The PrimitiveWays™ CD

The PrimitiveWays™ Book

What's New	Calendar of Activities & Events: October Photo Gallery 21 Photo Gallery 22 Wilderness Grooming Thumb Loop Hand Drill Fire Kit Become a Member of the **Society of Primitive Technology**

Resources		E-mail Questions Answered (new additions weekly) The PrimitiveWays™ CD The PrimitiveWays™ Book Recommended Books & Magazines Movies of Interest (Entertainment, Educational, and How-To videos) Stores that Offer Resources for Primitive Technology Projects TRADING POST - items for sale A $5 Friction Fire Starter Kit Thumb Loop Hand Drill Fire Kit
Workshops & Classes		Calendar of Activities & Events - 2003 Old Ways Workshops - 2003 KAHIKO Workshops of Native Skills - 2003 MAPOM Fall Classes - 2003 What to Teach Kids and Why Sharing Old Ways With The Young

Fire Making & Primitive Cooking

Some Uses of Fire

Starting Fire
With a Lens Made From Ice!

The Egyptian Bow Drill

Fire-By-Friction: Materials of the San Francisco Bay Region

Fire

The Two-Stick Hearthboard

Miracle of Fire-by-Friction

Making Fire with a Bow Drill

Making Fire with a Hand Drill

Fire-by-Friction with Damp Materials

Spindle Extension for a Fire Bow Drill

Fire-by-Friction Methods of the Australian Aborigines

Smallest Bow Drill Fire-by-Friction Set

Primitive Cooking

Adobe Horno

Bamboo Rice Cooker

Primitive Tools & Projectiles

The Secrets of the Sinew

Cordage Backed Bow

Making an Asiatic Composite Bow

Making a Bow From a Sapling

Fletching By Hand

Arrow Straightening

Making an Atlatl from a Branch

Jiffy Arrow & Atlatl Dart Fletch Using Duct Tape

Atlatl Dart Tuning

Atlatl Flexibility Analysis

Simple Atlatl Spear Thrower Construction

Atlatl in Ancient Rock Art

Bamboo Clay Thrower

Spears, Weirs and Traps

The Hoko Knife - A quick, simple stone tool

The Stone Saw

The Scapular Saw

Antler Handle Knife

Scallop Baking Shells

Musical Instruments & Magic		Bone Flutes Primitive Quail Call Primitive Hand Made Reed Flute Sycamore Membranophone Puniu - Hawaiian Knee Drum Deer Hoof Rattle Musical Instruments of Central California
		Random Thoughts on Tradition vs. Technology Primitive Crystal Light!
		Weaving a Lauhala Mat Processing Shark Skin into Rawhide Brain Tanned Buffalo Hides Tanning a Fox Hide Pelt Bag The Ties that Bind and Bindings that Tie What Knot to Use in a Primitive Situation Pomo Netting Cordage Fiber Shredder Made From Bone Making Cordage By Hand

Early Technology & Traditional Skills

Introduction To Tule Ethnobotany

Pomo Tule Bittern

Klamath Twined Tule Visor

Paiute Tule Duck Decoy

Ajumawi Fish Traps

Inuit Thimble

Willow Rake

The Three-Stick Roycroft Pack Frame

Making a Leather Knife Sheath

Steam Bending Wood

Log Ladder

Four Hour Kayak

How to Paint a Mammoth

Wilderness Grooming

Thirty Years in the Jungle!

Was Agriculture a Good Idea, or an Act of Desperation?

Calendar of Harvesting and Gathering

Coppicing

Useful Plants of California (1)

Useful Plants of California (2)

Useful Plants of California (3)

Useful Plants & Shelters		Nature's General Store: The Yuccas and Agaves The Ti Plant Called Ki Olona Hemp Dogbane Hawaiian Plants (a trip to the Big Island) Bull Whip Kelp Fishing with Poisons Fishing with Hawaiian Plants Cattail Pollen Pancakes Quiz: Can You Name These Plants? Thatched Ohlone Style House Scout Pit The Primitive Sauna
Events & Primitive Trips		I Belong To This Country (an Australian adventure) Native California Fall Gathering at San Luis Reservoir State Recreation Area Rattlesnake Rendezvous Australian Aborigine Flint Knapping Primitive Field Day at Stanford University

		Coyote Hills Knap-In and The Gathering of Ohlone People Winter Count
Hand-Made Tools & Urban Resources		How to Make Your Own Steel Knives Folding Saw Johnstone Tools Portable Shaving Horse Urban Resources Alternative Supplies for Urban Dwellers Wilderness & Urban Tips Fire by Chemical Reaction
Gallery & Links		Photo Gallery I Photo Gallery II The Info Super Highway Refugee Interesting Links

RESOURCES | WORKSHOPS | FIRE | TOOLS | MUSIC | SKILLS | PLANTS | EVENTS | URBAN | GALLERY

PrimitiveWays began in 1998 and is produced by
Dick Baugh, Bob Gillis, Norm Kidder, Chuck Kritzon, Ken Peek, and Dino Labiste.

The excerpts by Steve Watts (President of the Society of Primitive Technology)

summarizes our philosophy on practicing and teaching primitive technology.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com, "Bob Gillis" at shelter@best.com, "Richard A. Baugh" at dick_baugh@compuserve.com, "Norm Kidder" at atlatl1@aol.com, "Chuck Kritzon" at chuckk@petroglyphics.com, or "Ken Peek" at kspeek123@earthlink.net

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The PrimitiveWays™ CD

The PrimitiveWays™ website is being offered on a Compact Disk (CD). The PrimitiveWays™ CD contain 136 detailed articles on primitive technology along with 1,037 color images. No waiting for articles to download on the internet! This CD is an educational and instructional source of information that you can easily view with your friends.

