpose of picking and baling rocks to be sold for stone masonry work. The bundled rocks rest on pallets ready for shipping. The problem is that the roads give access to more people and ultimately compromise wildlife habitat. I think of this as my habitat too, and I add the gutted campsite to my life-long list of secret spots laid open by a bulldozer.

My companion on this expedition is Richard, a tall and lean eighteen year-old from Phoenix. Although new to the primitive camping experience, Richard is well read, conscientious of sustainable living issues, goal-oriented, and attitudinally mature for his age. I needed a good walk-about to energize me before starting my fall project list at home, and Richard came along for a hands-on experience learning stone-age skills. I'm not sure he was quite prepared for the intensity of the experience, but he proved to be very adaptable on the trail. Actually, he told me later that he was sure he would die out there, but that was just because he watched too many movies about people getting killed in the woods.

The premise of our trip was simple. We would spend two days exploring the swamps, then hike back over the Tobacco Root Mountains to Pony. The distance is only twenty-four miles according to the ruler on the map, but we would have to scale or circumvent the mountain peaks in between. We probably walked closer to forty miles when all the loops back-and-forth on the trails are counted.

September should be the beginning of fall, but now the sun baked the land with an intensity unusual even for mid-summer. We waded into the swamps and spent most of our first day, Tuesday, in the water, exploring, eating cattail roots, and just enjoying being out. Good campsites are rare in the dredge piles, but we did locate a new sand bar and moved our gear there. We worked together to make a bowdrill fire set. I started the first fire, and Richard practiced and started the rest of our fires through the week. We brought no blankets, but instead we scraped away the sand, heated the ground with fire, then pushed back the sand and slept on the hot ground. We harvested last year's dried cattail stalks for a blanket over the top of us. My half of the bed was a little too hot. Richard's half was a little too cool.



We brought basic food staples with us, like rice and lentils, bullion, oatmeal, flour, venison jerky and trail mix. However, I underestimated the amount of food we would need by at least a day. I'm not sure whether this was purely accidental, or if I subconsciously undercut the food supply so we would have to forage more along the way. Nevertheless, we ate fine all week. On Wednesday, our second day, we gathered a quantity of cattail roots for flour. I like to bring a small gold pan for cooking. With the aid of some vegetable oil, we stir-fried a delicious lunch of cattail buds and sow thistle leaves. The currants, gooseberries, and raspberries were few and far between, but we ate all we could find on the dry, half-brown bushes. We experimented with harvesting ants, but only came up with a couple teaspoons worth to add to a stew. We ate lots of rosehips.

By Thursday morning it was time for us to begin the trek back to Pony. We rose early, put our packs together and started walking, not even taking time to eat breakfast. Our packs were simple A-shaped frames made from willows, with buckskin thongs to tie the load on and shoulder straps to fit them to our backs. Richard made a copy of my packframe the day before the trip began.

The one item I wished we brought with us was a little sugar to work with the especially tart berries. As we walked up Granite Creek we found bushes loaded with buffalo berries, plus a few good chokecherries. Both types of berries are highly astringent with tannic acid

that tightens tissues and puckers the inside of the mouth. We ate the fruits heartily, and I do not ever remember having my mouth so puckered before. Sugar would have enabled us to make a delicious pie with the berries. Without the sugar we used very few of the berries we harvested and took with us. Pounding and drying the berries would have helped too, but we didn't have time for that.

Farther up Granite Creek we took time to sit and watch a young bear in the road pulling over a chokecherry bush and stripping the cherries from it. The bear was not quite full grown, but it was on it's own. Mostly it bent the tree to the ground to eat, but for a moment it stood straight up on it's hind legs to reach up to the cherries. We sat in the road and watched until it either smelled or heard us and left.

Earlier this year Richard took a tracking class with Jim Halfpenny, author of [Mammal Tracking in North America](#). I haven't focused much on tracking since high-school, but we both had fun looking at tracks and scat everywhere we went. Richard spotted a hole in one rock out-cropping that appeared to be a bobcat den. The round and narrow hole went straight back about ten feet into the rock.

We turned off Granite Creek at Mill Gulch and followed it high into the mountains. Grasshoppers big and small scattered before us as we walked. We caught more than a hundred for our dinner. In previous culinary experiences I found them to be bitter and unappetizing, but grasshopper cuisine is something I am determined to learn. We stir-fried the hoppers with buffalo berries and watercress, and although the bad taste was gone, we were unable establish a positive taste either. I thought the lemony-sour taste of the buffalo berries might help, but that was the worst part. I think next time just plain stir-fried grasshoppers with lots of watercress added at the last minute would be much better. Richard ate about half a dozen of them. I ate about two dozen. We disposed of the rest of the meal and cooked ashcakes instead.

We camped in the upper reaches of California Creek, probably about 8,000 feet in elevation. There was not enough insulating material in the mountains to make a good blanket, so we just slept by the fire all night. We rigged our ponchos as reflectors to bounce the heat to our backsides. The fire danger seemed high everywhere we went, and we did not know that all fires were banned because of the dry conditions, but we located our camp in a large patch of nearly barren ground. We kept our fire small.

The challenge in crossing the Tobacco Root Mountains is that we were traveling across most of the drainages, rather than with them. We could walk straight with lots of ups and downs, or follow the contour of the land and add lots of extra miles wrapping in and out of each drainage. We strived for a balance of both. Our total distance on Friday was relatively short, only about five miles straight, but it took us all day long to traverse the drainages along the way.

At one point in the day we rested near the ridge of the mountain, enjoying a lunch of

ashcakes, water, and raw pine nuts. Suddenly a cow elk came around the side of the hill, walked no more than twenty feet in front of us and casually passed on by. I am sure that it smelled our trail. And although we tried to hold very still, with mouths full of ashcakes, I don't think we were really fooling anyone. The brief, but close encounter seemed like a real gift. We saw several more elk in the area as well.



One of the reasons I like to do these expeditions is to explore the area resources. This time we discovered whitebark pine nuts. I've heard about the natives collecting pine nuts in Montana before and some people still collect them today. But I've never been in the right place at the right time to harvest a good quantity of them, mostly because there are so few on our side of the mountains. However, this trek took us across the other side, to the West slope of the mountains, into an abundance of pine nuts. The cones we saw

were high in the trees, but Richard found a squirrel cache with plenty of pine cones inside. Actually a bear found the cache first and ripped the old log apart, but there was still more than enough cones left for us. We ate some pine nuts on the spot and carried half a grocery bag of cones with us to camp. Bear piles marked the trails every where we went. We made camp near the Branham Lakes. We warmed and dried the cones by the fire through the night, then picked out the nuts on Saturday morning.

The Paiute Indians roasted piñon pine nuts to make them more brittle. Then they used a stone to gently break the shells so they could be winnowed out from the nut meat. We roasted the pine nuts in my gold pan and attempted cracking and winnowing out the shells, but our success rate was very low. Either our roasting or cracking technique was inadequate, or possibly the whitebark pine nuts are just inherently more difficult to process than piñon pine nuts. In any case, the pine nuts were delicious shells and all, so that is how we ate them. There are not many wild plant foods in the west that provide true sustenance, but pine nuts are packed with energy.

We quickly sprinted to near the top of a 9600 foot pass, up until Richard got altitude sickness and had to stop and concentrate on breathing. But we did make it up and crossed over to the east slope of the mountains.

By the time we descended to Bell Lake the sky was partly cloudy, breezy and a little bit cool. We thought we might freeze in the mountain water, but we both needed the bath and our pants needed washing too, so we jumped right in, much to the amusement of a couple picnicking nearby. Yet the water was surprisingly warm and even the breeze felt good afterwards. We hiked down the trail a couple miles into the Potosi drainage before

making camp.

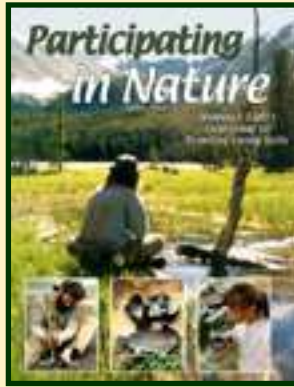
Potosi is a favorite camping area for many people, and on holidays the canyon becomes an ATV race track. Our trail would take us miles down the canyon, but in order to avoid the mayhem we first slept for a few hours, then ventured out in the moonlight sometime after midnight. The night was cloudy, yet the full moon lit up the ground, even in the forest. We walked down the main road past all the tents and campers to Potosi hot springs. The hot pool is small, with room for only four to six people, but it is just exactly the right temperature-especially after many miles of hiking. The hot springs is very well known, so there are people in it pretty much all day long on the weekends. But we had no competition in the middle of the night. Our only company was the fire-flies, and they were nearly burned out for the night. We soaked for most of an hour, then put our packs back on for the last leg of the journey.

Hollowtop is the next drainage over from Potosi, but I always forget how much distance there is between the two. The trail starts with a steep, winding climb up out of Potosi. Richard led the charge up the hill, and I had trouble keeping up. We climbed a thousand vertical feet at a fast pace with only a couple thirty-second breaks for water. It occurred to me as I puffed along behind, that besides being goal-oriented, Richard was also a goal-achiever. He will certainly achieve anything in life that he sets his mind to.

We crossed the big meadow in the moonlight, then lay down for a few minutes with our heads on our packs. We listened to the elk bugling in the forest. When dawn of Sunday morning finally came we were more than ten miles from where we "camped" the evening before. We ate a final breakfast of ashcakes and pine nuts, and hiked in the last five miles. On the road back to Pony we found a garter snake that had just been run over. The tire track went right across it's middle, so it was writhing in agony. I smashed its head in with a rock to end the misery. The strange thing was that there were baby garter snakes inside, partly squished out of the wound. I thought that snakes always laid eggs, but I later learned that a few species, like garter snakes, give birth to live young.

Soon we arrived home, cleaned up, and officially ended our expedition with a great big dinner at the School House Cafe in Norris.

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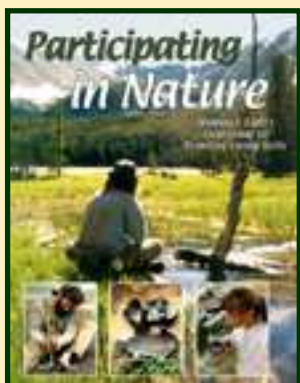
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Tire Sandals

Adapted from Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills

I'm hard on shoes. It's not uncommon for me to go through half a dozen pairs of shoes, or more, each year. I maintain an active lifestyle, hiking, playing, camping, and working. Water wears out a shoe quicker than anything else. A few trips in and out of the creeks, puddles, and swamps, and they just come unglued.



If I do not happen to dissolve my shoes in water, then I wear out the soles on gravel. It has always amazed me that tire companies can manufacture a tire and warranty the tread for some 50,000 miles, yet I can wear out the sole on any ordinary shoe in less than a year. How come we cannot buy a shoe with a 50,000 mile warranty?

Really, I have never been quite satisfied with conventional shoes, and it's not just because I wear them out so easily. Mostly it is because I do a lot of camping, and ordinary shoes have a lot of drawbacks for this type of lifestyle. For one thing, I tend to rot my feet out each summer.

Shoes are like incubators, holding in the dirt and sweat at warm temperatures, and culturing all kinds of fungus and bacteria. Walking through a little bit of water once or twice a day just compounds the problem, making it nearly impossible to dry out the shoes. My feet even rot when I take care of them, washing and drying my crusty socks each day.

While I am at it, I have other complaints too. You see, I do a lot of primitive camping, building my own shelters, starting fires without matches, gathering wild foods--that sort of thing. To me this type of camping is a way of getting close to nature, by participating in nature, instead of merely camping in it. I like to touch nature, and I feel so removed in a pair of ordinary shoes.

I go barefoot as much as I can, but like most people, I have tender feet--because I don't go bare foot all the time. Moccasins are ideal for camping, at least to a point. I can really feel the earth through them, and it has a profound psychological on me, making me feel so much more in tune with my surroundings. The trouble with moccasins is they wear out--fast. It takes me about eight hours of physical labor to tan a deer hide, several more hours to stitch a pair of moccasins, and generally one or two days of hiking to wear the first hole in them. The holes always start at the toughest points on your foot, so they are not initially a problem. You can get several more days of hiking in before you have to stitch in a new sole. Still, that is not a very long time at all. I have heard that some Native Americans carried multiple pairs of moccasins on journeys and spent each evening around the campfire fixing them.

I may practice primitive camping, but I also have to face the modern realities of the clock. My camping trips are typically short, and full. I always have a lot of things I want to do

while I am out. Fixing my moccasins every day is not one of them.

To solve that problem, I have tried over the years many marriages between buckskin and rubber to make lasting soles on my moccasins. The "paint-on" sole, a mixture of ground up tires and Barge Cement glue, does not work all that well. It helps, but even that wears through quite quickly under harsh conditions, and the rubber coating makes it difficult to dry out the leather of the moccasins. More so, they are not very patchable once a hole gets started.

I have also tried working with the "crepe soles", a thick sheet of rubber cement that you can buy, cut, and glue to the bottoms of shoes. The problem I had with these is that my foot no longer stayed in the right place on my moccasins. My foot was typically sliding off the back edge of the sole.



After all these life-long problems with shoes, I was ecstatic to learn of something that actually did work. My friend Jack Fee and I were preparing to go out on a three-week expedition in the mountains. He made a new backpack for the trip, and I made some new moccasins. The best idea I had left to try for protecting the soles was a mixture of pine pitch, charcoal, and dried manure. I figured I could easily dope a little fresh material on the soles each night at camp to keep them from wearing out. I thought I was on to something, and the

finished sole even looked good. Unfortunately, I wore completely through the pitch in two short city blocks, on a test run. I was out of a plan before we had even begun our expedition.

Jack then told me a story about Indians from Mexico coming to the United States and winning foot races in sandals cut from tires. I've been interested in using tire soles before, but it seemed like I would have to glue or stitch the tire to the moccasins. I had reason to doubt that it would work. I also once had a pair of tire sandals, made in Mexico, where the leather lacing was nailed to the tire soles. Those came apart within a couple of days.

Jack had never seen the tire sandals that were reportedly used by the Mexican Indians, but decided to see what he could do anyway. I have to say I was quite impressed with the final product, a sort of Teva-style sandal.

I was most impressed with the fact that there was no glue, and no stitching or strapping on the bottom of the sole where they would be exposed to the ground. Instead he cut the sole with some side tabs out of the tire as one contiguous piece. The first model was a little

crude in appearance, but was amazingly comfortable. I too had to make a pair for the expedition.

The field tests of our sandals were quite exciting. The tire sandal and moccasin combination meant we had "modular" shoes. We wore both the moccasins and the soles when hiking, and then just one or the other around camp. We could use just the moccasins for stalking, or just the tires for walking in water. We climbed 10,000 foot peaks twice and generally just put on the miles. I did not wear socks, and never washed my moccasins, but my feet were in healthy condition for the duration of the trip-- a first for me.

We did find that we would get blisters if we wore just the tires for any significant hiking, but we seemed to have no problems when the tires were worn in combination with moccasins, or with a couple pairs of heavy socks. I was amazed at how comfortable these sandals were, particularly because I once wore conventional hiking boots on a 500 mile walk across Montana, with severe blistering for the first 250 miles of the trip. Our new type of footwear gave me a freedom and comfort I had been searching for for a decade.

Our prototype sandals were crude, but effective. Since then, I have developed the idea some more, into the tire sandals shown in these pictures. The most significant modification was the addition of the tab at the very back of the sandals. That tab is not normally necessary, except in water. Without it your feet tend to slide forward off the front of the soles when the tires are wet. That back tab holds your foot securely in place. I also added the rubber buckles, and did away with the rope and buckskin ties of our early models.

Also for our prototypes we just traced around a pair of conventional Tevas onto a tire, and started from there. I have since developed a system for creating a pattern to match your own foot. Plan on spending most of an entire day making your first pair. You will get faster as you make more.

Making Your Tire Sandals

First, place either foot in the center of a large piece of paper, at least an 8 1/2 x 14. Trace around your foot, being careful at all times to keep the pencil straight up and down. Next make a mark on each side, directly down from the point on your ankles (A) (see pattern at the end of this web page). Also make a mark at the point along the inside of your foot, directly back from your big toe (B).

Remove your foot from the pattern. Now sketch a bigger outline around the tracing of your foot. Add about 3/8 inch for the toes and sides, but not to the back. Then use a ruler and bisect the pattern lengthwise, extending the line three inches past the heel. This serves as a guide to help you sketch the rear tab accurately. Now connect the marks you made by your ankles (A), extending a line three inches beyond each side of the pattern. These tabs will be sketched in front of this line. Also draw a line for the front tabs, extending from the

single mark (B) across the pattern, perpendicular to the line that bisects the foot lengthwise.

The positioning of all these tabs is quite variable, and you can choose to move them forward or back, or at angles to one another, and all usually work, although the arrangement I have suggested may work more consistently. Problems usually arise with the front set of tabs. When at angles across the pattern they can twist a little and dig into your foot. If the tabs are moved forward or back then the edges can dig into that point (B) on the inside of your foot. That point is more pronounced on some people's feet than on others.

Now sketch in the five tabs, as shown on the pattern. These tabs are sized width-wise for 3/4 inch wide strapping, and should be made according to the approximate dimensions I've written in on the pattern, regardless of how big or small the foot. If anything you might make some adjustments length-wise, adjusting for particularly large or small feet. Finally, sketch in the holes that you will cut out to thread the strapping through. This just helps you remember to cut them the right direction when you get to that stage. Cut the pattern out, and it can be used for both sandals, assuming your feet are fairly similar to one another.



As for tires, I would recommend truck tires, rather than car tires. The "corner" of any tire, where the sidewalls and tread come together, is always much thicker than the rest. You can work with that thickness in the tabs of the sandals, but not in the sole itself. Pickup tires are typically wide enough to work with, and you can make about three pair of sandals from one tire.

Most importantly, always use tires that do not have steel cables running through them. All tires have some kind of fibrous reinforcement in them, typically nylon or rayon threads. Most of the newer tires also have a layer of steel cables, which is not workable at all. Still, there are a few billion of the older tires around without steel cables, so you should not have to look too far to find some. Just look on the sidewalls of the tire and it will be printed there how many plies of nylon, rayon, or steel are imbedded in the rubber.



We used simple utility knives to cut out our first sandals. Doing it this way you can trace around the pattern on the outside of the tire and start cutting. However, I must say this is very laborious and not much fun. It is hard work, and you could easily slip and cut yourself with the utility knife. Along the way I have discovered that it is much easier and more enjoyable to cut tires using sharp wood chisels or a bandsaw.

To do the chisel or bandsaw method you must first remove a section of tire. This allows you to run the piece through the bandsaw, or to put it on a wooden block, where you can chisel from the inside out.

A circular saw works fairly well for cutting tires, except that it creates a lot of blue-black smoke, and binds frequently. Cut out a piece that is at least a half inch longer than your pattern, and save as much of the sidewalls as you reasonably can. These are useful later for making the buckles. Do not try cutting through the inner edge of the tire, which has an imbedded steel band to fit the tire snug against the rim.

Now, trace the pattern on the inside of the tire, being certain that the pattern is centered and straight on the tire. Even a slight 1/2 inch angle along the length of a sandal can cause problems when you wear it.

I've done separate tests, cutting out the sandals with chisels and with a bandsaw, and the bandsaw method is only a little faster. A good set of wood chisels works just fine if you do not have the bandsaw.

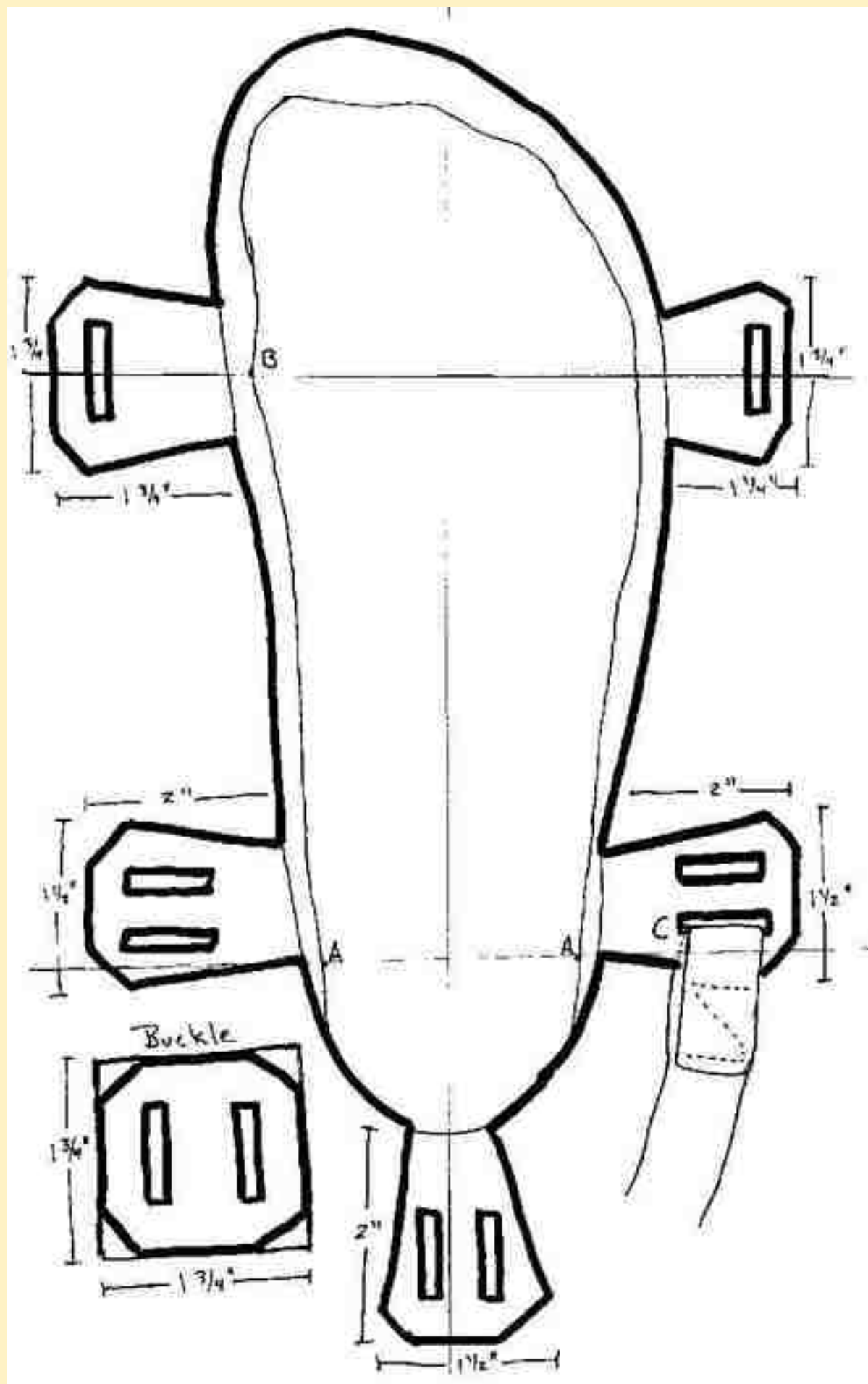
I would suggest making only one sandal at a time, and completing it. Finish the one and try it on; you might think of some modifications to improve the next one. Few of my pairs of sandals are exactly identical, as I usually find some new idea to try on that second sandal.

The next step, after cutting out the sandal, is to thin the four side tabs. The tabs are generally cut from that "corner" on the tire, where there is a thick lump of tread. These are easiest to thin on a bandsaw. You can, however, do a crude but adequate job by cutting the lump down with some careful chiseling or with a sharp knife. Thin down as close as you can to the nylon/rayon plies, without actually cutting any of them. This step is not easy by any method I have found, and I typically leave 1/8 to 1/4 inch of rubber covering the plies, for a total thickness of up to half an inch. That is still quite thick, but thin enough to work.

Now, to make the tabs flex upward, take a razor blade and slice straight into the tread of the tire at the joint where the tab attaches. Slice in all the way until the plies inside are exposed. Be careful not to cut into those fibers.

Chisel out each of the eyelets, where the strapping will be threaded through. For this I use a 1 inch chisel and a 1/4 inch chisel. Be careful to not cut too close to the edge. If you break out the side of a tab, then you generally have to start all over. Also cut a set of buckles from the sidewalls of the tire. These are easy to do.

For strapping, I use a sort of a nylon harness strapping,



available at farm and ranch supply stores. 3/4 inch wide strapping works well with the one inch slots. Cut pieces that are extra long, you can trim them off after you thread them through. Use a match, and melt the end of the nylon strap to secure the threads. To do the back strap, thread through the hole marked point (C) on the pattern and stitch an inch or so of the strap back on itself. Thread around through the other eyelets, through the buckle, through the other hole on the first tab, and once again through the buckle. The front strap should be threaded through the buckle, through both eyelets, and back through the buckle again. This system is a little hard to adjust, but once set, I find I can slip my foot in and out, without having to tighten or loosen them.

The finished sandals should be comfortable to wear, although you may need to do some fine-tuning to get them right. For any serious hiking you should wear a couple heavy pairs of socks, or moccasins, or bring along some moleskin.

Hi,

Just read your interesting article on making sandals out of rubber tires. We did that in Germany after WW2 because there were no shoes one could buy for years. As a 14 year old I made a pair that I wore all year (hiking all over the Alps and over glaciers in them during summer vacation), from 1946 to 1949, when one was able to buy a pair of real shoes once again.

The straps were cut from my old worn out "Lederhosen". They were inserted into slits sliced into the sides of the sole (below the fabric belt), and fastened with twine that we threaded through holes melted into the rubber with a needle that was heated in a flame. That was not necessary if one had a big enough needle, or pliers to force the needle through.

To secure the straps even better, we made some rubber cement by soaking some gum rubber in gasoline until the rubber was dissolved - took about three days, if I remember correctly. We didn't have utility knives so I used an old hacksaw blade that I honed to a razor edge.

All that probably won't interest you, but the way we cut the rubber was so easy: We used plain water to lubricate the cut. Once there is water in the cut the knife cuts like butter! Be careful, I slipped and sliced through the tops of three fingers. (Want to see my scars?)

When I looked at the pictures of your sandals I saw that you left tabs from the sidewalls to attach the straps. That is much better than our method and left me wondering if one could make some 'boots' out of a properly sized tire? That would have been much nicer for wear in the snow! We never considered that, because the man, who sold the tire pieces on the black market, had already cut the sides off.

He punched discs out of tires to make bicycle tires (for those who were lucky enough to still have a bike.) You bought enough of the discs, drilled or burned holes in the center, and ran a sturdy fence wire through the holes. To mount these 'tires' one twisted the fence wire until it was tight enough take up any slack. It was a very hard ride, especially on the old cobblestone roads, but it was better than walking for some people.

Thanks for the entertaining reading, I'll revisit your info!

Ernie
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The Atlatl and Dart

An Ancient Hunting Weapon

by Thomas J. Elpel

Through the eons of prehistory, primitive peoples from all over the world developed hundreds of unique weapons for hunting game. Among all the technologies invented the atlatl and dart was the first true weapons system, consisting of both a projectile and a launching device. The atlatl, essentially a spear-thrower, was developed in Europe more than 30,000 years ago, and in North America about 12,000 years ago. By comparison, the bow and arrow first appeared here only 2,000 years ago.

Today there is a resurging interest in atlatls for sport and hunting. There is even a World Atlatl Association with national and international competitions. I met in the metropolis of Manhattan, Montana (population 800+) with modern day atlatl guru William "Bob" Perkins. Perkins has an engineering background. He has devoted his life and skills to uncovering the secrets of the atlatl, studying why mathematically it works so well, and theorizing how it evolved over the years to become more efficient. He manufactures these ancient weapons for sale at his home. His fascination with the atlatl earned him the nick-name "Atlatl Bob".



The atlatl throwing board consists of a stick about two feet long, with a handgrip at one end and a "spur" at the other end. The spur is a point that fits into a cavity at the back of a four to six foot long dart. The dart is suspended parallel to the board, held by the tips of the fingers at the handgrip. It is then launched through a sweeping arm and wrist motion, similar to a tennis serve. A fine-tuned atlatl can be used to throw a dart 120 to 150 yards, with accuracy at 30 to 40 yards. The

atlatl is the tool ancient peoples used to "bring home the bacon", said Perkins.

Perkins started researching the atlatl in 1984 as an engineering student at Montana State University in Bozeman. He made and tested his first atlatl as part of an archeology course in replicative study. He became fascinated with the mathematics of the system and made it his life's work to discover and replicate the secrets of this age-old technology.

Eighty percent of the technology lies in the dart alone, according to Perkins. "The dart is like a long, loose spring," he explained "and when accelerated by the atlatl it compresses and stores energy. That energy is then used to push itself away from the atlatl, enabling the dart to launch smoothly and effectively."

The mass of the stone point, according to Perkins, is an integral part of the mechanics,

resisting acceleration, causing the back of the dart to travel faster than the front, thereby compressing it like a spring. To Perkins, the stone point is more essential for the mechanics of the system than it is for tearing through the flesh of the animals it is meant to kill.



The other 20 percent of the technology of the system lies in the atlatl board used for launching the dart. The first atlatls were just rigid platforms, Perkins noted. Over time the atlatl underwent a technological evolution much as rifles evolved from muzzleloaders to breach loaders, to lever actions, to automatics, he said. The first major improvement in the technology is what Perkins describes as "launch geometry". Archaeologists found pictographs and artifacts of throwing boards of different lengths, long boards for long distances, and short boards for short distances. Changing the length of the throwing board changes the point in the swing when the dart is launched.

The dart lays almost flat on the throwing board before it is launched, but lifts away as the board is swung in an arc. The nock at the back of the dart remains engaged on the spur of the throwing board until the dart is tangent to the arc of the swing (perpendicular to the board). A long throwing board causes the dart to become tangent to the arc much sooner in the swing than with a short board, so the dart launches high into the air at a long-range target (and right over the top of any close targets). A short throwing board allows for more follow-through so the dart is pointing downward when it launches; this enables the hunter to aim at short-range targets.

Later in the evolution of the atlatl it was discovered that flexible, rather than stiff, atlatl boards could store and release energy much like darts do. This led to the development of the atlatl weight. The purpose of atlatl weights was controversial among archaeologists, who speculated that it was either a counterbalance to steady the board or a "magic charm." Perkins has demonstrated mathematically that it was neither.

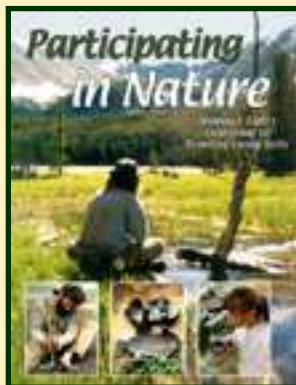
The weight has an effect similar to the mass of the projectile point on the dart. It resists acceleration, forcing the spring of the atlatl to store an equal and opposite amount of energy to that stored in the spring of the dart. "The technology employed here is impressive even by today's standards," Perkins noted.

If the flexibility of both atlatl and dart are in a functioning relationship to one another, the result will be similar to that of a diver diving from a spring board. In this system, the diver's legs are bent, like the dart, and store energy to be used in pushing away from the board. The diving board, like a flexible atlatl, is bent back, storing energy to be used to push the diver away from board. With the diver and diving board pushing each other away at same

time, the launch of the diver is considerably higher, smoother, and more powerful than if the diver had used a fixed rigid form. The weight in the atlatl system therefore serves as a timing device to bring the flexibility of the dart and the board in tune with each other, much as one might adjust the timing of a car engine.

Perkins is continuing to reveal the secrets of atlatl technology. He discovered that ancient people applied "stealth-like" technologies "mathematically analogous to the B-2 bombers in use today". One style of atlatl weight, used by people living in what is now the eastern U.S. was demonstrated to serve as a type of "silencer" for canceling the zip-like sound of the atlatls' swing!

Laws vary from state to state governing the use of atlatls for hunting. In Montana legislation was introduced into the House and Senate a few years ago to create a special two-day atlatl season that would immediately precede the normal archery season. The first version of the bill passed the House, but the bill died before it could be reconciled between both the House and Senate versions. Nevertheless, it is legal to hunt with the atlatl in Montana during the general rifle season as long as you stick to the basic hunting rules-wear hunter's orange, have a valid license, and shoot only during daylight hours. Be sure to check the laws in your own state before hunting with an atlatl.



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Bear Summer by Thomas J. Elpel

As a teen-ager I spent a great deal of time living with my Grandmother here in Montana. We shared a common interest in learning outdoor skills and particularly in studying the wild plants and their uses. I was living in Bozeman, but went to visit Grandma Josie almost every weekend, and all summer long. She lived near Virginia City through most of my youth, but then moved to Pony in 1985, between my junior and senior years. Pony is a small community at the base of the Tobacco Root Mountains, halfway between Butte and Bozeman. One summer I will never forget came to be known as Bear Summer.

I remember hearing a report on the radio suggesting there could be bear problems due to an exceptionally low berry crop. That, I soon learned, was an understatement. I do not believe there was a day all summer when I did not hear some story about bears.

Of course, the main reason I heard about bears all the time was because I spent so much of my time with Grandma. Her house was the last place in town up along Pony Creek. Or, from the perspective of a bear coming down the gulch, it was the First house in town. And so Grandma was always concerned that she would walk out one night to lock up the chickens and end up in a bear. She talked about bears all the time.

The first bear incident occurred early in the summer. Grandma and I were doing a little organizing when I happened across a box with a very dark black bear rug in it. Grandma was working in the other room so I draped the bearskin over me and slipped in behind her and crouched down to blend in with a dark desk and a dark wall. I did not say anything; I didn't need to...

Not long afterwards, a bear was sighted on the slope across from the Post Office. Next, a mother, a yearling, and a cub were seen near the same spot. A few days later Grandma and I were returning from our evening walk when we met three tourists with binoculars. They kept looking at the hill behind us and told us a bear had been seen there the night before. We talked only briefly as the shadows grew darker in the trees. Grandma was not about to idly stand around to visit with night coming on. I could hardly keep up with her on the way home.

At about the same time I was in the habit of getting up around five or five-thirty in the morning and hiking out to watch the deer. The deer are always out grazing, moving, and playing at that hour, and they are quite carefree because people are not normally out that early. Every morning I would see several deer with fawns in a gulch that I call "Deer Valley". Then I started seeing bear sign, where the rocks had been over-turned by bears hunting ants and ant larvae. Sometimes I would find where the bear had split rotten logs apart in its search for grubs. Occasionally I would find a perfect bear track.

As I looked at all the signs, one question burned in my mind: How did the bear eat all the

tiny grubs without eating a paw-full of dirt? This question was somewhat answered for me when I found a bear pile left several days before. I pulled it apart with a stick and found it to be full of gravel, pine needles, ant parts, and indistinguishable mush. I didn't know if the mush was digested food or just dirt mixed with stomach acids to make mud.

I went away for a few days on a camping trip. Upon returning to Pony, Grandma greeted me and said, in an exasperated voice, "Tom, the BEARS! They're getting closer!" She proceeded to tell me the latest story about a bear in a yard across town.

Later I talked to some old-timers who had grown up in Pony and had come back to visit. They had all kinds of bear stories to tell. Among their stories was one about the time they were putting up a barbwire fence. The barbs on the wire were the exceptionally long ones that were used on the battlefields in World War II. The guys watched while the bear carefully crawled through the fence one limb at a time. When it was halfway through the wires they threw a red jacket up in the air and yelled "Yippee!". The bear left a hunk of hide in the fence.

I returned home to Bozeman, and the next night Grandma called me, "Tom, GUESS What!" She and Great Uncle John and Great Aunt Alice saw a bear while taking their evening hike. I believe they were a little disappointed because it was not too ferocious, and it ran away as soon as it saw them. However disillusioned, Grandma was still plenty worried. In the next incident, Renee and I saw a bear in the late evening while returning from a hike. It was only a short distance downstream from a tent. Being kindly, we detoured to the camp to warn the campers, especially since they left some coolers of food sitting around outside. We also hoped to scare the wits out of them. The campers had already gone to bed, but were not asleep. They said they were not worried about the bear. We were disappointed that they took it so casually, but one way or another, they were not camped there the next day.

Then Grandma's neighbors had a bear in their yard. When the woman saw it out the kitchen window she pointed her finger and started shaking, unable to speak until her husband came running to see what was the matter.

Meanwhile, Great Uncle John bought Grandma a big-beam, six-volt flashlight for walking out to lock up the chickens at night. The next time I came to Pony Grandma said, "The BEARS! They're getting closer. They are starting up the road!" My cousins had been taking pictures of a bear at the end of Grandma's long driveway.

Then my sister, Jeanne, had a face-to-face stare down with a bear on trail in Bozeman, where we still lived with our mother. She heard a noise in the bushes and thought some kids were building a fort. A bear lumbered out into the trail twenty feet ahead of her. At the time she could not have done anything at all to defend herself, because of a back injury. Someone could have come up the trail behind the bear and startled it right into her, but fortunately no one did. She and the bear looked each other over up and down, and

both turned tail and went opposite ways.

All summer people asked me if I worried about bears, especially since I do quite a bit of camping. I always answered, "No, why should I? They are all in town."

And so a bear raided the neighbor's garbage and ate the centers out of all the baby's diapers. Then it raided the dump. My dog nearly lost his voice from barking so much. And Grandma was scared she would end up in a bear.

I packed my gear to go on another camping trip. Great Aunt Evie called up and said she had a bear pass through her yard at four in the morning. As I walked out of town towards the mountains I noticed the tracks of a bear cub neatly padding down the road--towards town.

Thomas J. Elpel is the director of Hollowtop Outdoor Primitive School, LLC in Pony Montana, and the author of four books, including [Participating in Nature: Thomas J. Elpel's Field Guide to Primitive Living Skills](#).

A reminder from the author: It seems that everyone wants to live on the fringe of the wild, close to nature. Unfortunately, Montana is being chopped to pieces by subdivisions and houses plopped down by the thousands in prime wildlife habitat. Every new home in the wrong place reduces wildlife habitat, which translates directly into less wildlife. There is certainly plenty of room here for all, but please locate in existing communities, rather than breaking up additional wildlife habitat. Thanks for your consideration!

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Storytelling

The Art Form Of Painting Pictures With Your Tongue

by Michael Patterson, copyright 1999
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... and then, after carefully reading the map, they realized they had found exactly what they'd been looking for, all the time, and it was right under their noses!...

Introduction

1. Stories

- Stories Are Efficient Communication
- Healing Story
- One Story About Healthy Community
- Story And Community
- Stress Release Exercise Using Story
- Peace Village
- Community Self
- Teaching Stories

2. Technique

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- Future Pacing Or Visioning
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- National
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- New York/New Jersey/New England
- Atlantic Coast
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- Midwest
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5. Stories Can Help Awaken Vision In People

Introduction

Tom Brown, Jr., the Tracker, has talked about the importance of getting healthy ideas out to the young. There is no more effective or quicker path than Storytelling. Teachers and parents already know what Storytelling is. You can bring in Stone Age tools to your presentations. If you tell stories from your heart, you will fill spiritual hunger like few others can, and help begin the Community Healing process. Storytelling is a powerful, beautiful art form. If you can talk, you can do Storytelling.

Tom Peters has said the most valuable people in the country will soon be those who can most quickly get ideas across to other people. Community building is basically sales-sales of good ideas. That's where it all begins. Nothing works better or faster to get new ideas across, or entertains more, than storytelling. I suggested to the big boss at work that training was sharpening the saw, from Steven Covey's retelling of the story of the man too busy sawing to sharpen his tools... and got my point across instantly. If you've ever seen anyone using a chainsaw, who knows what they're doing, you'll notice they spend half their time sharpening the saw- and get the job done in half or less the time it takes with a dull saw.

Effective people know that there are only 2 functional activities- taking small slices off the beast, and celebrating small victories. The journey of a thousand miles starts with a single step- and continues, step by step by step. These are two very short "stories" on the value of persistence. The Dream drives the Action. What are your dreams, and the dreams of people in your community? All positive accomplishments are borne of dreams- they start out in the mind of one person. Where there is no vision, the people perish. Storytelling gives life to the Vision. It is like planting seeds. It must be a little painful and risky for a seed to break open its body, to send out a shoot in the darkness, trusting and hoping for the best. Yet it eventually finds the light, and growing faster into the light, becomes green and healthy. Think about this- there is both a literal and a metaphorical side to that story, and they reinforce each other.

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1. Stories

Traditional cultures were not literate. They needed an efficient way to store and transmit cultural values. That method was... storytelling. They got multiple use out of most things, and they certainly had multiple uses for storytelling. Stories were never only for entertainment. They at the very least:

- * define the place and purpose of people in the cosmos- possibly even with direct reference to geographical and astronomical formations
- * holistically model ideal values and behavior
- * could be exclusively for ritual, ceremonial, or spiritual purposes. This was especially true for the Sufi/Semitic and Native American tradition.
- * mirror or even parody archetypal behavior - so that people could see and laugh at their own faults, and correct them
- * provided language models. Shakespeare's plays, for example, provided a number of expressions still in use today.

Aristotle noted in his "Poetics" that mythology/poetry/history don't tell what happened- they tell what always happens. Values of Native American culture crystallized in stories included:

- * co-dependence on the beneficence of the cosmos for life, and the need for cooperation, gratitude, appreciation, and long-range focus in planning for life
- * The individual struggles and suffers for the well-being of the group/community
- * even enemies are human beings with needs, who act for reasons that make sense to them
- * There is no failure, only experience... those who "fail" should be given a second chance.
- * respect as the center of community, with infinite patience as its context
- * balance, sharing, and generosity are part of healthy people and communities
- * elders, children, and women deserve respect as much as anyone else. Elders for their wisdom (go to the white-hairs if you wish to know), children for their recent contact with the joyful mystery, and women as the heart of the community
- * the earth does not belong to people, rather people to the earth. Life is a circle: for each thing taken, something is returned.

* focus on the positive, since what we concentrate on grows

(adapted from a presentation by Dovie Thomason, Storyteller, (POB 168, Canton Ctr, CT 06020 (203) 693 8475), who cited many storytellers and elders as inspiration, including Joseph Bruchac and Lenore Keeshig Tobias.), and conversations with the Storyteller Manitonquat, of the Wampanoag Nation.

Which teachers did you enjoy most in school, the teachers who could spit data out like a computer, or the teachers who told funny and interesting stories? Whose information do you best remember? Which method did you find more inspiring?

Stories Are Efficient Communication

Storytelling is the most powerful activity we can engage in to empower communities, because storytelling is how new empowering ideas are shared. Success stories are the best sales method there is. "War stories" are the most useful part of any training, because they animate the tools. Who would not listen closely, when it's time to get the "low down" on the higher ups? In Japanese Art, there's a term for the "space between"- the white space on this page, for example, the context for the text. Stories deal with and structure this "space between" in the human psyche, and give meaning and context to most of what we do.

We are the crystallizations of our paradigms, stories and myths, the "footprint" of the meaning we assign to life, we live our stories as our lives. Most holy scripture is... stories. Some stories were so important to ancient near eastern cultures that only certain people were allowed to tell them. Bards (storytellers) were highly respected members of Celtic and other cultures. Plays and theatre were born in the temples, as storytelling methods. The temples were also the origin of writing and accounting, which are also storytelling methods of a sort.

Consider most Romance novels. They have slight variations on the myth of Medea (tall dark handsome stranger from afar comes to take her away from it all... and dumps her, too, a story one hears as well). Romance novels for guys, aka adventure novels, have slight variations on the story, or myth, of Jason (a troublemaker who gets to go out in a vehicle with his drinking buddies, get into fights, maybe get some treasure, and who cares about tomorrow?).

Stories structure our "inner landscape", the inner world from which behavior is born. Troops in the Civil War would willingly charge cannonfire, oblivious of the danger - because they were living the stories they'd been raised on, of Revolutionary War heroes, of Napoleonic wars men on horseback. What marine doesn't know about Chesty Puller and the Cho-sen reservoir, during the Korean War? Stories are powerful.

Sometimes becoming conscious of "stories" makes it much easier to change behavior. Conrad Salas, formerly a Texas State Legislator of Mexican descent, used to tell his

"Mexican Crabs" story. As a boy, he saw a shallow pan of live crabs in a shop. He warned the owner, "Hey mister! Your crabs are going to get away!" The owner replied, "No they're not, they're Mexican crabs. Anytime one tries to climb out, the others all drag him back down." I told that story years ago in a factory I worked in. Workers started calling each other "Mexican crabs" when they did negative things, and they did those things less.

A better metaphor for community building is the starfish story. A man on a beach saw another picking up washed-up starfish and throwing them back into the sea. He said, "You can't possibly make a difference! Look at the thousands of starfish on this beach!" The other man threw a starfish into the sea, and said, "Well, it made a difference to that one." Isn't that precisely the problem of awareness we face in our communities- that we CAN make a difference? The journey of a thousand miles begins with a single step, and continues- step by step by step.

Eagles have magnificent eyesight, dogs an incredible sense of smell, and humans have an equally unique quality- memory, of stories.

M. Scott Peck evokes Community with the story of the rabbi's gift. A monastery had fallen on hard times. The brothers fought over how to solve their problems. Finally, they decided to ask a nearby rabbi how to solve the problems. The rabbi said, "The Messiah is among you", meaning that with a Christian belief system, they had the presence of the Messiah among them. The brothers misunderstood him to mean that one of them was the Messiah. They didn't know which one, though, so they treated each other as if each one was the Messiah. The brothers treated each other much more respectfully, its whole energy changed, and soon the monastery became renowned for its piety and faith. New candidates flocked to join, and its problems solved themselves.

This story in longer form is used by the Foundation for Community Encouragement, a non-profit, educational foundation, as the beginning to its community building trainings for individuals, groups and organizations. [FCEonline@ aol.com](mailto:FCEonline@aol.com))

Art forms like stories long outlast the cultures that generated them, just like shark's teeth long outlast the shark that made them. Art forms and stories are the "teeth" a culture uses to "chew up" experience, into bite-sized chunks of meaning. If you take out a quarter, and look at the back, you will notice a Roman imperial eagle. Where did the Roman empire exist? In the minds of Romans, as stories. When Rome died out in the minds of Romans, it died out. Yet we still use Roman art forms. They are convenient.

Stories last a long time. You might not think that a group of stories that date back more than 2,000 years, from the Hadhramaut section of the Arabian Peninsula, from what is today Yemen, might have much effect on you. Yet those stories eventually were crystallized into the Thousand and One Nights, even a story or two in Chaucer's Canterbury Tales, and we know some of those stories today as the Voyages of Sinbad, and Aladdin and the Magic Lamp. Listen to the speeches of motivators as diverse as the

Reverend Dr. Martin Luther King to the Ayatollah Ruhollah Khomeini- you will notice master storytellers, who invoke well-known stories to explain current events.

Stories drive behavior. One common bumper sticker in this country is "He who dies with the most toys wins". It must reflect a fairly common belief system. The television show "Wheel of Fortune" has a ritual quality to it. Ritual is the reenactment of story, and in this case it is the story of consumerism. Contestants seriously pursue material goods, and it's not very hard to win. Think about what a "Wheel of Fortune" is, really... it is a secular belief system about the way life works, a story that explains things. It's also vicarious "wish fulfillment", which can be another function of a story.

We can find a very different kind of belief system in another American culture. The Navajo have a word - "Hoz'h'o" - which means beauty, harmony, joy, happiness, healing, and dozens of other such words rolled up into one. One could define it weakly in English as sparkling, harmonious, joyful, healing beauty. For the Navajo, the purpose of life is the creation of Hoz'h'o- of healing beauty- on the path of healing beauty, the Nizhini. This very different core belief system leads to a very different kind of culture. I wonder how would American communities change if that were a common belief system?

Native Americans would "layer" meaning into phenomena, with multiple stories and other references. Animals and elements of the Natural World could hold quite a bit of meaning. Following is an attempt to put this in words.

Hummingbird Medicine

When I was a little kid, the world was a magical place. There were always lots of things to explore, new things to learn, the whole world was just an expression of the joy of the moment. Then I learned that nature had been desacralized, that it was only resources waiting to be used up, that the world was a dreary place of things and the material. I learned that I had to grow up, and abandon this childish way of seeing the world. I read many books in school, and absorbed many facts, but it wasn't the same. I began seeking, and learned techniques and processes to hopefully free myself from limiting, artificial structures, so I could get to a more relaxed, happy, natural state. Yet the very path I took- studied, linear, logical, of orderly progression ... kept me from my goal- the free-flowing, natural aliveness, of intuitive living. I love books, and yet, I learned that the only way to recapture the fire of the awareness of beauty and joy that I lost is to jump into it directly, to feel it with all my being, to swim in it, to fill my universe with it. I had to inhale, to drink deep, of original essence... core life force, infinite spirit- to get back to my true self.

I learned through direct experience that truth, beauty, meaning and purpose in life, peace, happiness, satisfaction, joy, wholeness, healing, and the spiritual, were all different faces of the same thing. I learned that they exist only right here, in the eternal now. Guilt and blame are to the past what fear is to the future, and none is useful. I learned that we have a part of the Creator in each one of us- it is our attention. What we put our attention on

grows, and is created. I learned to pay attention to my fascinations. I learned that the Universe reflects back to me my belief systems, and that the Universe is a much more pleasant place as a Universe of energies, of vibrations, of webs of relationships, of currents and flows and cycles, of rapture, rather than a Universe of things and objects.

All of these lessons are summed up for me in the Medicine of the Hummingbird. Every time I see a hummingbird, even only in a picture, it is a reminder of this basic truth at the core of life, and I smile, for I create this Truth in my life again with my attention. Synchronicity is the bridge between spirit and matter, and I welcome every emanation of the Hummingbird Medicine. When I notice hummingbirds, I might hear a faint whizzing sound, of their wings, and then a ball of magically jewelled, iridescent light, moving from flower to flower. Watching hummingbirds is still just as magical as it was when I was a little child. There is a Navajo word, which can be very weakly translated as "sparkling, harmonious, joyful, healing beauty". For the Navajo people, the purpose of life is the creation of that kind of healing beauty. There's something about the hummingbird that makes me think of healing beauty, that something that beautiful just can't exist in flesh, and yet it does. When I see a hummingbird, the boundaries of flesh cease to exist, for a moment, for a second I am in non-verbal space, and am one with the Hummingbird, with the flower, with the water and air, with all of nature, in a great glorious symphony of joy and celebration.

So many people seem to be among the Walking Dead, with broken spirits, separate from beauty and joy, in a vast prison of their own making, of their own belief systems about limitation, scarcity, lack, cruelty, conflict, pain, sorrow, and anguish. I lived among them for a long time. Like a day with great stormclouds, though, occasionally the Sun would shine through, in little bits of beauty. As I paid more attention to them, they grew, and grew, and in time the clouds broke. It was as if the Sun burned away my fog, and I could see, clearly, the beauty that surrounded me, the beauty of moving water and rocks, of waterfalls, of vibrant Spring green, of flowers, of finely worked art, of a carefully crafted story, the intricate beauty of all creation. I went out in the rain, and joyfully jumped in puddles, and skipped rocks on water, and flew balsa gliders, and enjoyed those things that most fascinated me. I learned Chinese Ink Brush painting. I saw pine trees, and fish, and birds, and flowers, and all of nature differently, for it captures the energy, the essence, of what is painted, and lacks the line heaviness and exclusive concentration on form and matter of Western Art. I plugged myself in, to my own fascinations, to what excited, surprised, and delighted me, to my Vision, to my purpose in life, to the magic all around me. I relit the flames of my Being, and recovered the awareness of who I was, for healing is just remembering who you really are_ this is the medicine of the Hummingbird. When I see Hummingbird, all of it comes back to me, in a flash, an awareness capsule that fills me with feelings, which become, sometimes, words, as you see them here. I wonder just how much beauty, joy, truth, meaning and purpose in life, peace, happiness, satisfaction, and wholeness a person could perceive, and enjoy? Is there a limit to rapture?

Healing Story

I heard a Wampanoag Nation Storyteller named Manitonquat (which means Medicine Story, or Healing Story), at a presentation he made to the Connecticut Storytelling Association conference in New London, CT. I had taken my daughter- she was as fascinated by the stories he told as I was. I next heard him in my daughter's school, where he kept over 100 young children, and some adults, fascinated and riveted to their seats during his hour long presentation. He does storytelling presentations in schools and elsewhere, as well as other seminars based on Native American ideas. He noted that storytelling may well have been the first art. Perhaps it was the first journey into something other than the eternity of the now.

He has a smile like the morning sun, and somehow, well, he's just a fascinating storyteller. He clearly comes "from the heart" in all he does. I heard from another person about Manitonquat's idea of "give-away", that one goal in life is to gather all the awareness one can, and then to pass it out freely to those who are interested. I put this manual together as a direct result of that inspiring idea. He says he does storytelling in schools because the children help teach him how to stay centered. I have enjoyed his stories, especially his telling of the story of Degonawida, (on tape), who brought the 6 nations of the Iroquois (Haudenosaunee Nation) confederation together in peace.

I first heard of Manitonquat from one of his books, Return to Creation. His literature identifies him as a Native American elder, spiritual leader, and Keeper of the Lore for the Assonet band of the Wampanoag Nation; an internationally recognized storyteller who uses the history, traditions, and stories of his ancestors and other native people to teach practical ways of enriching the experience of childhood, strengthening the family, and developing trust between individuals to keep the spirit of community alive.

He is extremely modest, and like many Native Americans I've dealt with, very patient and pleasant. Unlike our schools, where information is dolloped out in measured doses, and absorption is measured with standardized tests, traditional Native American education is strictly based on interest. If a student shows no interest, nothing is said. When a student starts showing sincere interest, information is given, but only sparingly, really only enough to tantalize- which means students get more and more interested, starts seeking out information on their own, and change their mind set to be much more receptive- as that is the only way to get more fascinating information. The only test is experience, and results, and service to others. Following is my recollection of a story he told, which is very much a community building story.

One Story About Healthy Community

One of Manitonquat's neatest stories is of porpoises, a favorite animal of his coastal tribal nation. His grandfather told this story; he could tell it in 5 minutes, or telescope it to an hour or more, depending on the audience.

It seems there was a huge monster terrifying the people- it had many sharp teeth, and was very big, and was tearing up nets, attacking people, and generally causing trouble. Mashaup (a cultural hero) went to talk with the monster, first. Respect is the first rule of life, and the second is patience- so Mashaup tried both. However, the monster refused to listen, or to stop causing trouble. Mashaup eventually noticed his patience wearing thin, so he decided to hunt the monster. He gave chase, and was able to stick his spear in its back. It felt nothing though, and the handle broke off. The spearhead stayed, though, and it did some good, as it warned people that the monster was approaching- they could see the spearhead cutting through the water.

Mashaup then went to the porpoises. He knew that porpoises liked humans, though they thought humans were much too serious at times. He told them they were very smart (as indeed they are- their brains, especially the cerebral cortex, are larger than human brains, both in size and by comparison to body weight. Porpoises may have gone back to the sea, along with whales, and they've had a very long time to perfect their culture.) He asked them to do something about the monster. The porpoises said the monster had sharp teeth for weapons, and was very mean, and they avoided it. Mashaup responded that he knew they were very intelligent, that the porpoise's weapon was brains, and that they could figure out a solution to the monster, but that he didn't and couldn't know what it was.

The porpoises formed a council circle, (where one can see each person's eyes, where all are equal, in a circle, the source of power in Native culture) and each spoke in turn. The first said that they lacked the education and training to take on the monster- they couldn't fight, they were non-violent. The second wasn't sure exactly what they should be doing; they weren't trained warriors, and couldn't take on such a big fish- there was certainly no reason to do what they couldn't do. The third said that they were smart, and so could figure out an answer. The fourth said, "Oh, I know, listen, what we're good at is playing, and having fun. Why not do what we do best already? What do you say we play with the monster? We're experts at fun, and having a good time. He'll either have to loosen up, or leave, or go nuts." They all agreed it was a good plan. Besides, we know that a path is correct when there is fun attached to the activity, because that is how the Creator marks out the correct path for us. If you can solve a problem having fun, you know the solution is the right one.

And that's just what they did. They crowded round the monster, and started turning cartwheels, jumping and diving. The monster fish was very serious, and tried to swim away quickly, but the porpoises were too fast, and kept up with him. One would bite his tail, and when the monster turned to get him, two more porpoises would swim in and poke the monster with their dorsal fins, while another would but the monster in the stomach with its beak. The monster was driven to distraction, and eventually dived so deep the porpoises couldn't follow, and went away and never returned. The porpoises told their cousins, the dolphins, about the monster, and they all thought playing with monsters was a great idea. It is so to this day- if you see porpoises or their cousins, the dolphins, playing

in the water, you may be sure no sharks are about, as the porpoises will drive them away.

(This story and others in a similar vein are presented in the book *Children of the Morning Light*, available from the author at the address cited in the resources section.)

Story And Community

In the Native American world view, generally, ideal human interaction occurs on the model of a circle. What goes around comes around, you attract what you are, the cycle of the seasons, from Spring growth to Summer heat to Autumn reflection to Winter hibernation, all of this is summed up in the circle. The circle of the fireplace, the drum, a dwelling, the horizon, the power of the world comes from circles, as the Dakota elder Black Elk said. How many values did we see crystallized in this one entertaining story? And this is only one of a lengthy cycle of such stories, some of which appear in Manitonquat's books. Grandfather Manitonquat is a master of the teaching story.

Manitonquat cited Mother Theresa, who on a visit to this country, said that people weren't starving for food, but that they were starving for love. Father Thomas O'Brien, in his book "You Can't do it Alone", on his very successful drug rehabilitation program, Daytop, notes the same thing- that addicts worldwide are starved for the energy that flows naturally in a healthy community. Tony Flaherty, of the Massachusetts Housing Finance Agency, notes that alcoholics' thirst for spirits is an unfocused thirst for spirit- and that cultures that tend to have many alcoholics tend also to have deeply spiritual tendencies, from Ireland to Russia and others. Alcohol and drugs are involved in over 80% of all crime, I've read. Perhaps cravings associated with them are misdirected longings for energy no longer available in our pathologically inadequate communities.

My thoughts wandered to the long spoon story (In this story, a man goes to hell, and notices that no-one can eat, because they have extremely long spoons, and instead they fight with the spoons; he goes to heaven, where they have the same spoons - and people FEED EACH OTHER), and Reverend Ike's "you can't take it with you, but you can send it on ahead". All of this and much more is evoked by the circle. Councils occur in a circle, and in a circle, one can see everyone's eyes, and all are equal. In Chinese Feng Shui design theory, straight lines are regarded as undesirable, and meanders and circles as generally good.

The legendary psychologist Milton Erickson could achieve permanent changes in his clients' behavior, solely through storytelling- yet this is nothing new to Native Americans. One typically has to patiently pry and ask intelligent questions that reflect sustained focus on a positive purpose to get anything from Native elders. It is worth the time- the traditional culture equivalents to doctors spent a 30 year apprenticeship before being allowed to practice on their own, 3 times what our doctors take, and they kept their business only if they could heal successfully. The TQM concept of constant improvement is nothing new to Native peoples. I had no idea Manitonquat was doing anything like the

number of seminars he offers, or the prison rehab program he does, at first, he doesn't boast or brag, he answers questions evenly and politely, feeding interest only. He notes that he was taught that respect is the center of the circle of community, and patience its context.

Native approaches to learning, in my experience, are the reverse of what we do. For example, in learning about a medicinal plant in a native culture, one would see it in context, alive, where it grows, learn what conditions it preferred, what it was good for, see it from seed to dying husk, and really understand it, and its medicinal and utilitarian uses, KNOWING ITS COMPLETE CONTEXT AND STORY, before learning its name. Our own botanical classes would start with a name and a dead illustration in a book, or a dead dried husk, and perhaps not even cover the rest of what could be known.

I cannot imagine a native healer ever having a gross anatomy lab, for example; the emphasis is on health, ideal state, and keeping or returning people to that state, rather than on problems, diseases, and dead things. I don't know how to put this in words well, but it is as if Native people are interested first and primarily in the energy and spirit, the "story", of what they study, and only incidentally in the material aspect, while our own culture seems to have precisely the reverse orientation. Instead of looking at the purely material, it is as if storytellers like Manitonquat knows there is an ideal state, and that people bearing the worst appearance can be awakened and inspired to return to that ideal state, in which after all they entered the door of existence anyway. Sufis told specific stories at set times, to awaken specific kinds of awareness, to help people return to that state.

It must have been fun to grow old in a traditional native culture- that is when one can start having fun, really learning what one missed when young, when there is respect, when one can really start getting into awareness and spiritual growth. Period literature recording early contact with Native cultures notes that it was not unusual for Native elders to live past 100 years of age, living very pleasant, rewarding lives. In my culture, I see people dropping dead of heart attacks in their 40's and 50's, worn out. Gary Witherspoon, an anthropologist, once asked a 55 year old Navajo (Dineh Nation) man why he'd said nothing in a council. The man responded, "Well, I'm still so young, really you have to be over 70 to know anything worth saying."

Medicine Story noted in his presentation that cooperation is what makes human beings what they are. It was noted that competition tends to make people stupid, and the average political speech was cited as supporting evidence. A nurturing, healthy community is a circle, even a basket, held together by mutual trust, respect, and interdependence. Corporations and similar organizations are pyramids, or triangles, with clearly defined, even sharp, edges. I heard once in that the military was the concentrated essence of America- that it somehow combined small town America with Alice in Wonderland and Franz Kafka. All three comparisons are from stories. I've heard lawyers where I work say that the best legal solution is one where no-one is happy. Is that any way to run a society?

No-one wins in a war. Cooperation is how people survive. Native Americans used stories to get this message across repeatedly.

The book *The Evolution of Cooperation* is a sort of Western equivalent to this.

Manitonquat also does programs in prisons. One could perhaps say that prisons are the refined essence of our society- just as the military is. He's very patient. The one statement that will make him bridle, is when someone says he has to earn their respect. He says, "No, we have to start over. Everyone has a RIGHT to respect. Respect is the center of the circle of life. You can't expect people to love others, but you can reasonable expect them to respect others. Respect doesn't mean agreement, it means simply regarding other people as the sacred, precious, intelligent beings in search of joy, freedom, peace, and play they are." Respect may mean making eye contact, which is remarkably rare in American society, and normally an open challenge to a fight in a prison. Manitonquat cited prisoners in his groups that said that his circle was the only place in their lives where they felt like a human being, where they got respect. I wonder what relation that has to their behavior. In India, people greet each other by placing their palms together, and saying "Namaste". Joseph Campbell translates this as "I recognize and salute the divinity in you". The maxim "What you concentrate on grows" may help explain just how powerful these ideas are.

Manitonquat noted that babies spend 9 months in a very comfortable place, and come out naturally full of love. They come out of the lodge, and find that people are... wierd. Nowadays we might say that they have their own difficulties to work out, but babies don't know this, so they start to grow a mask, to survive. We all have masks. We could think of relationships, where 2 masks meet, and in time gradually let the real selves through, and sometimes things don't work out so well, as the mask and real self aren't necessarily in harmony. Your public mask is the self that goes on your resume'.

Then there's a less crystallized mask, the mask you wear with your friends. How would a resume look if you were applying to someone to be their friend, I wonder? Then there are deeper parts. There's a master craftsman part, a "Shakespeare" part, which has the seeds of greatness. Perhaps there's a "shadow" part, of repressed hopes and fears. Perhaps there's an "inner child" part. And perhaps there's a part so invisible that when you do something totally out of character, you say, "Where did that come from?" and you aren't sure.

Stress is a natural part of life. Stress energy builds up inside, swallowed up into the inner landscape, the inner life. Men sometimes build up resentment energy in their chests, for years, and perhaps it leads to heart attacks, for energy built up must always find release. A circle of people can be a very powerful way to release stress energy. One can think of Alcoholics Anonymous, and similar groups. The smallest number to form a circle with is two. If one is allowed to unload built up poisons from inside, to hear that "it's ok to make mistakes, you did the best you could with what you had at the time", one can get rid of masking layers, and get down to one's real essence.

Stress Release Exercise Using Story

(see also www.rc.org) Manitonquat noted that you could have an agreement with a friend, that you get to talk for, say, ten minutes, and they listen attentively, and don't interrupt. Then, after ten minutes, you reverse, and they get to speak. He recommended that one choose success stories, issues that "have juice", something that "rings your buzzer", something that looks like it needs attention, as those are markers for important issues. You might think about what your real nature is, what your purpose is, to see the story you tell in this exercise as a lens to define, perhaps, your place in the universe. It is not spiritual to say that we are made of stardust- one could even see it as literally true. Manitonquat noted that some have been hurt more than others, and thus have more layers to go through to their core being. He felt that he could get through to the humanity of the worst serial killer, with this exercise, given the time. He noted that none of the prisoners he dealt with had come from good homes, that all had been subject to severe control, and pain, and had gone from foster home to foster home to adult life often without a friend they could trust, much less a healthy family.

This exercise is truly a "Healing Story" exercise. Manitonquat may be reached at Story Stone/Another Place, 173 Merriam Hill Rd., Greenville, NH 03048 (603) 878-3201 His books, available from that address, include: RETURN TO CREATION: A Survival Manual for Native and Natural People, and THE CHILDREN OF THE MORNING LIGHT: Wampanoag Tales, as well as stories on tape. He does many different kinds of trainings, tailored to client interest, on everything from community healing to healthy sexuality to several other subjects.

Manitonquat has tested his community building ideas under the most adverse conditions possible- in prisons, for 22 years at the time of this writing. Perhaps some might be put off by that- yet, if it is a good program, don't you think it ought to work under the most adverse conditions? I saw a presentation on another prison program some years ago. The main instructor made a very interesting point: he said that it was easier for inmates to succeed in the program, because they could see the walls... whereas people on the outside found it harder to see their walls.

I've heard that called a "reframe". We assign meaning to things. "Reframing" takes an event, and simply puts new meaning around it. Isn't that what a story does? I was told once by a military trainer that "if it doesn't kill you, it makes you stronger" and "the best steel takes the hottest fire and the hardest blows". That was a whole new way to look at stress, for me- a brand new "story", that changed how I experienced stress. Another point one sees in Native American storytelling is its grounding in Systems Theory. Western culture is still stuck in a Cartesian, Newtonian world where the whole is the sum of the parts, of materialistic, adversarial approaches.

The Systems Theory Story

Systems Theory approaches accept that the whole is more than the sum of the parts (e.g., you are much more than the mere sum of your bones, organs, skin, and so on), where it is possible to make great changes with small focused effort by understanding the system using the "butterfly effect", where "win-win" mutual interest approaches are tried first. One common symbol for a system is the circle- think of maxims like, "What goes around, comes around." "Win-win" approaches are fun- once you get through the other side's suspicions, you get to a neat solution that benefits everyone, much faster. Who would really want to object to a solution where everyone benefits, anyway? Why on earth hasn't our culture thought of win-win solutions before?

One sees the Systems Theory story applied in business management by W. Edwards Deming, Margaret Wheatley, Peter Senge, and others. In personal development, Steven Covey's "The Seven Habits of Highly Effective People", and other writers, apply it. In Economic Development and Community Building, John Kretzmann's book, "Building Communities from the Inside Out", very nicely crystallizes it- with concise success stories. Kretzmann's personal presentations are laced with... inspiring and heartwarming stories. Systems Theory ideas are beginning to change the way our culture does things.

Peace Village

There is Native American idea that is very significant to community. Perhaps the best known most recent form is the self-sufficient Cherokee Peace Village. (Dhyani Ywahoo's book *Voices of our Ancestors* is one source of info on these.) These were sort of a combination college town and homeless shelter, run by very spiritual people. They were also places of refuge; those who had committed crimes, if they could get to one, were untouched as long as they stayed there. After a year, they were free to go- and whatever had caused them to commit crimes was gone, the spiritual people made sure of it.

Peace Villages lasted right up into the 1830's. The tradition was so strong they accepted Colonial refugees, and escaped slaves- a major factor in Andrew Jackson's decision to deport the Cherokee on the "Trail of Tears" to Oklahoma, where 75% of the marchers died en route. Tad James notes that the Hawaiians had the same concept of a refuge village. Some monasteries in Europe were run similarly; the industrial revolution of the 10th century, in Europe, came out of the monasteries. Some Taoist communities in China, especially during the Ming and Sung dynasty, were very similar. Peace Villages were totally self-supporting, too- so there was no cost to the taxpayer.

Systems approaches are much cheaper. For example, "Indian cattle", deer, required only that fields next to forests be burned in the fall, so that the deer's favorite foods would grow in abundance. European settlers preferred the much more labor intensive route of keeping domestic cattle. You figure it out, I can't- how can you beat a system that requires much less work?

Community Self

Where does your sense of Self stop? For many Americans, the sense of Self stops at the skin. This is a very peculiar idea, one that many people in the world today would find very strange. A community is a circle of people who have a sense of self beyond their skin, where people communicate and work together on goals for their common good. Community is for humans what the hive is for bees. It might be people who share the same place, or people who are related, or people who share the same interests. Isn't "Community" self the web of the small, seemingly unimportant things- perhaps little courtesies, or favors, looking out for others, a smile or a wave to people on the street, and all the other things people used to do without thinking?

As I finish this draft, I heard a 12 year old friend of my nephew say that his ambition in life was to be a "hit-man", or assassin. He's from a good family, he's a good kid, his mother is a teacher, and he lives in a middle class neighborhood. It really shouldn't have shocked me, this is the dream job portrayed in the stories in our media, isn't it- who among the male readers hasn't dreamed, at least once, of trading places with James Bond? Yet I would ask you, is that really a useful cultural ideal? How can that ideal male role model solve any problems?

Dale Carnegie noted in his "How to Win Friends and Influence People" that people we might think of as very bad- from Al Capone to others like him, in the 1930's - never thought of themselves as bad people. They thought of themselves as misunderstood, good people in bad situations. The most vilified, evil appearing criminal knows he has some human core, deep down. We need to find better ways of bringing that out, instead of seeing only the bad part. We don't know what a healthy community is- all we know is the pathology of the average. Whatever has been done in the past, what we are doing now isn't working very well. We need new approaches, new visions of the ideal, and a much healthier paradigm to base them on. The best way to communicate those new approaches is... storytelling.

Teaching Stories

Two well-known stories are good examples of teaching stories. Brother (Br'er) Rabbit and the Tar Baby is actually an African teaching story, on the power of resentment. One must be mad with resentment and rage to get stuck in the sticky goo of known consequences to negative actions, don't you think? In fact, the sequence in that story- Comparison (ideal treatment versus ignoring Br'er Rabbit), Resentment, Resistance, and Revenge, is the precise sequence of all crimes of passion. That program can run in under half a second, outside of consciousness. The purpose of this story was to bring it into consciousness so it can be interrupted. The story of the Three Little Pigs is entertaining, and at some level it also points out the consequences of choosing one's belief systems from ideas that sway in the winds of fashion, like grass, or ideas that are offshoots of core truth, like sticks, or ideas that are tested in the fire of experience.

Tom Brown, Jr., the Tracker, tells a Bow Story to introduce his classes on Stone Age Nomadics to bowmaking. A white man making a bow would tromp out looking for a tree. He might see a tree in the middle of a field, and chop it right down, giving no thought whatsoever to future generations that might need that tree right where it was. He might chop a couple more trees down, carelessly, and discard one on the way home, again, with no thought to how that tree fit into its context. He'd make his bow, with the tree's dead flesh, cursing if the drawknife missed, and end up with... a lusterless bow, with minimal snap and cast. Trees that grow in the middle of a field grow with a lazy grain, they don't have to fight for life, and their wood is not very good for bows.

A native seeking bow wood, on the other hand, would get prayerful. He would go into a grove, where there were too many saplings, and after careful introspection, pick a sapling that would otherwise not survive. In taking the sapling, he would give the other trees a better chance for life, thus actually improving the environment by taking what he needed. He would treat the tree with respect, and use it perhaps almost reverently. The wood might even seem to be cooperating with him as he carved it down, since he was so much in rapport with his environment (the effects of such rapport are noted in early literature describing native peoples). He'd end up with a magnificent bow, with good snap and cast, that might last over 100 years with care- and have improved the environment for his descendants in the process. This story very precisely tells the different effects of the Cartesian/Newtonian materialistic story versus the Systems Theory story.

(Tom Brown may be reached at his Tracker School, POB 173, Asbury, NJ 08802-0173, ask for a Booklist and list of courses taught. I tell this story when I bring the Osage Orange bow I made in Jim Hamm's class to schools- it gives the bow life, and the bow grounds the story))

Stories are often used to introduce new ideas and perspectives. Albert Einstein, Abraham Lincoln, and others did it all the time. Let's tell one of Abe's stories, which he told when asked how he felt about all the criticism of him that was endemic in the newspapers of his time. He said a man was caught in a thunderstorm walking home, at night. The lightning crashed around him, and he was soaked. He looked up at the heavens, and said, "Almighty God! I know the rain is good for the crops, but could I have less noise, and more light?"

The movie Mindwalk noted that we are shifting from a Newtonian paradigm to a holistic, systems paradigm, and that this is as significant as shifting from a flat earth paradigm to a round earth paradigm. Instead of separate objects, the world (and community) consists of a "web of relationships" - like a basket, or a "wiring diagram". That's a major shift. One great way to see that new paradigm in community work is in stories from Chicken Soup for the Soul, by Jack Canfield, which are very inspiring.

- a. One at a Time
- b. The Royal Knights of Harlem

- c. Everybody has a dream
- d. Love: The One Creative Force
- e. Follow your dream
- f. Who you are makes a difference

Ever notice that kids just have all kinds of energy? One reason is that they put fun into what they do. Storytelling can be a great way to put fun into passing on ideas, and learning. When I was learning a language, I was told to do what many 5 year olds do- have an imaginary companion, with the twist that the companion could only speak the language being studied. We were told to choose a very attractive image of the opposite gender. Interestingly enough, I just ran across a Video teaching French, using just this method- it has several vignettes of increasing difficulty, with an organic story binding all the different lessons. There are two ways to remember- repetition, and strong emotion. The second way can be a lot more fun. Many authors have imaginary characters in their heads- who in effect act out the story. Robert Louis Stevenson, who wrote Treasure Island, wrote his stories in precisely this way.

2. Technique

Reading out loud from a book is ok. Many people recommend it, and it's a great way to spend time with children. The important thing with any form of storytelling is to really feel the story, to put a lot of emotion and feeling into it. Storytelling is best done from the heart.

Classical storytelling was not done from books. All good storytellers of the past ran a "movie of the mind" in front of them, of the story, and described what was happening as it ran. The story was the same, but the words used varied at each telling.

Bards, storytellers, griots... were all highly respected in the past, because they passed on the culture. When no-one reads or writes, a culture needing a compact way to pass on its values and ideas uses stories. Stories were used for other purposes, too. Remember knights and coats of arms? Coats of arms were used to identify people at a time when no-one could read or write. Native Americans used a coat of arms in just the same way- as a "Medicine Shield". Sometimes the images for these shields were obtained after difficult vision quests, and they functioned as lifelong Mission Statements, "stories" of their purpose in life. Storytelling nowadays is seen by some as a quaint old craft. It was not always so. Consider how powerful the ancients thought words were - they cast "spells", or were "enchanted". We don't believe in magic any more, of course, but stories can have powerful effects. Milton Erickson, cited in the book *My Voice will Go With You*, by Sidney Rosen, could achieve permanent changes in behavior for people who wanted to change- just by telling a story.

Some stories are so powerful they are preserved in written form- as scriptures. Most ritual is the reenactment of very well-known stories. What are "cult movies", but specialized stories that people go to see again and again?

We're interested in the positive aspects of stories, so we won't discuss conspiracy theories and rumors, though they can be fascinating. Propaganda is generally written to 4 emotions: fear, hate, hope, and curiosity. We focus our message on hope, as there is more than enough support in our culture for the other two emotions. The best propagandists use 2 simple rules- reinforce existing belief systems only slightly, preferably below the awareness of people, and always have entertaining material. On the principle that everyone has something to teach, we can say that is a good guide to storytelling- keep any learning "bite-size", expanding people's belief systems only slightly, preferably with any learning not very apparent, and always be entertaining.

Somewhere between the ages of 10 and 12 children "crystallize" in their belief systems- before that time, native fluency in foreign languages is easy, and after, it takes some work. You can understand people if you know where they were, and the year, when they were that age. Stories told to children before that time are very powerful. Most stories for children, especially those on television, have no values, or what values they do have are apparently somewhat shallow. Leo Buscaglia has noted that the average six year old entering school has seen 6,000 murders portrayed graphically on television, which is more than many combat veterans ever see. What an interesting accumulation of stories to start them out with in school.

3. Practice

There's a story behind every cultural symbol. Let's take the Thanksgiving basket, known also as a horn of plenty, or cornucopia. If you track that symbol back far enough, you'll find it was one of two horns of the goat Amalthea, and it was used to feed Zeus when he was a baby.

Now, let's take a modern theory, something like a "system" as defined in systems theory, or better yet, from Chaos theory, the long-lived standing wave form with phase-locked feedback, or "soliton". Examples of each include self-maintaining systems like the ecosystem, red spot on Jupiter, planetary orbits, the vortex of a tornado, and even systems like the community you live in, or even your employer. Individual elements may change, but the structure lives on. That is a modern scientific equivalent to the symbol of the Thanksgiving basket- both describe a long lived system, which may give out more than it appears to take in.

Let's think about the symbol of a basket. The individual elements aren't very strong. However, when woven together, they form something much stronger. An engineer might think of it as a "composite" of diverse elements, where the combination is much stronger than any individual element, or even the sum of the strengths of the individual elements.

We can take basketmaking as a metaphor- to represent something which is much more difficult to visualize, like community making. Isn't keeping a community healthy very much like connecting diverse elements into a whole that is more than the sum of the strengths of the individual elements? Baskets were used by the ancients to gather and carry food, too, so there was a whole rich association of images.

New paradigms are coming into being. Remember the paradigm of the earth being the center of the Universe? It took a long time for people to accept the Sun as the center of our planetary system. If you deal with other people, you must understand, and even enter, into their paradigms, their "stories". Let's illustrate that point with a story. A bank Asset Manager was on site at an elderly complex. An elderly resident complained about the glowing green snakes in her apartment- she'd put them in the garbage, but they'd come right back. Now, the manager could have simply said there were no snakes- which was true. It wouldn't have accomplished anything, though. Instead, the manager entered the other person's reality, and said, "Oh, well there's your problem right there. Those are homing snakes, they'll always come back. You've got to put them down the garbage disposal, that way they can't come back." The resident was delighted with the solution, and there were no more complaints.

4. Other Specialized Forms

Aren't comedians just specialized storytellers? They often use a mismatch of expectations, and exaggeration, to show distilled truth. Another kind of refined truth is the maxim. Rudyard Kipling wrote a poem about all he remembered of his school days was the maxims that his teacher wrote, one per day, on the blackboard. You could think about your own maxims, or concentrated truths. Bumper Stickers and T-shirts are the billboards for concentrated truths- the essence of how people live their lives. One finds every sort of thing.

Another specialized form of storytelling is the Sufi, or Muslim mystic, form. Sometimes these stories were told to illustrate human habits, and sometimes to trigger spiritual growth and awareness. Following are examples of each.

Nasrudin was looking desperately under a streetlight for something. His friend came along, and asked, "What are you looking for?". He said, "I lost my keys, I think I dropped them inside the house." His friend said, "So why aren't you looking for them there?" The Mulla said, "Oh, the light is much better here."

A wandering monk sought shelter in an Oriental monastery. It was the custom at that time to have a contest, and to allow shelter only if the visitor won it. The abbot received the monk. He didn't want to make it hard, so he pointed the visitor to a brand new monk,

who'd only been around for a month, who had one eye. The visitor went to the new monk, and held up one finger. The new monk held up 2 fingers. The visitor held up 3, and the new monk shook his fist in the visitor's face. The visitor came back to the abbot, bowed, and said, "Your superior teaching has clearly defeated me." The abbot had no idea what was going on, and asked what had happened. The visitor said, "Well, I put up one finger, for the Buddha (Ideal person). Your man put up 2, for the Buddha and the Dharma (rules). I put up 3, for the Buddha, Dharma, and the Sangha (community). He then made a fist, to say that all was unity. How could I top that? I must go. Farewell." The abbot asked the new monk what had happened.

The new monk said, "yeah, that jerk put up one finger for my one eye. So I put up 2 fingers, to say he had 2. He put up 3 to show we had 3 eyes between us, so I shook my fist in his face, and he left."

Do you notice patterns in the behavior of others, or you, based on these stories? There is a wonderful Iranian story about a cat who decided to take holy orders, and be a vegetarian. Hordes of mice came to see the cat, and the cat, who never had intended to really follow through, caught the last mouse each day and ate it, with no-one the wiser. I read the story in one of my daughter's books. It was generated at a time when the religious authorities were very powerful, and direct resistance was very dangerous, just as it is today, in Iran... The Italian Commedia della Arte introduced wonderful exaggerations- the bumbling doctor, even Punchinello, who later became part of Punch n' Judy, and several other comedic archetypal figures that still show up on TV. The psychologist Carl Jung wrote extensively on story "archetypes" in human consciousness.

Future Pacing Or Visioning

Future pacing is a tool reported by Napoleon Hill, Zig Ziglar, Marshall Sylver, and several other people. It is a goal definition method that is totally outcome-based, and holistic- it draws on the total mind. Those who use this technique review their future "memory" on awaking, and just before sleep, at least, daily. This will align your consciousness like few other exercises. If you can be really excited about the future, you will find yourself washing away the negativity of others. This is a FUN exercise.

This is written from my fascinations, of course. If you do this exercise, you would want to write your own fantasy, from your own fascinations- that will give it power. You want to cover spiritual, social/romantic/ emotional, physical health, vocation/wealth, and mental areas. It seems bizarre to do this the first time, but I have begun realizing some of the dreams cited here. I don't know how to explain it, but somehow, reviewing this daily seems to weave it into my future timeline. Hey, if you don't like this exercise, well, don't use it. I just really like this exercise. Think of it like the old Hawaiians- dreaming the future into existence. Why stop dreaming? You don't have to do this in words, either, you could do this exercise in collage. Following is a future pace I wrote for inner city folks I was working with. Interestingly enough, even though I wrote it generically, some of these items

have actually occurred since I wrote it.

I wake up as the Sun hits my bed, hearing the birds, singing. I think about the awards banquet last night, and smile. The mayor, and federal and state representatives were all there, to honor our group, Neighborhood Superstars, for doing the impossible in our community. We welcome attention like that, because it helps us be recognized as movers and shakers, and get more resources. Besides, they need people like us more than we need them. The "conference bird" was good, too. They used to call chicken the "gospel bird" when I was growing up, because that's what we ate when we ate at church, and it may as well be the "conference bird" too.

What have we accomplished in the last 3 years? Let's see, we got the bank to let us use that abandoned branch as a Learning Center for our children, with donated computers, encyclopedias, and so on. We made our own furniture for it. Our kids love it, we had to put together another center, it was so popular. They don't even think about roaming the streets anymore. They love the crafts we have now, too. Let's see, they make and sell wind chimes, from electrical conduit pipe thrown out at construction sites, and baskets from waste copper electrical wire. They carve beautiful stuff from wood scraps from the cabinetmaker's place, too, African designs, Celtic Interlace, Islamic designs. They got an old forge cheap at an auction, and Pete even has the kids doing blacksmithing, now, with leaf springs from cars. He got them into sandcasting, and they make foot treadles for sewing machines, and the woodworking kids make the wooden parts. Those sell well at our fairs. We found we could get cannonbones cheap from the slaughterhouse, and Pete taught the kids to make their own carving tools from concrete nails, and they make beautiful "ivory" boxes. The strangest thing he does is have the kids put chicken wire into water, he says it works best in seawater, but he just adds salt and other things, and then he runs current from a battery charger through the wire, and this concrete stuff starts coating it. He says that we could make all concrete this way, and that it costs 1/10 what concrete does, but I don't understand it all. He says the kids teach him more than he does them. He has them build tiny landscapes, with rocks, some Chinese art form, Penjing, I think he said. They're never larger than your hand. Art doesn't get much cheaper than rocks, and scrap wood, it's cheap, and beautiful. They had to learn calligraphy to do carvings, and it's helped them in school. I never knew the arts made it so much easier for kids to do well in school.

We have our summer crafts fair, with all the ethnic groups doing some kind of presentation. The Quilt guild started it, so they could sell quilts, and it just kind of grew from there. I had no idea there were so many different kinds of quilts. We have our own Storyteller's association now. We do a neat kind of folk dance almost every week, now, through the church, people didn't want to wait a year for another fair. 2 people started their own businesses with money they made at the fair, they're small, but they're off welfare. Another started a grocery coop, so the small stores around here can't rip us off any more, and we get much better food, cheaper. Then somebody got permission to garden on a vacant lot, and they did that Biodynamic raised bed gardening stuff, and we had so many

vegetables we couldn't eat them all, we had to start selling them at the farmer's market. We got fast- growing trees, Pahlonia, I think they said, and we sell them to the Japanese. The trees also shelter our vegetable gardens, as they grow. Sure is better than the garbage heaps the drug dealers used to keep here. That one old Chinese guy did Feng Shui stuff, it sounded wierd, but his ideas were all cheap, we followed them, and somehow the park is just a much nicer place to be.

What do they call that program? Microenterprise? Yeah, the one where 6 people get a loan of \$500 each, and they repay it as a team, to build small businesses. Mary sells pies, now, Jose' sells oak furniture, beautiful stuff. Ian actually does hypnosis, now, I didn't know it was so easy to get certified in that. We hooked up with those Alcoholics Anonymous groups, we decided to give the old guys as much to do as possible, if they have addictive personalities, well, we want them addicted to doing positive things in our community. They sure seem happier now, they have a place in the community, for some it's the first time. I was sure glad when we got the City to revoke the permits of those 2 package liquor stores, they say 80% of all crime is associated with booze and drugs, and seems like a lot of the troublemakers just went somewhere else when those stores closed down. We had that guy from Ithaca, NY come in and talk about they print their own money, it's legal if it doesn't look like U.S. money, and so we started doing that.

Our money honors leaders we want to honor, like Dr. King, and Luis Betances, and it's a work of art. The police we have now say it's like a vacation, in this neighborhood, like we're all on happy pills or something. The Police Department sends out all its new Community Policing officers to our neighborhood first, they want them to see community done right, and have us train them right, before they go into the worse areas.

We got us a branch of Habitat for Humanity, and when housing is abandoned, and the city can't sell it, they give it to us, we rebuild it, and sell it to our residents. We got the churches involved in redevelopment, they could see they wouldn't survive without it, and they help a lot. We rebuilt one lot as a park, with all kinds of flowers, a stone maze for the kids to walk, huge wind chimes and wind harps, and a pond with goldfish and a Japanese rock garden that looks like one of those landscape paintings, all built because people each wanted something, and we worked together to make it happen. You know, every culture and person has something special to offer, and putting it all together is so beautiful.

You know, people need beauty in their lives, just like they need calcium and Vitamin C. Our community wasn't built to be beautiful, and that doesn't matter, because we've added so much beauty. Seems like everybody has flowers, now, and even perennial herbs, which taste so much better fresh. Seems like since I started eating fresh food, I don't need to go to the doctor nearly as often, and I feel so much better and have much more energy.

It's time to get going now. I shower, get dressed, look in the mirror one last time, and say, "You are really good, you lookin' good, girl, you know that?" (No need to be modest in the

presence of greatness) and go. First, it's off to the community college, where we offer to trade having their instructors come to our community center to give job skills classes, for us giving crafts classes to other parts of the city. We don't beg any more, we overcame our poverty with our wealth of knowledge and skills, and we trade for what we want. Then it's off to meet with the community affairs editor of the paper. I'm really glad I got to know her, since we started working together they started writing such nice articles about all the good things in our community. I was just so tired of reading about arrests and drugs, and they were tired of writing about it, too. They feel so much better writing about positive things, and we make sure they have lots to write about. Now it's off to the church; we're getting the priest to let us go out to the suburban churches, and trade folk dance instruction for older computers, bicycles, and other things folks would get rid of anyway. It's kind of like missionary work, too, suburban folks don't have the richness of life we do, some of them are like walking dead people, we help them live life with more fun.

Lunch is always fun. I go to the coop bakery. They got this Persian guy in. He makes bread only from whole grains, and they have a taste that won't quit, you can make a meal out of the bread, it's just delicious. I can't believe people eat Wonder Bread here, it's like tissue paper compared to this stuff. They have this Essene Bread, they say the recipe is in Leviticus, it's kind of heavy, and with raisins, it's really good, like a fruitcake.

In the afternoon, I go to the Farmer's Market, to get some vegetables and fruit. Fresh carrots are sweet, when they're grown right. No grocery store has ever had apples as good tasting as fresh picked. The kids like the sweet peas I grow in my backyard so much they pick them and eat them right there. I have mint and chives, they come up every year, all I have to do is pick them and eat.

Then it's off to the middle school. The kids wanted their own dances, with a Juice Bar, so we told them they could have them if they ran everything themselves, had people in charge of everything, and just had adults around to offer suggestions. There's one at least once a month. I have to make sure that mops and brooms are available, so the kids can clean up afterwards. Our young people want to do things themselves, and it wasn't hard to get them into doing what they wanted. Once that's done, I have a volunteer thing where I do storytelling for the kids in Mrs. Adam's class.

It's fun. I used to be a medical records specialist, but since my community group recognized my talents, they pay me the same money just to get things organized in my community. It's not a lot of money, but it's enough. Besides, I have so much fun at it. Just the other day, Robert, who went off to join the Marines, came back on leave. He said he would have ended up selling drugs, and dead, if it weren't for being in this community. Some of his friends ended up that way. It's really nice, knowing that I've made a difference in other people's lives, that I'm leaving something behind. I always wanted to do that, and I am.

Following is another future pace I shared with a friend, in response to what was originally

a sort of joke. Think of it only as a model; what would YOUR ideal future be like? Could you write up a page or two, and enjoy "reliving" it every day, or so, to sort of help your mind get aligned with this future, and to pose the question "How do I make this happen?" to your consciousness? This is more powerful than it looks; last year, I got an answer to a question I put to myself in high school. If you don't stop the process, your question will ALWAYS be answered by the Universe. I recently read a book about Albert Einstein, the physicist who came up with the theory of relativity. The book said that his secret was that he asked questions only a child could ask, and waited patiently for the answers...

My Perfect Day: Birthday 2010

5:15AM Wake up feeling really great about life. Do Tai Chi, Aikido, and Chi Kung exercises. Run 5 miles, swim 3 miles.

8:30AM Breakfast: fresh squeezed orange juice, croissants, and an assortment of fresh fruit. This food just seems to have an explosion of wonderful taste to it.

9:00 AM Begin workday. Today, we're planning a training for "energy" workers, a high level training for people with 5 years experience. These people are trauma erasers; some of their graduates have, among other things, ended executions worldwide, begun military games that have replaced war, come up with a 'free energy' source that left oil as a source of plastics material only, begun colonizing other planets, and even space, in Gerard O'Neill style habitats (The Babylon 5 Space Station is based on an O'Neill design). With the new Universal Apprentice program, no-one is unemployed any more. Local currencies, an old idea raised in the late 20th century by the E.F. Schumacher society, (efssociety@aol.com), meant that there was never a shortage of money. The Biodynamic Agriforestry program grows much more nutritious food at half the cost of before. Since the Forest Service originated this program, in Los Angeles, in 1992, it has become a worldwide part of cities as well as the countryside. Tracker School students have created urban wildernesses in every major city, to practice wilderness skills in.

Climate engineers used careful tree plantings to reforest the major deserts of the world. It was finally realized that the Earth, having once been an Eden, could be again, with very minor shifts in human activity. The Sahara has been almost completely taken over with agriculture, using methods developed by Machaelle Small Wright, and Keith Varnum, among others, which require 1/10 the water of any other method.

Something about the Systems Theory paradigm critical mass, reached in August, 2001, caused people to realize that fighting accomplished very little. Since people realized they didn't have to struggle for what they wanted anymore, war ended. No-one felt it necessary to fight for their rights, or anything, as abundance, the natural condition of nature, was now the natural condition of society. Prisons were emptied out after Native American leaders trained teams of trauma erasers, in 2020. Crime doesn't really exist any more, because the conditions that breed crime just don't exist any more. Most prisons were simply demolished, however a select few were kept as museums to a barbaric age. The

market for illegal drugs collapsed gently, shortly after the collapse in the market for food produced with artificial chemicals, as they were very closely related. Teams of people in different localities do nothing but envision new forms of beautiful technology, which they then work into computer models. Skilled craftsmen and women work their creations into wonderful new forms. Perhaps the most beautiful of the new art forms were the cocreated, interactive ones, where the crafts folks worked directly with the material. The first appearance of this technology was the use of computer-directed lasers, in the early 1990's; masters for machine tools could be created with light polymerized plastics, in a few minutes, instead of several days or weeks, with machine tools. The process was extended to crystalline materials in 2001, and metallic materials in 2003. Diamond sculptures made with this method were particularly iridescent. Curiously, all the arts flourished as never before, and unique community celebrations were everywhere. Ericksonian storytelling competitions were held nationally. The new electroplating of concrete-like substances onto wire suspended in seawater, first pioneered at the University of Texas in the '80s, allowed for particularly beautiful structures that cost 1/20 the cost of comparable concrete. New housing is constructed in the shape of an octagon, allowing about 50 people to live together, about the size of a nomadic band. Earth-sheltered, housing needs almost no heat. Most utility bills were reduced to zero by 2001.

12:00PM light lunch with best friends at outdoor cafe.

1:30 PM back to work. The timeline for the company for the next 10 years is finalized, and each person programs it into their own timeline in great detail. With the new rapport exercises based on Thoughtstorming, there is very little conflict any more. Most people can retire, financially independent, after 10 years in the workforce. They usually choose to follow their own pursuits.

4:30 PM time to end workday. Children just coming home from school, really excited about it. The enforced immaturity of past education is long gone; with the methods first developed by Georgi Lozanov in the 1970's, and popularized by Ostrander and Schroeder, and Colin Rose, among others, kids can learn at an incredible rate, for example, 3,000 words per day in a foreign language. The debate in Congress is whether the requirement to master 10 foreign languages for high school graduation should be dropped, since 95% of all students master 15 or more languages.

5:30 dinner for two.

Parables On Dealing With Other People

There once was a very bad temper, attached to a young lad. His father, despairing, at last gave him a box of nails, and told him to drive a nail into the fence every time he lost his temper. The first day, he used 29 nails. The second, 21, the third, only 15. It seemed to be easier to count to 10 and drain out his anger, than to have to go out to the fence. Soon, he didn't lose his temper at all. His father said he could pull out a nail for each day he didn't

lose his temper. Days and weeks passed, and soon all the nails were out. His father led him to the fence, and said, "Great job, son, and now let's look at the fence. It still has a lot of holes in it. It will never be what it was. When you say things from anger, they leave a wound, just like a nail. Say you're sorry all you want, but the wound remains. A verbal wound stings just as bad as a physical one.

If the lettuce you are growing isn't doing well, do you blame the lettuce? No, you find out why it isn't doing well. Could be it needs more water, fertilizer, or less sun or interference. Why would you ever blame the lettuce? Yet those who have problems with friends, family, or community, often blame other people. If you take care of them, they will grow well. Blaming doesn't do anything positive, nor does trying to "fix" the situation with arguing or reason.

No blame, no judgement, no reasoning, no argument, just understanding. If you understand, and show that you do, you can love, and things will change if not improve. Once in Paris, I spoke on not blaming the lettuce. After the talk, I heard a 9 year old child tell her mother, "Mommy, be sure to water me. I'm your lettuce." I was delighted she'd completely understood my point. Then her mother said, "Yes, and I am your lettuce. Please remember to water me, too." Practicing together. It was very nice.

-from a talk by Thich Nhat Hanh

Best of luck to you in your efforts to use storytelling to entertain, and to help heal your community.

Resources

America has experienced an incredible revival of traditional storytelling. Local groups can sometimes be found through your library, arts council, or nearest college. The following list is by no means complete. NSA, among others, could be approached for updated information. Please note that no organization is in any way endorsed by its listing here.

National

National Storytelling Association POB 309 Jonesboro, TN 37659-0309

National Story League 3508 Russell Apt. 6, St. Louis, MO 63104

Association of Black Storytellers, POB 27456, Philadelphia, PA 19118-7456

International Network of Biblical Storytellers 181O Harvard Boulevard, Dayton, OH 45406

(healing storytelling) NGH, P.O. Box 308, Merrimack, NH 03054-0308
(603) 429-9438 annual conference: August

Scheduled Gatherings Of Storytellers

All Native American Powwows seem to have some storytelling component, and the Native Americans are some of the best in the business. Check out your public library, or the events section of your newspaper, for events happening near you, or contact the organizations cited as follows.

New York/New Jersey/New England

Connecticut Storytelling Center, Department of Education,
Connecticut College, New London, CT 06320
CT Chapter, Network of Biblical Storytellers
15 Dogwood Drive, Prospect, CT 06712
Southeastern Connecticut Storytelling Support Group
3 Main Street, Noank, CT 06340

New England Storytelling Center Lesley College Grad School,
29 Everett St, Cambridge, MA 02238

Western New England Storytellers' Guild
6 Round Hill Road, Northampton, MA 01060
The Spellbinders 301 Jacob Street, Seekonk, MA 02771
Maine Chapter, International Network of Biblical Storytellers
12 College Ave, Gorham, ME 04038
Seacoast Storytellers Portsmouth Public Library,
8 Islington St, Portsmouth NH 03801
North Jersey Storytellers 145 Walnut Street, Englewood, NJ 07631

Spin-a-story Tellers of Western New York
31 St. Paul Mall, Buffalo, NY 14240
Pearl in the Egg Storytellers' Guild- Kirkland Arts Center,
POB 213, Clinton, NY 13413
Storytelling Center of Oneonta Route 2, Box 206, Delhi, NY 13753
Westchester Storytellers' Guild
60 Southlawn Avenue, Dobbs Ferry, NY 10522
Odyssey Story Tellers- Finger Lakes Library,
314 North Cayuga St., Ithaca, NY 14850
Jewish Storytelling Center 525 West End Avenue, Apt. 8C NYC 10024
NY/NJ Chapter, International Network of Biblical Storytellers
229 West 78th Street, New York, NY 10024
New York City Storytelling Center
10 Patchin Pl, New York, NY 10011
Genesee Storytellers 203 Whistle Stop, Pittsford, NY 14534
Story Circle of the Capitol District

1117 Ardsley Road, Schenectady, NY 12308

Gatherings

Connecticut Storytelling Festival- Dept of Educ., CT College, New London, CT 06320
APRIL

Tapestry of Talent Children's Storytelling Event 38 School St, Enfield, CT 06082 MAY
CONFRATUTE Conference/Institute on Gifted Education, UConn, Box U7, Rm 28, Storrs
Hall, 231 Glenbrook Road, Storrs, CT 06268 JULY

Winter Solstice Storytelling Celebration- Northampton Center for the Arts, 6 Round Hill
Road, Northampton, MA 01060 DECEMBER

Sharing the Fire Storytelling Conference- New England Storytelling Ctr, Lesley College
Graduate School, 49 Washington Avenue, Cambridge, MA 02238 MARCH

Women's Storytelling Intensive 724 Berkley St, Berkley MA 02780 MAY

The Art of Storytelling from the Inside Out POB 214,
Oak Bluffs, MA 02557-0214 JULY

Three Apples Storytelling Festival POB 994,
Cambridge, MA 02238-0994 SEPTEMBER

Women's Storytelling Intensive 724 Berkley Street,
Berkley, MA 02780 NOVEMBER

Stories After Dark 99 Arlington St, Brighton, MA 02135 FREQUENT

Storytellers in Concert POB 994, Cambridge, MA 02238-0994 FREQUENT

Spellbinders Storytelling Series for Adults

301 Jacob Street, Seekonk, MA 02771 FREQUENT

Interface, 55 Wheeler St., Cambridge, MA 02138-1168 VARIED

Rowe Conference Center, Kings Hwy Rd, Box 273, Rowe, MA
01367-0273 (413) 339-4954 VARIED

Children's Literature and Storytelling Conference- Trenton State College, Forcina Hall 384,
Hillwood Lakes, Trenton, NJ 08650 OCTOBER

Pumpkin Patch Festival 145 Walnut Street, Englewood, NJ 07631 OCTOBER

Storytelling Institute- Palmer School of Library and Information Science, C.W. Post
Campus, Long Island Univ., Brookville, NY 11548 MAY

Clearwater's Hudson River Revival 112 Market Street,
Poughkeepsie, NY 12601 JUNE

Open Air Storytelling Festival- Finger Lakes Library System,
314 North Cayuga St, Ithaca, NY 14850 JUNE

Storytelling Conference- University of Rochester,
125 Lattimore Hall, Rochester, NY 14627 JUNE

Taking Words, Making Worlds Storytelling Conference 56 Brighton Street, Rochester, NY
14607 JUNE

Jewish Storytelling Conference 525 West End Avenue, Apt. 8C,

NYC 10024 JULY

Long Island Summer Storytelling Festival-Cartoon Opera, POB 354,
Huntington, NY 11743 JULY

Storytelling in Central Park New York Public Library,
455 Fifth Avenue, New York, NY 10012 JULY

Conference on Jewish Storytelling 525 West End Avenue, Apt. 8C,
New York, NY 10024 AUGUST

Omega Institute, 260 Lake Dr., Rhinebeck, NY 12572 VARIED

Atlantic Coast

Frederick Area Tale Spinners POB 254, Middletown, MD 21769-0254

Lancaster Chapter, International Network of Biblical Storytellers

545 College Avenue H-302, Lancaster, PA 17603

Hola Kumba Ya POB 50173, Phila, PA 19132-0173

Patchwork: A Storytelling Guild 101 West Harvey Street, Phila, PA 19144

Tapestry of Tales- York Area Storytelling Guild,

Route 6, Box 253-S, Red Lion, PA 17356

Philadelphia Chapter, International Network of Biblical Storytellers 1043 Nicholson Road,
Wynnewood, PA 19096

Turning Stone Story Guild Route 1, Box 147, Barboursville VA 22923

Northern Virginia Storytellers Route 1, Box 576, Chantilly, VA 22021

Voices in the Glen, Ltd. 2631 Kirklyn Street, Falls Church, VA 22043

Richmond Story League 920 Clearlake Rd, Richmond, VA 23236

Gatherings

Garrett Lakes Arts Storytelling Festival- Garrett Community College, McHenry, MD 21541
AUGUST

Conferences and Workshops- Phoenix Power and Light Company, Inc., Drawer C,
Odenton, MD 21113 FREQUENT

Mansfield University Storytelling Workshop POB 117,
Mansfield, PA 16933-0117 JULY

Northern Appalachian Storytelling Festival POB 117,
Mansfield, PA 16933-0117 SEPTEMBER

National Festival of Black Storytelling POB 27456,
Philadelphia, PA 19118-7456 NOVEMBER

Virginia Storytelling Festival Route 1, Box 576, Chantilly, VA 22021 APRIL

Busch Gardens Storytelling Festival- Busch Gardens, The Old Country
PO Drawer F-C, Williamsburg, VA 23187 MAY

Washington Storytelling Festival 2631 Kirklyn Street,

Falls Church, VA 22043 MAY

Fall Festival of Tales POB 6051, Charlottesville, VA 22906 NOVEMBER

Institute on Storytelling Skills for Ministry- Storyfest Productions, 3901 Cathedral Avenue NW, #608, Wash., DC 20016 FEBRUARY

Storyfest Ministry Travel Seminar 3901 Cathedral Avenue NW, #608, Washington, DC 20016 JULY

Elva Young Van Winkle Storytelling Festival 901 G St NW, Washington, DC 20001 NOVEMBER

Southeast And South

Southern Association for the Preservation and Perpetuation of Storytelling POB 1154, Fairhope, AL 36532-1154

The Spellbinders POB 443, Huntsville, AL 35804-0443

Sandbar Storytellers Guild

10531 Southwest 53rd Street, Miami, FL 33165

The Storytelling Center

5247 81st Street N, St. Petersburg, FL 33709

The Dream Spinners, Selby Public Library

1001 Boulevard of the Arts, Sarasota, FL 34236

Athens Storytellers 160 Hall Street, Athens, GA 30605

Southern Chapter, International Network of Biblical Storytellers

Chandler School of Theology, Emory University, Atlanta, GA 30322

Southern Order of Storytellers

980 Briarcliff Road NE, Atlanta, GA 30306

Bluegrass Storyweavers 1384 Tanforan Dr, Lexington, KY 40502

International Order of E.A.R.S.

12019 Donahue Avenue, Louisville, KY 40243

Carousel StorySpinners 1505 61st Court, Meridian, MS 39305

OSIMILA (Order of Storytellers in Mississippi and Louisiana)

1505 61st Ct. Meridian, MS 39305

Chapel Hill Area Storytellers POB 8, Bynum, NC 27228-0008

Tarheel Association of Storytellers

740 Cleveland Avenue, Winston-Salem, NC 27101

South Carolina Storytellers' Guild 101 Verdin Dr, Mauldin, SC 29662

Chatta-Tellers 84 Lake Shore Lane, Chattanooga, TN 37415

Tennessee Assn for the Preservation and Perpetuation of Storytelling

East Tennessee State University Box 2191OA, Johnson City TN 37614

Yarnspinners of Memphis 1950 Felix Avenue, Memphis, TN 38104

Gatherings

Storytelling Festival- Southern Assn for Preservtn and Perpetuatn ofStorytelling POB
1154, Fairhope, AL 36532-
1154 APRIL

Mountain Valley Arts Council Storyteller Festival
POB 525, Guntersville, AL 35976-0525 MAY

Alabama Tale-Tellin' Festival 1103 Selma Ave, Selma, AL 36701 OCTOBER

Tampa/Hillsboro Storytelling Festival- Tampa/Hillsboro Cty Public Library 900 North
Ashley Dr, Tampa, FL 33602 APRIL

Biscayne Bay Storytlg Festival 101 West Flagler Street, Miami, FL 33130 MAY

Olde Christmas Storytelling Festival- Callanwolde Fine Arts Center, 980 Briarcliff Road
NE, Atlanta, GA 30306 JANUARY

September Storytelling at the Stovall House- Callanwolde Fine Arts Center,980 Briarcliff
Road NE, Atlanta, GA
30306 SEPTEMBER

Cherokee Rose Storytelling Festival 1971 South Highway 16,
Carrollton, GA 30117 NOVEMBER

Fifth Sunday Storytelling- Callanwolde Fine Arts Center,
980 Briarcliff Road NE, Atlanta, GA 30306 FREQUENT

Corn Island Storytelling Festival 12019 Donahue Ave,
Louisville, KY 40243 SEPTEMBER

Festival of the Moon of the Geese- Order of Storytellers in Mississippi and Louisiana,
1505 61st Court, Meridian, MS 39305
JANUARY

Tarheel Storytelling Festival 818 Woodcote Street,
Winston-Salem, NC 27107 MAY

Fall Storytelling Festival- Wake Cty Public Library System, 4020 Carya Dr,
Raleigh, NC 27610 SEPTEMBER

Storytelling Festival-Caldwell Cty Public Library, Caldwell Arts Council,601 College
Avenue SW, Lenoir, NC 28645
OCTOBER

A Baker's Dozen: A Celebration of Stories- Richland County Public Library 1400 Sumter
Street, Columbia, SC 29201 APRIL

Stone Soup Storytelling Festival- Woodruff Branch Library,
East Georgia St, Woodruff, SC 29388 APRIL

Storytelling Festival- Tenn. Assn for Presvtn/ Perpetuatn of Storytlg
E. Tenn. State Univ., Box 21910A, Johnson City TN 37614 APRIL

Storytellers Special Interest Group of the Int'l Reading Association
E. Tenn. State Univ., Box 2191OA, Johnson City, TN 37614 MAY
National Congress on Storytelling- Nat'l Assn for the Preserv. and Perpetuation of Storytlg,
POB 309, Jonesboro,
TN 37659-0309 JUNE
National Storytelling Festival- Nat'l Assn for the Preservatn and Perpetuatn of Storytlg,
POB 309, Jonesboro, TN 37659-
0309 OCTOBER

Tapestry of Talent: Student State Storytelling Festival
504 Allen Hall, W. VA Univ., Morgantown, WV 26506 APRIL

Midwest

Chicago Storytellers' Guild 1372 West Estes #25, Chicago, IL 60626
Copper Beech Tree Folktellers Guild Arlington Heights Memorial Library 500 North Dunton
Avenue, Arlington Heights, IL
60004
Great Lakes Region Chapter, International Network of Biblical Storytellers 3344 North
Broadway, Chicago, IL 60657
Heartland Story League- Tinley Park Public Library
17101 South 71st Ave. Tinley Park, IL 60477
Illini Storytellers' Guild
208 1/2 East Jefferson Street, Clinton, IL 61727
Lincoln Story League-Dundee Library,
555 East Barrington Avenue, Dundee IL 60118
McHenry County Storytelling Guild
1210 Menge Road, Marengo, IL 60152
North Shore Storytelling Guild
2127 Bennett Avenue, Evanston, IL 60201
Prairie State Story League
1813 Prairie Avenue, Downers Grove, IL 60515
Riverwind Storytellers Company- Edwardsville Public Library
112 South Kansas Street, Edwardsville, IL 62025
The Northern Indiana Storytelling Guild
1225 East Third St. Mishawaka, IN 46544
Northwest Indiana Storytelling Guild- Lake County Public Library, 1919 West 81st Ave,
Merrillville, IN 46410
Fireside Consortium- Iowa City Art Center,
129 Washington St, Iowa City IA 52244

Community Storytellers Club POB 521, Oshtemo, MI 49077-0521
Detroit Story League
2825 Kimberly Street, Ann Arbor, MI 48104

Great Lakes Storytellers

Suite 186, 1043 Robbins Rd, Grand Haven, MI 49417
Story Spinners of Grand Rapids- E. Grand Rapids Public Library,
746 Lakeside Dr SE, EGR, MI 49506

Northlands Storytelling Network

POB 758, Minneapolis, MN 55458-0758
Storyfront 4825 Wellington Ln., Plymouth, MN 55442

Gateway Storytellers 527 Greely Avenue, Webster Groves, MO 63119

Jacob's Pillow Coffeehouse 14455 Clayton Road, Ballwin, MO 63011
Midwest Storytelling Theatre 9100 Cherry St, Kansas City MO 64131
Missouri Storytelling 636 Elmwood Avenue, St. Louis, MO 63119

Cleveland Storytelling Guild 5832 Clearview Drive, Parma Heights, OH 44130 Miami Valley Storytellers-

Dayton/Montgomery County Public Library,
215 East Third Street, Dayton, OH 45402
Ohio Chapter, International Network of Biblical Storytellers
1481 East Huffman Ave, Dayton, OH 45403
OOPS (Ohio Order for the Preservation of Storytelling)
985 Velma Ave, Columbus, OH 43211
Word Weavers- Public Library of Columbus/Franklin County
Whitehall Library 4371 East Broad Street, Columbus, OH 43213

Gatherings

Cedar River Storytellers Festival- Wartburg College,
222 Ninth Street NW, Waverly, IA 50677 SEPTEMBER

Sangamon State University Storyfest- Sangamon State Univ.,
Shepherd Road, Springfield, IL 62708 APRIL

Copper Beech Tree Storytellers Festival- Arlington Hts Memorial Library
500 North Dunton Avenue, Arlington Heights, IL 60004 JULY

College of Lake County Storytelling Conference- College of Lake County, 19351 West
Washington Street, Grayslake, IL 60030

SEPTEMBER

Storytelling Conference- Nat'l College of Education,
2840 Sheridan Road, Evanston, IL 60201 OCTOBER

Illinois Storytelling Festival POB 1012, Woodstock, IL 60098-1012 JULY

Rockford Storytelling Festival 5690 E. State St,
Rockford, IL 61108 SEPTEMBER

Hoosier Storytelling Festival POB 20743,

Indianapolis, IN 46220-0743 AUGUST

Renaissance City Storyfest 585 Manoogian Hall, Wayne State University, Detroit, MI 48202 MAY

Great Lakes International Storytelling Festival 250 Martin St, Birmingham, MI 48011 JUNE

Michigan Storytellers Festival- Flint Public Library, 1026 East Kearsley Street, Flint, MI 48502 JUNE

Great Lakes Area Storytellers Symposium- Great Lakes Storytellers, Suite 186, 1043 Robbins Road, Grand Haven, MI 49417 AUGUST

The Gathering- Kalamazoo Nature Center, 2528 Aberdeen Dr, Kalamazoo, MI, 49008 OCTOBER

Storytelling 2825 Kimberly Street, Ann Arbor, MI 48104 OCTOBER

National Council of Teachers of English-Department of Education, University of Michigan-Flint, Flint, MI 48508

NOVEMBER

Northlands Storytelling Conference and School of Storytelling- Northlands Storytelling Network, POB 758, Mnpls, MN

55458-0758 APRIL

St. Louis Storytelling Festival 314 Lucas Hall, University of Missouri-St. Louis 8001 Natural Bridge Road, St. Louis,

MO 63121 MAY

Missouri River Storytelling Gathering- Midwest Storytelling Theatre, 9100 Cherry St, Kansas City, MO 64131 JUNE

OOPS Storytelling Conference- Ohio Historical Society

1985 Velma Avenue, Columbus, OH 43211 MAY

Fish Story Telling Contest- Cuyahoga County Public Library, 5225 Library Ln, Maple Heights, OH 44137 SEPTEMBER

Chippewa Valley Storytelling Festival- Chippewa Valley Museum, POB 1204, Eau Clair, WI 54702 AUGUST

Family Halloween Storytelling Festival POB 101,

Blue Mounds, WI 53517 OCTOBER

Wisconsin Storytelling Get-Together 7306 23rd Avenue,

Kenosha, WI 53140 OCTOBER

West

Tellers of Tales 4432 South Paseo Don Juan, Tucson, AZ 85746

Rocky Mountain Storyfolk 11960 West 22nd Place, Lakewood, CO 80215

Library Storytellers 1730 Llano St, Santa Fe, NM 87505

Territory Tellers 704 North Dryden Cir, Stillwater, OK 74075

Voices of Excellence- Preston Royal Library
5626 Royal Lane, Dallas, TX 75229
Dallas Storytelling Guild 5310 Keller Springs Road #833, Dallas, TX 75248
Texas Storytellers' Guild POB 6901, NT Stn, Denton, TX 76203-6901
Tarrant Area Guild of Storytellers POB 470273, Fort Worth, TX 76147-0273
Houston Storytellers' Guild 1525 West Main Street, Houston, TX 77006
Texas Storytelling Association POB 441, Krum, TX 76249-0441
Heart of Texas Storytelling Guild 2924 Braemar Street, Waco, TX 76710

Gatherings

Mid-Winter Storytelling Conference- Tellers of Tales,
4432 South Paseo Don Juan, Tucson, AZ 85746 JANUARY
Rocky Mountain Storytellers Conference- University of Colorado at Denver, 1200 Larimer
Street, Denver, CO
80204 MARCH
Storytellers on Tour in Colorado POB 588,
Monument, CO 80132-0588 OCTOBER
Colorado Storytellers Concert POB 588, Monument, CO 80132-0588 FREQUENT
Oro City Yam Spinners Gathering- Colorado Mountain College,
Leadville, CO 80461 FREQUENT

Storyfiesta- Storytellers Int'l 4703 Club House Ln NW, Suite H-5,
Albuquerque, NM 87114 OCTOBER
Storytelling Institute: University of New Mexico- Storytellers Int'l 4703 Club House Ln NW,
Suite H-5, Albuquerque, NM 87114 OCTOBER

Wintertales Storytelling Festival- Arts Council of Oklahoma City,
400 West California Avenue, Okla City, OK 73102 JANUARY
SunFest Storytelling Festival POB 3705, Bartlesville, OK 74006 JUNE
Tulsey Town Storytelling Festival 3913 East 37th Place,
Tulsa, OK 74135 DECEMBER

Texas Tale Trading and Music Festival-Armand Bayou Nature Center, POB 58828,
Houston, TX 77258-8828 MAY
Texas Folklife Festival- Institute of Texan Cultures, POB 1226,
San Antonio, TX 78294-1226 AUGUST
Marion Carter Storytelling Festival 168 West 500 N,
Salt Lake City, UT 84114 JUNE

California And Pacific Northwest

Fairbanks Storytellers POB 1702, Fairbanks, AK 99707-1702
San Gabriel Valley Storytellers
1130 South Marengo Avenue, Pasadena CA 91106

Community Storytellers 19573 Cave Way, Topanga, CA 90290
Pacifica Storytellers 2316 Palmetto, Pacifica CA 94044
Peninsula Story Guild 1900 Tasso Street, Palo Alto, CA 94301
Storytellers of San Diego 3406 Elliott Street, San Diego, CA 92106
Baybottom Talespinners 1448 Valdez Way Fremont, CA 94539

Eugene Storytellers Association 1975 Olive St, Eugene, OR 97405
Seattle Storytellers' Guild 16741 37th Stieet NE, Seattle, WA 98155
Storyspinnners of the Inland Northwest
East 44 Hawthorne Road, Spokane, WA 99218

Gatherings

Bay Area Storytelling Festival
2808 Hillegass Avenue, Berkeley CA 94705 APRIL
Claremont Spring Folk Festival 220 Yale Ave., Claremont, CA 91711 MAY
Fremont Storytelling Festival- Baybottom Talespinners,
1448 Valdez Way, Fremont, CA 94539 APRIL
Southern California Storyswapping Festival 19573 Cave Way,
Topanga, CA 90290 MAY
Sierra Storytelling Festival- North Columbia Schoolhouse Cultural Center,17894 Tyler-
Foote Crossing Road, Nevada
City, CA 95959 JULY
Lauta Simms Storytelling Residency- Wellspring Renewal Center, POB 332,
Philo, CA 95466-0332 AUGUST
Young Israel of Hancock Park Jewish Storytelling Extravaganza
321 North Detroit Street, Los Angeles, CA 90036 FREQUENT
Winter Tales- North Columbia Schoolhouse Cultural Center,
17894 Tyler-Foote Crossing Road, Nevada City, CA 95959 FREQUENT

Storytelling Gathering 1712 Aupuni Street, Honolulu, HI 96817 APRIL
Storytelling Workshop- University of Washington, Graduate School of Library and
Information Science, FM-30,
Seattle, WA 98195 MAY
Second Sunday Storytelling- Boiserie Coffeehouse, University of
Washington, 846 Northeast 98th Street, Seattle, WA 98115 FREQUENT

Canada

Stone Soup Stories 154 Queenston St, Winnipeg, MAN R3N OW7
The Storytellers' School of Toronto
412A College Street, Toronto, ONT M5T IT3
T.A.L.E.S. (The Alberta League Encouraging Storytelling)
10523 100 Avenue, Edmonton, ALB T5J OA8

Vancouver Storytelling Circle
4143 W15, Vancouver, British Columbia V6R 3A4

Gatherings

Toronto Festival of Storytelling- The Storytellers School of Toronto, 412A College St,
Toronto, ONT M5T 1T3 FEBRUARY

T.A.L.E.S. Storyfest 10523 100 Avenue, Edmonton, ALB T5J OA8 OCTOBER

For information and resources on Storytelling in the US, contact:

National Storytelling Association, P0B 309, Jonesborough, Tennessee 37659 (615) 753-2171

Specialized Storytelling Resources In New England

Somers Mountain Indian Museum,

332 Turn Pike Rd., Somers, CT, (203) 749-4129

Storowton Village, part of Big E, West Springfield, MA

Sturbridge Village, Sturbridge, MA

Institute for American Indian Studies, POB 1260, 38 Curtis Rd.,
off Rt. 199 Washington, CT 06793-0260 (203) 868 0518

Plymouth Village, Plymouth, MA

Advanced NeuroDynamics, 1833 Kalakaua Ave, Honolulu, HI 96815 800-800-MIND

Anthroposophic Press, RR 4 Box 94, Hudson, NY 12354, (518) 851-2054

Specialized Storytelling Books

My Voice will go with you: The Teaching Tales of Milton H. Erickson. Rosen, Sidney. New York: W.W. Norton & Co., 1982. For therapeutic storytelling.

Journey to the Ancestral Self Song, Tamarack. Station Hill Press, 1994.

MIND GAMES, The Guide to Inner Space. Masters, Robert, and Houston, Jean. New York: Dorset Press, 1972.

Zen in the Martial Arts. Hyams, Joe. Los Angeles: J.P. Tarcher, Inc., 1979.

ONE BOOKSTORE DEVOTED SOLELY TO STORYTELLING RESOURCES IS:
Yellow Moon Press POB 1316 Cambridge, MA 02238-1316 (617) 776 2230

PUBLISHERS OF TAPES INCLUDE:

August House POB 3223 Little Rock, AR 72203-3223

1 800 AUGUST House (800 284 8784)

Medicine Story's address is: 173 Merriam Hill Rd, Greenville, NH 03048 USA Tel: (603)

878-3201 his books on community or storytelling include: RETURN TO CREATION A Survival Manual for Native and Natural People, and THE CHILDREN OF THE MORNING LIGHT Wampanoag Tales, as well as stories on tape. Manitonquat is working on a manual for operating mostly self-sufficient, healthy communities, which is projected to be available around the end of 1999. Re-Evaluation Counseling is a form of "storytelling" to deal with trauma. The basic manual, and info on training, is available from Medicine Story, or the Publisher, Rational Island Publishers, POB 2081 Main Office Stn, Seattle, WA 98111, or off www.rc.org . I have not yet identified other providers, though they exist. Since all violence, and other negative behaviors, are "learned", and usually if not always based in the traumatic experience they were "learned" in, well... I hear community organizers who are very interested in finding some means by which they can reduce bickering, and increase the sense of community in their housing. This is one of the better ideas I've run across. Conflict resolution and dispute mediation training are good, but they don't usually address the sources of negative behavior, as this system does.

Community Building Soap Opera

It can be quite holistic to present new ideas as a "Soap Opera" to animate them. People seem to like such drama, perhaps, well, additional value could be gotten from it. I propose storytelling as an instructional method. There are some reasons for this.

1. New technology should always be presented in familiar dress, if possible. Greek and Hindu stone temples were first carved to look like their wooden predecessors, for example, and this pattern occurs with many new technologies- early automobiles looked like carriages. Model T's even had wooden spoked wheels.
2. People like material with emotional content, especially in the context of a story. One can look at newspapers like the Enquirer, for example. Jay Leno did a fascinating show where he quizzed people on world events, and most people knew nothing on them. He then quizzed them on popular sitcoms, and they knew almost every answer. I'm not judging this, only making an observation.
3. Effective propaganda, and any education, must first be entertaining. Aside from that, people LOVE gossip-look what the OJ trial did for the Enquirer.
4. Storytelling is a "holistic" way of getting info across. When I was in the 7th grade, 3/4 of the students in the class KNEW how many times one should chew one's food before swallowing- because they'd seen that episode of the television show, Gomer Pyle, USMC. Primitive cultures use storytelling in all education, because they know the lessons will stick. B'r'er Rabbit and the Tar Baby, for example, is a powerful African Teaching Story on the power and danger of resentment.
5. Life imitates Art- or, Art is at least a form of fantasy wish fulfillment. Many people watch Soap Operas. In fact, in my office some employees have small TV's they can catch their

favorite soaps on during lunch. This means we have an already established, safe, comfortable communication media in the storytelling modality. Hollywood used to be called the "Dream Factory" in the 30's, because people could escape painful reality for a short time. Wish fulfillment is big business. "Fictional characters can be more real than real people"- perhaps because they reflect the archetypes of the deep inner mind, the visceral level of existence.

"Murder She Wrote", my mother's favorite program, by way, has a niche audience of older women- and oddly enough, the main character is remarkably bright, and the men she's around incredibly stupid. Interesting. Consider the prejudices being reinforced, the dreams lived out from a distance. I remember reading about an American woman, in India, embarrassed because her hosts watched "Dallas" after something from the Mahabharata. Her hosts said, "Oh no, it is just stories, about people, just like the Mahabharata", implying that they enjoyed Dallas just as much.

People I knew in college, and in the military, loved copying Warner Brothers cartoon characters, or Peewee Herman's laugh... I wonder what a similar fun program with useful technical info might look like...

6. There is no better sales tool than Success Stories.

"It is better to inspire than to instruct."

"One must first see the invisible to do the impossible."

I wish we used Soap Operas to pass on useful ideas, instead of titillation. Wouldn't it be interesting for a group of people to make up an imaginary community, working in a pastiche of real events, just the way novelists do. Napoleon Hill spoke of his imaginary Board of Directors, in one of his books, that gave him useful ideas. Smithsonian magazine had a great article on Banana Kelly, the innovative Bronx neighborhood, in 1996, which said that ALL community development efforts like that start with one person, in that case a very energetic woman. Why not use already "spare parts", like John Todd's organic industrial waste and pollution dissipators, and weave them into an ideal community?

A Story On What It Means To Be Human

WILD HORSES

Until recently, I've carried a deep, hidden sadness for most of my life. Often I'd break down, crying out: "Why am I here? How could I have lost all touch with myself, my very soul? How can I get it back?" For years I prayed that I would find a way back to my real Self. Hiking deep in the Arizona canyonlands one day, I had a chance encounter with a timeless creature ... a wild stallion. This steed and his herd run free on Indian land and have never been ridden or domesticated. The lead stallion came forward from the pack to inspect me ... curious and innocent in a very child-like way, yet majestic, strong and totally sovereign. We stood and felt, enjoyed and marveled in each other's being for an eternal

moment. I pulsed with the wild, explosive, yet soft energy that emanated from his core. I glowed and quivered in this vibration for the rest of the day. That night the spirit of the stallion came to me in a dream. He spoke to me gently, brotherly... not in words, but in a direct capsule, heart to heart:

"For a long time you humans have been using techniques and processes to try to free yourselves from artificial structures and constraints to get back to a more relaxed, happy, natural state. This approach has worked only to a degree. This is because the very way you've been going about it... studied, linear, logical... has inhibited, and in the end prevented, the very goal you seek... free-flowing, natural aliveness. The only way to recapture the fire that you have lost is to reconnect with it directly. Technical and methodical approaches will not cut through the ancient layers of deadness and fear that now surround your every breath and movement. Only by touching, again, original essence... core life force, infinite spirit, the alchemical cauldron of life...will you have enough power to burn your way to freedom and real vitality. Re-discover the fire in your belly, the primal excitement that is life itself. Nurture it as you would a pilot light, as if it meant the very survival of your soul, which, in fact, it does. Put your attention there and only there ... not only in order to heal, not only in order to transform, but just simply because that is the original intention, because that is what your heart longs to do ... because that is where life itself resides. In this way you will begin to live again, and to become what you actually are ... an energy... a vibration ... a star!"

I recalled Don Juan speaking of a man whose "spirit is broken," just as a horse is domesticated by "breaking its spirit." As I felt this, a realization dawned on me like the sun piercing through an early morning fog: "That's it! My spirit was broken. That's what happened!" I was so emotionally shaken by these words that I spontaneously went back to the very moment in my life when my "spirit was broken"...by resigning myself to following outside authority, accepting others' boundaries and "adapting to the real world." I had never realized it before, but there was one exact moment... when I was a teenager in my hometown.. when I gave up completely... on myself...on the excitement I knew life was about...on life itself. Since that time I hadn't felt that deep, total aliveness again. In fact, I buried it so well that I forgot it ever existed... until now.

By consciously going back to when I shut the door to my essence, I cleared the path to retrieve my spirit. I reconnected myself to the energy of my own eternal being, to the fire of being really alive ... and I got it back ... this time forever! This is how we re-ignite our eternal flame and recover the absolute knowing of who we are. This is why we gather now.

Courtesy of Keith Varnum: "The Dream" training 800 736 7367 Phoenix, AZ 861-2631
Used with permission.

A LAST STORY, ON PURPOSE

As you finish this, think about your fascinations. If you had no limitations at all, and could be ANYTHING, what would that be? What would perfection be for you? How does it differ from what you have now? How could you create a little bit of what you want RIGHT NOW?

Socrates was a Greek soldier by way, at a time when physical strength counted for everything. Plato went to Socrates, and asked, "How can I know what I wish to know?" Socrates said nothing, he just took him to the seashore. Plato was going, "Yeah yeah yeah, he's gonna tell me the secrets of the Universe now!" Socrates held Plato's head under water. Plato waited... and waited... and waited... and gulped, and panicked. When he was almost limp, Socrates threw him on the shore. Plato gasped for air. After 5 minutes, he gasped, "I only asked a question, what'd you try to kill me for?" Socrates said, "Oh yes, what was your question again?" Plato said, "I wanted to know the secrets of the Universe!" Socrates said, "When you were under water, what was it you wanted?" Plato shouted "AIR!" Socrates said, "How bad did you want it?" Plato said, "It was all I could think about! My entire being was focused on getting air!" Socrates said, "When you want to know what you wish to know as much as you wanted air, it will come to you almost effortlessly."

Whatever your dream is, how bad do you want it? How many ways could you find to have fun, achieving it? Could you write out an "Ideal Day" in your life 5-10 years from now, where you are enjoying having achieved every one of your dreams, as a Story? I have such an "Ideal Day", which exercise I learned from Zig Ziglar's books. It feels great, and is one of my favorite stories. I have a tape recorder/alarm clock, and I wake up to that story, followed by Olympic marches. There are many books in the "Self-Help" or "Motivational Literature" section of your bookstore with such ideas. Further, each time I listen to the story, I get more focused on what I need to do to get there... We all have dreams. Part of the "Story" of life is achieving them. I participated in a group "Search" on what people most wanted in life some years ago. We eventually came up with "People most want to achieve all their dreams, playfully, effortlessly, and lovingly." You can use "Story" to structure your life, to help heal your community, and to guide yourself to where you want to be. I like cheap, effective "tools", in community building work, and stories are one of the best I've found. Good luck. One last thing: try not to have too much fun.

Stories Can Help Awaken Vision In People

Storytellers can help lead people back to their spiritual roots, to their Vision, to their purpose in life. The spiritual energy aroused and used in Storytelling can have this effect. Towards that end, I close with these thoughts:

Our deepest fear is not that we are inadequate.
Our deepest fear is that we are powerful beyond measure.
It is our light, not our darkness, that most frightens us.

We ask ourselves, who am I to be brilliant, gorgeous, talented and

fabulous? Actually, who are you not to be? You are a child of God. Your playing small doesn't serve the world. There is nothing enlightened about shrinking so that other people won't feel insecure around you.

We were born to manifest the glory of God within us. It is not just in some of us. It is in everyone. And as we let our own light shine, we unconsciously give other people permission to do the same. As we are liberated from our fear, our presence automatically liberates others."

-- Nelson Mandela

EMBODY YOUR VISION

BURN BRIGHT with the power and force of your Vision

Find a way to use everything: every letter every conversation
every meeting every chance encounter

every hobby and fascination and passion and skill and gift
to CRYSTALLIZE YOUR VISION

BECOME the TRUTH you want to see in the world

model it: glow with it vibrate and resonate to it

Network addictively effortlessly playfully joyfully

through energy feeling thought action love smiles kindness

Network from the truth, the Vision, deep in your soul

You are the Center of your Vision

The mantle for the Flame of your Truth

You are a free, effortlessly powerful welling of life,

light, love, truth, and sparkling, harmonious, joyful, healing beauty

feel it deep within your being

know it to be true- for it is

affirm it, project it, radiate it in concentric rings, light up your world

Enflame yourself with its energy, its feeling, its vibration, its light

and the miracle of the truth and purpose of your own life will manifest
as you help others realize their dreams

you realize your own

Great corporations, governments, the media, all seem so powerful

they are paper tigers before the power of vision and networking

and they know it

Living your Vision is the healing salve, the quintessence, the elixir of joy,

Aladdin's lamp, the peak of peak experiences

It is freedom, the joy of creating, power to help others and self,

democracy realized, truth known

Happiness, joy, peace, truth, purpose in life, beauty, satisfaction,

the spiritual side of life

all different faces of the same thing

and networking is the path

Things are only useful as a way to help you realize peak experiences
And all great human creations started out as a feeling in the heart of one person
who persisted at bringing it into form

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A Friction Fire Inquiry: Bow Drill

By Storm

The Past: During the winter of 1999 I was fortunate enough to teach at an outdoor school in southern California with Jeff Stauffer, now the Ethnobotanist of that school and an adjunct primitive skills instructor for Raven's Way Traditional School in Arizona. It was then that I first became aware that fire lay dormant within sticks, ready to expose itself with a little coaxing from humans. Jeff would reverently bring out his bow drill set, knead together a tinder nest, and with about fifteen seconds of bow-draw, an ember would magically appear. A spark was planted inside me at that very moment.

I moved to California at the top of 2000 and mostly lost that valuable, one-to-one mentoring that has served to bring into each successive generation the exact duplication of skills necessary to promote us into the future. So I began to rely on the wisdom of elders in print: books, journals, newsletters, correspondence and Internet. I was inspired by the local work of Dick Baugh, who offered encouragement and guidance. I was amazed at the variety of theories and techniques that surrounded friction fire. My amazement turned to confusion, however, when some applications consistently worked for me while others did not. Questions revolving around the nature of friction fire began to burn within me, questions that only I can answer for myself. Thus began an experiment. Here are the queries I wished to address:

1. Which local woods worked best?
2. Do woods used on themselves (e.g. buckeye on buckeye) generally perform better than woods used on other species (buckeye redwood)?



For the past eighteen months I gathered bow drill spindles and hearth boards from every single species of tree, shrub, liana and forb within a half-day walk of my home within the redwood forests of Loma Mar, California. As I collected such diverse materials as madrone, pear, and blackberry, I labeled and then dried the pieces for at least a week (in the house) before using them. I ended up with three or four spindles and a few hearth boards from each of the forty-four native and non-native species I was able to identify.

After cutting a piece of hairy honeysuckle for the bow, purchasing 500 feet of parachute cord, and finding a stone handhold in the tidepools, I began to attempt ember-making with all 1,936 possible combinations of the woods. Incredibly, the bow and handhold (which never heated up!) survived the entire experiment, while I ended up using around 400 feet of the cordage. Knowing from the onset that one of my goals was to add to the current amount of available information, I determined that the best way to relate what I felt was going on was to quantify the amount of effort I was putting into each attempt at an ember with a particular combination of woods. Effort ratings ranged from 1 (easiest) to 4 (very difficult), with a 5 representing the failure to get an ember. A summary is represented in Table One.

The Present: Over the course of thousands of ember-making attempts, I developed an affinity for certain wood species. Elderberry, buckeye, clematis, redwood and box elder seem the more reliable bow drill woods in this area. Table Two ranks the woods in order of overall performance (easiest to most difficult).

While amassing the data I became concerned with the subjective nature of this endeavor. Interpreting effort expenditure can be highly variable, depending on such volatile factors as daily health, time of day, mindframe, energy level, and so on. One statistical procedure that can help gauge the coherency of the data is based on the overall average of the effort ratings. Since this is a comparative study, I had to quantify an average effort and assign it a number (in this case, 3). One could also argue that as I became increasingly proficient with the bow drill, my estimations would become skewed. So I looked at how close the average effort rating was (over all 1,936 data points the average was 3.22) to my initial average effort estimation (3.00). If these two numbers were significantly different, then I would conclude that the experiment was lacking in consistency, but I think that they are sufficiently similar.

It is interesting that while the overall average effort of all wood combinations is 3.22, using woods on themselves is just slightly lower, 3.18, the difference seeming insignificant.

The Future: One purpose of this article is to broadcast this data in hopes that others will experiment with woods in their areas and share their findings.

I've nearly finished a separate hand drill experiment that involves seventy-two California species of spindles and just four species of hearth boards (no sense going overboard again). I have further concentrated on the role of wood density, incorporated the value of nascent growth for spindles, and am exploring the best woods for producing non-notched spindle coals. I am also

investigating the use of polypore mushrooms and rocks as potential hearth boards.

I would appreciate hearing from anyone regarding any of these endeavors!

About the Author: Storm grew up in northern Maine, where he attained a B.S. in Ecology. Working westward as a logger, ecological field technician, farm laborer, National Marine Fisheries Service Observer, bar-room bouncer, and most recently naturalist/aboriginal skills teacher, he now calls home the temperate rain forests of the Olympic Peninsula of Washington, ancestral lands of the Makah, Klallam, Hoh, Ozette, Quinault, and Quillayute. He values the sharing of knowledge and skill, so please feel free to contact him via the following addresses: Olympic Park Institute, 111 Barnes Point Road, Box 1, Port Angeles, WA 98363; stormbythesea@netscape.net.

Table 1. Effort Rankings For Bow Drill Ember Attempts. Non-Natives Are Underlined.
Effort ratings range from 1 (easiest) to 4 (very difficult), with a 5 representing the failure to get an ember.

HEARTHES

BOWDRILL - Effort Ratings		aca	map	box	buc	ald	md	sag	coy	lil	cle	hor	dog	haz	cyp	s.b.	eu	bur	ivy	toy	o.s.	tan	hon	lup	app	wax	pin	plu	che	fir	pea	oak	cof	rhog	goo	ros	blath	wild	el	rw	ced	bay	huc	gra			
Acacia sp.	Acacia	3	2	3	1	4	5	3	2	5	2	2	4	3	1	3	4	5	3	5	5	2	2	1	3	3	2	4	3	2	3	3	4	2	2	3	4	2	5	1	3	4	4	3	3		
Acer macrophyllum	Big-leaf Maple	3	2	3	2	3	3	1	3	4	2	4	3	4	2	3	2	3	4	5	2	4	2	3	3	3	2	2	3	1	2	3	2	3	3	2	2	4	5	1	2	2	2	4	3		
Acer negundo	Box Elder	4	2	3	3	4	5	2	3	5	2	3	3	4	4	4	3	3	2	5	5	5	1	4	1	3	4	3	2	2	1	3	4	4	2	1	3	2	4	1	2	2	2	4	2		
Aesculus californica	CA Buckeye	2	1	2	1	3	3	2	4	2	1	1	3	3	3	3	1	2	1	3	2	4	1	3	1	3	3	2	3	2	2	3	3	2	1	1	2	2	2	1	2	1	2	4	1		
Alnus rhombifolia	White Alder	3	3	3	4	4	5	2	4	5	2	5	3	2	3	4	4	3	4	5	5	5	2	4	3	4	4	4	2	2	4	3	4	4	5	4	2	4	3	3	2	1	3	3	4	3	
Arbutus menziesii	Madrone	4	5	5	4	4	5	5	3	3	3	3	4	4	3	5	5	5	4	5	5	4	5	5	5	5	5	5	2	4	3	5	3	2	4	5	4	4	4	3	4	3	4	5	4	3	4
Artemisia californica	CA Sagebrush	3	4	2	3	3	5	3	4	3	2	3	4	5	3	4	2	2	4	5	5	4	4	5	4	5	3	2	4	3	2	5	4	5	3	2	5	3	4	2	3	2	2	4	1		
Baccharis pilularis	Coyote Brush	4	2	5	3	5	4	3	3	3	4	2	3	3	2	2	3	4	3	5	5	5	4	3	3	4	3	4	3	1	3	5	5	3	3	3	4	4	3	3	3	3	2	3	4	3	
Ceanothus thyrsiflorus	CA Wild Lilac	2	3	2	3	4	5	3	4	4	3	5	3	5	4	2	2	3	3	5	5	5	4	4	4	5	3	2	4	2	3	4	5	3	2	3	4	4	4	2	3	4	4	5	4		
Clematis ligusticifolia	Clematis	3	2	2	2	3	3	3	3	3	1	3	3	4	3	3	1	4	4	3	5	4	3	2	2	4	3	1	2	2	2	2	4	4	2	1	2	3	2	1	2	3	3	4	4		
Conyza canadensis	Horseweed	4	4	1	2	3	3	2	1	4	3	1	3	4	3	3	2	3	3	3	3	1	1	3	4	4	3	1	3	3	1	5	5	4	3	3	5	4	3	3	2	1	3	4	2		
Cornus sericea	Amer. Dogwood	2	1	4	2	3	3	2	5	4	3	2	4	4	2	4	3	3	3	3	3	4	4	5	3	3	3	2	2	2	4	4	4	4	4	3	5	4	3	2	3	3	4	5	4		
Corylus cornuta var. californica	CA Hazelnut	3	2	2	3	5	5	4	5	4	2	3	4	3	4	3	3	4	1	5	4	5	3	3	4	4	3	5	5	3	3	4	4	5	3	3	5	3	4	2	3	2	4	5	4		
Cupressus abramsiana	SC Cypress	2	4	4	4	4	3	3	5	3	2	2	4	5	2	3	4	3	3	4	4	5	3	4	2	5	5	2	2	4	4	3	4	3	3	3	3	3	3	3	3	3	3	4	4	4	

Friction Fire Woods of California for starting a Bowdrill Fire, an Article by Storm

Cytisus scoparius	Scotch Broom	1	3	5	1	5	5	3	4	4	3	4	3	4	2	3	2	3	2	5	4	2	3	3	2	5	5	4	3	3	4	3	4	3	2	4	4	3	1	1	2	2	4	4		
SEucalyptus globulus	Eucalyptus	4	3	2	2	2	5	1	5	3	3	1	3	3	2	4	4	4	3	4	4	5	2	2	4	3	4	3	4	4	5	4	1	3	2	5	3	2	1	2	2	3	4	5		
PEuonymus occidentalis	Burning Bush	5	3	2	2	4	5	4	5	4	2	4	4	5	3	4	4	3	5	4	4	5	3	2	4	5	2	2	5	2	4	5	4	4	2	2	5	4	4	4	4	3	5	3		
IHedera helix	English Ivy	4	2	4	1	3	4	2	3	4	3	4	4	3	1	4	2	4	4	5	4	3	3	3	5	4	1	2	4	3	4	4	5	5	3	3	5	3	2	1	2	3	2	4	4	
NHeteromeles arbutifolia	Toyon	3	5	3	2	4	4	5	5	5	3	5	5	3	5	4	4	3	4	5	5	2	2	4	4	5	5	3	2	2	4	4	5	3	5	5	5	3	4	3	3	3	4	5	3	
DHolodiscus discolor	Ocean Spray	2	4	4	3	4	5	3	5	3	2	3	5	4	4	3	4	4	3	2	3	5	3	4	4	4	4	4	5	4	1	2	4	4	3	3	5	3	5	4	1	3	2	2	3	2
Lithocarpus densiflorus	Tan Oak	1	3	5	2	5	4	4	3	3	4	5	4	5	4	4	2	4	4	4	3	5	5	4	3	5	5	2	4	3	4	4	4	2	3	5	4	4	5	2	2	3	3	4	3	
Eonicera hispidula var. vacillans	Hairy Honeysuckle	2	2	4	1	3	3	3	3	3	4	3	2	2	3	4	4	3	4	2	3	5	1	2	3	3	2	1	3	1	2	4	5	5	3	4	2	2	3	1	1	2	4	3	3	
SLupinus arboreus	Tree Lupine	4	3	3	2	4	5	5	3	4	3	5	2	4	4	3	2	4	4	4	4	4	4	5	3	2	4	4	2	3	2	5	4	2	2	4	5	3	2	3	3	4	4	5	2	
Malus sp.	Apple	2	3	2	1	3	5	3	3	3	1	3	4	4	2	5	2	4	2	5	5	3	1	2	4	4	2	3	3	2	3	3	3	3	5	2	4	4	2	3	2	3	4	5	3	
Myrica californica	Pac. Wax Myrtle	3	3	4	2	3	4	4	3	4	2	2	4	5	5	4	2	2	2	4	5	4	4	4	4	4	3	2	3	3	1	3	4	2	4	4	5	3	4	3	3	4	4	5	5	
Pinus radiata	Monterey Pine	4	2	3	2	4	4	3	5	3	2	2	4	3	3	3	3	2	2	4	3	4	1	2	2	3	3	3	2	2	2	3	4	3	2	3	3	3	1	1	2	1	3	2		
Prunus cerasifera	Cherry Plum	3	3	1	3	4	4	4	4	3	4	5	3	5	3	4	3	4	4	2	5	4	3	3	3	5	3	5	3	3	2	4	4	4	5	3	3	3	5	3	2	3	5	5	3	
Prunus sp.	Wild Cherry	4	1	2	2	5	4	3	4	4	3	3	1	5	2	3	2	2	5	3	4	3	2	5	4	4	3	4	3	2	4	5	3	5	4	5	3	3	5	2	1	5	4	3	1	
Pseudotsuga menziesii	Douglas Fir	2	2	3	2	2	5	3	3	4	2	1	4	4	3	2	3	2	3	4	4	3	2	3	1	2	3	2	1	2	4	2	3	3	4	1	3	3	2	1	2	2	3	3	3	
Pyrus sp.	Pear	5	4	2	2	2	4	5	5	4	1	4	3	3	4	5	2	3	4	4	5	2	2	5	5	2	2	4	1	4	4	4	3	5	1	3	3	3	2	1	2	1	5	2		
Quercus wislizeni	Interior Live Oak	5	4	5	4	5	5	4	5	5	4	4	4	4	5	4	4	5	4	3	5	3	5	4	3	4	3	3	2	2	5	5	5	2	2	3	4	5	5	3	2	4	3	5	5	
Rhamnus californica	Coffeeberry	4	2	5	2	5	4	4	4	2	3	1	5	4	2	1	3	4	2	5	5	4	4	5	5	4	2	1	3	3	5	2	3	4	4	4	3	2	2	3	3	3	1			
Rhododendron macrophyllum	Rhododendron	4	3	3	3	5	5	4	3	5	2	4	3	4	3	4	2	3	2	2	3	5	3	4	2	3	4	5	2	3	2	5	3	4	4	4	4	4	4	5	4	1	1	5	4	2
Ribes menziesii	Gooseberry	3	4	5	4	2	5	2	4	5	2	3	2	4	3	1	4	2	3	4	4	2	4	5	3	5	3	1	3	2	1	3	4	4	3	3	2	5	1	3	3	3	3	2		
Rosa gymnocarpa	Wood Rose	4	2	2	1	2	5	3	3	3	1	4	3	3	4	2	4	3	5	4	5	4	4	3	3	4	2	2	4	1	3	5	3	3	2	2	4	4	4	1	1	3	3	4	3	
Rubus discolor	Hm. Blackberry	4	4	5	5	4	5	2	5	5	2	3	5	5	4	5	5	4	3	4	5	4	1	4	5	5	4	5	4	2	5	4	5	3	5	4	4	5	3	2	3	5	4	5	5	

Rubus parviflorus	Thimbleberry	2	3	1	1	2	3	4	4	3	2	4	3	4	5	3	4	3	4	4	4	3	3	2	4	4	2	2	4	5	3	5	3	3	2	3	1	2	3	3	5	3						
Salix sp.	Willow sp.	2	1	3	2	3	3	3	4	3	4	1	4	5	5	4	3	3	2	2	2	4	5	4	2	2	1	3	3	3	3	4	4	4	5	3	2	1	1	3	4	5	5					
Sambucus mexicana	Blue Elderberry	3	2	2	1	2	2	2	2	3	1	2	1	1	1	1	4	2	2	3	4	1	1	3	5	3	2	2	3	2	4	2	3	2	1	1	2	2	2	1	1	4	2	1				
Sequoia sempervirens	Coast Redwood	1	3	4	1	4	4	3	1	3	2	2	2	4	3	2	4	2	1	3	3	1	1	4	3	3	3	1	2	4	2	3	3	5	2	3	3	3	1	2	2	2	3	2	4			
Thuja plicata	W. Red Cedar	4	2	3	2	2	4	3	2	3	3	3	2	1	3	3	2	3	2	4	4	3	2	3	2	3	2	4	4	3	4	3	4	3	5	3	3	2	1	3	4	4	2					
Umbellularia californica	CA Bay Laurel	3	3	3	1	4	4	4	4	3	1	4	2	2	3	2	4	4	4	4	4	4	5	5	2	3	2	4	5	3	3	3	4	5	4	3	4	4	4	5	3	5	3	2	1	3	4	3
Vaccinium ovatum	Huckleberry	1	1	2	3	5	5	4	4	5	2	3	4	4	2	5	3	5	3	5	5	5	3	3	3	1	4	4	2	3	4	2	2	5	2	4	3	5	5	4	3	2	3	3	4	3		
Vitis californica	Wild Grape	2	4	5	1	3	5	3	5	4	2	1	2	3	3	4	2	4	1	4	4	3	2	5	5	2	2	3	3	2	2	4	4	5	3	2	3	3	3	3	1	2	4	3	2	2		

Table Two
Preferred Bow Drill Materials
of the Central Coast Section
of the California Floristic Province

Great	
Achillea millefolium	Yarrow
Conyza canadensis	Horseweed
Acer negundo	Box Elder
Aesculus californica	CA Buckeye
Baccharis salicifolia	Mule Fat
Sambucus mexicana	Blue Elderberry
Sequoia sempervirens	Coast Redwood
Typha latifolia	Cattail
Acer macrophyllum	Big-leaf Maple
Artemisia douglasiana	Mugwort
Cirsium vulgare	Bull Thistle

<i>Cytisus scoparius</i>	Scotch Broom
<i>Pseudotsuga menziesii</i>	Douglas Fir
<i>Scrophularia californica</i>	CA Figwort
<i>Sonchus oleraceus</i>	Sow Thistle
<u>Good</u>	
<i>Erigeron</i> sp.	Fleabane Daisy
<i>Umbellularia californica</i>	CA Bay Laurel
<i>Verbascum thapsus</i>	Common Mullein
<i>Helianthus</i> sp.	Garden Sunflower
<i>Lonicera hispidula</i>	Hairy Honeysuckle
<i>Salix</i> sp.	Willow
<i>Solidago spathulata</i>	Coast Goldenrod
<i>Cornus sericera</i>	American Dogwood
<i>Rubus parviflorus</i>	Thimbleberry
<i>Silybum marianum</i>	Milk Thistle
<i>Urtica californica</i>	Stinging Nettle
<i>Vitis californica</i>	Wild Grape
<i>Alnus rhombifolia</i>	White Alder
<i>Artemisia californica</i>	CA Sagebrush
<u>Difficult</u>	
<i>Ceanothus thyrsiflorus</i>	CA Lilac
<i>Chlorogalum pomeridianum</i>	Soaproot

<i>Dipsacus fullonum</i>	Fuller's Teasel
<i>Eriophyllum staechadifolium</i>	Seaside Woolly Sunflower
<i>Euonymus occidentalis</i>	W. Burning Bush
<i>Holodiscus discolor</i>	Ocean Spray
<i>Myrica californica</i>	Pac. Wax Myrtle
<i>Rubus discolor</i>	Himalayan Blackberry
<i>Thuja plicata</i>	Western Red Cedar
<i>Prunus cerasifera</i>	Cherry Plum
<i>Rosa gymnocarpa</i>	Wood Rose
<i>Escallonia macrantha</i>	Escallonia
<i>Mimulus aurantiacus</i>	Sticky Monkeyflower
<i>Rhododendron occidentale</i>	Western Azalea
<i>Tamarix parviflora</i>	Smallflower Tamarisk
<i>Baccharis douglasii</i>	Marsh Baccharis
<i>Larix</i> sp.	Tamarack
<i>Lithocarpus densiflorus</i>	Tan Oak
<i>Madia elegans</i>	Tarweed
<i>Pteridium aquilinum</i>	Bracken Fern
<i>Symphoricarpos albus</i>	Snowberry
<i>Acacia</i> sp.	Acacia
<i>Calocedrus decurrens</i>	Incense Cedar
<i>Corylus cornuta</i>	Hazelnut
<i>Cydonia oblonga</i>	Quince
<i>Grindelia stricta</i>	Marsh Gum Plant

Phyllostachys sp.	Bamboo
Rhododendron macrophyllum	Pacific Rhododendron
Salix lutea	Yellow Willow
<u>Extremely Difficult</u>	
Arbutus menziesii	Madrone
Baccharis pilularis	Coyote Brush
Conium maculatum	Poison Hemlock
Cupressus macrocarpa	Monterey Cypress
Eucalyptus globulus	Blue Gum Eucalyptus
Hedera helix	English Ivy
Heteromeles arbutifolia	Toyon
Juniperus communis	Common Juniper
Lupinus arborus	Tree Lupine
Malus sp.	Apple
Pyrus sp.	Pear
Rhamnus californica	Coffeeberry
Ribes menziesii	Canyon Gooseberry
Rumex crispus	Curly Dock
Ulmus minor	Smooth-leaved Elm
Vaccinium ovatum	Evergreen Huckleberry

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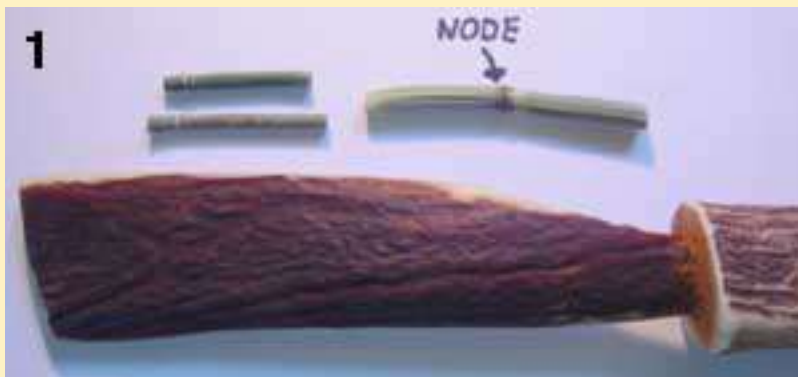
Making a Horsetail Pan Flute

By Storm

Strolling by a patch of horsetail (*Equisetum hyemale*), it is hard to resist cutting a length of this slender, abrasive plant and blowing across an open end for its sharp whistle effect. Upon witnessing a friend play his pan flute one day, I realized that I could fashion one out of horsetail.



This horsetail pan flute is easy to make, but takes patience and dexterity, especially when securing each piece of horsetail to the frame. I initially made the mistake of using fresh horsetail when assembling my first pan flute. This resulted in whistles that shrank away from the frame and the yucca bindings, as well as buckled into unattractive, tone-less hanks of horsetail. It seems very important to thoroughly and slowly dry whole horsetail stems in a cool place devoid of direct sunlight. For my material in my locale, this process took three weeks.



The next step is to cut the horsetail into suitable lengths to produce whistles of different pitches. I find that using a swift chopping motion with an antler cleaver works well, giving a clean cut without crushing the horsetail (**photo 1**). When cutting horsetail into whistles, you don't want pieces that are totally hollow. One must leave an intact node, or cross-

wall, inside the length of each piece (**photo 2**). Some species of *Equisetum* branch at these nodes. I have not had success making whistles out of these species. Experiment,

experiment, experiment! Knowing nothing about music, I cut a couple hundred pieces and blew away, setting aside those that "sounded right." Generally, the longer and/or wider the piece, the lower it will sound. Coincidentally (I whimsically prefer instinctively), when I finished selecting those whistles I deemed good enough to affix to a frame, a musician friend informed me that my arrangement decently coincided with a nearly two octave scale, starting with a C (438 Hz).



For the triangular frame, I chose clematis, which was light and handy. Here was the most difficult part of this endeavor-attaching the horsetail to the frame, which proved to be intricate and taxing to my dexterous capabilities. **Photo 3** shows the grand fir pitch and yucca fibers I used to attach the whistles to the frame. After I tied the frame together with yucca, I glued each whistle to the frame using the heated pitch. Upon drying, I then tied the horsetail to the frame with a yucca fiber, with the thicker fibers being more reliable (but be careful not to crush the horsetail when cinching down your knots!). Occasionally a whistle would dislodge from the frame with handling, so re-application of pitch was necessary. When each whistle was finally tied to the frame, I re-enforced the bindings with a drop of heated pitch (**photo 4**). **Photo 5** shows the finished product, having lastly rubbed ochre rock dust on all pitched surfaces to eliminate stickiness.

This is a great activity to do with kids: it gives them a real connection with their environment; utilizes a widespread resource (here in the Pacific Northwest); and produces a final product that their parents don't mind them having (as opposed to, say, a stone blade). Enjoy!

About the Author: Storm grew up in northern Maine, where he attained a B.S. in Ecology. Working westward as a logger, ecological field technician, farm laborer, National Marine Fisheries Service Observer, bar-room bouncer,



and most recently naturalist/aboriginal skills teacher, he now calls home the temperate rain forests of the Olympic Peninsula of Washington, ancestral lands of the Makah, Klallam, Hoh, Ozette, Quinault, and Quillayute. He values the sharing of knowledge and skill, so please feel free to contact him via the following addresses: Olympic Park Institute, 111 Barnes Point Road, Box 1, Port Angeles, WA 98363; stormbythesea@netscape.net.



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Construction and Efficacy of a Quartz Crystal-Tipped Hand Drill

By Storm

A few years ago, amongst the shovel-and-pick gold claims and scattered stately yuccas, I had collected some point-tipped quartz crystals in the San Bernadino National Forest of southern California. There were fascinating outcroppings of pegmatite (**photo 1**), a coarse-grained granite containing tourmaline, beryl, phosphate, micas, and quartz (to name a few possibilities), which sometimes offered large crystals. "These must be of some use," I thought to myself as I not-so-gently crushed the pegmatite to reveal small pockets of clear quartz crystals. Four years later, a few uses presented themselves.



Having nearly no knapping skills, I've thought long and hard about alternatives to the stone micro-drills so wonderfully displayed in the annals of the *Bulletin of Primitive Technology*. Putting the eyes in bone needles, holes in shell ornaments, and primitively starting friction-fire sockets are tasks that have become important to me. It had recently dawned on me that I could *simply* sink a pointed quartz crystal into a hand-drill spindle (of which I have a few hundred), affix it with pitch, and drill away. **Photos 2 and 3** shows the cutting and sanding tools, deer dung, Douglas fir pitch (and littleneck clam shell container in which to melt it), elderberry and honeysuckle spindles, and quartz crystals necessary to make a hand drill. In order to create the socket in which the crystal would be glued into the spindle, I hand-spun the pointed tip of the quartz into the future working-end of the spindle shaft, which took about ten minutes (**photo 4**). Using a little fir pitch to firmly nest the crystal into place, the tool was finished and ready to use (**photo 5**). For the fun of it, I bought a fluorite crystal and made a drill out of that (**photo 6**), but the fun ended when I found that this mineral was far too soft to be useful in general.

Now it was time to test the tools at hand. **Photos 7 through 11** illustrate the various materials that have been successfully drilled with the quartz crystal hand drill. An avid friction-fire practitioner, I am very pleased to have a wholly primitive tool capable of easily starting the socket in which a hand drill or bow drill spindle would spin. Here is a little efficacy examination of this mineral drill regarding various materials:

<u>Material</u>	<u>Drill Time (min.)</u>
CA Fan Palm Wood Hearthboard (3mm depression sought)	0:20
Red-Belted Conk Fungus (3mm depression sought)	0:30
Coast Live Oak Hearthboard (3mm depression sought)	0:35
Mussel Shell (2mm thick)	1:15
Snapping Turtle Carapace Shard (6mm thick)	2:20
Deer Leg Bone Shard (4mm thick)	3:25
Elk Antler Shard (7mm thick)	4:00

About the Author: Storm grew up in northern Maine, where he attained a B.S. in Ecology. Working westward as a logger, ecological field technician, farm laborer, National Marine Fisheries Service Observer, bar-room bouncer, and

most recently naturalist/aboriginal skills teacher, he now calls home the temperate rain forests of the Olympic Peninsula of Washington, ancestral lands of the Makah, Klallam, Hoh, Ozette, Quinault, and Quillayute. He values the sharing of knowledge and skill, so please feel free to contact him via the following addresses: Olympic Park Institute, 111 Barnes Point Road, Box 1, Port Angeles, WA 98363; stormbythesea@netscape.net.

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