The compact disk runs on the PC or Mac operating system.

The PrimitiveWays™ CD is produced by PrimitiveWays.com. The CD sales help with the cost of maintaining the website and other web hosting fees. If the information on PrimitiveWays has been beneficial in any way, please support the website by purchasing a CD.

The cost is only $20 per CD, which includes shipping.
California residents add $1.65 sales tax (for each additional CD, add $1.65 sales tax).

Fast Credit Card Orders can be placed through Shelter Systems
by calling 650-323-6202 or Fax 650-323-1220

You can also place your credit card order on-line through Shelter Systems secure credit card order form. Just scroll down to the category labeled "Other Item" and type in PrimitiveWays CD. Type in all the appropriate quantity, sales tax (if you are a California resident), shipping cost, and total. For placing a credit card order on-line, go to: https://secure.webcom.com/surfer/shelter/credit.html

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To place a mail order: Send a check or money order, including the **Order Form** to;

Bob Gillis
224 Walnut Street
Menlo Park, California 94025

E-mail your questions and comments to "Bob Gillis" at shelter@best.com

The following categories* from the website are on the PrimitiveWays™ Compact Disk:

1. **Resources**
2. **Fire Making & Primitive Cooking**
3. **Primitive Tools & Projectiles**
4. **Musical Instruments & Magic**
5. **Early Technology & Traditional Skills**
6. **Useful Plants & Shelters**
7. **Hand-Made Tools & Urban Resources**

8. **E-mail Questions & Answers**

9. **Photo Gallery & Links**

*A few articles on the website may not be included on the CD. Inquire by contacting "Bob Gillis" at shelter@best.com

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PRIMITIVEWAYS™ CD

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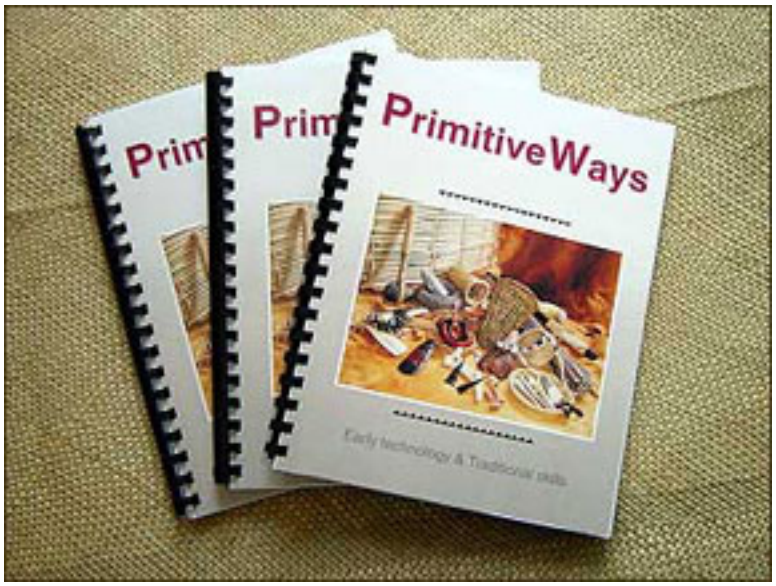
The PrimitiveWays™ Book



The PrimitiveWays™ website is being offered in a book version. The PrimitiveWays™ Book contain 69 detailed articles on early technology and traditional skills in a convenient, 8 1/2" x 11" spiral bound booklet. It has a color cover with 86 black and white pages of informative text and images.

This booklet is an educational and instructional source of information that you can take with you anywhere. It can easily be shared with your friends.

The PrimitiveWays™ Book is produced by PrimitiveWays.com. The book sales help with the cost of maintaining the website and other web hosting fees. If the information on PrimitiveWays has been beneficial in any way, please support the website by purchasing a book.

The cost is only $25 plus $4 for shipping (add $1.00 to shipping cost per additional book).
Inquire about shipping rates for Alaska, Hawaii, or international orders.
California residents add $2.06 sales tax (for each additional book, add $2.06 sales tax).

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SATISFACTION GUARANTEED: If you are not satisfied with The PrimitiveWays™ Book for any reason, simply return it to us within 30 days in new condition for a full refund.

E-mail your questions and comments to "Bob Gillis" at shelter@best.com

Many of the articles from the website categories are included in the booklet:

1. Steam Bending Wood
2. Making an Atlatl From a Branch
3. Fire-by-Friction: Materials of the San Francisco Bay Region
4. Ajumawi Fish Traps
5. Coppicing Willow for Basketry Withes
6. Clay Thrower Made from Bamboo
7. Bull Whip Kelp
8. Spears, Weirs, and Traps

42. Making Cordage By Hand
43. Inuit Thimble
44. Johnstone Tools
45. Jiffy Fletching Using Duct Tape
46. Reed Flute
47. Puniu - Hawaiian Knee Drum
48. The Atlatl as Depicted in Ancient Rock Art
49. Random Thoughts on Tradition vs. Technology
50. Pomo Tule Bittern
51. Making a Leather Knife Sheath
52. Quail Call
53. The Two-Stick Hearthboard for Fire-by-Friction
54. The Scapular Saw
55. The Versatile Molcajete and Scallop Baking Shells
56. Stone Age Nail File & Fish Bone Comb
57. Sharing Old Ways With the Young
58. My First Scout Pit
59. The Stone Saw
60. Folding Pocket Knife
61. Cordage Fiber Shredder Made From Bone
62. Simple Atlatl
63. Sycamore Membranophone
64. Thatched Ohlone Style House
65. Fishing with Poisons
66. Cattail Pollen Pancakes
67. The $5 Friction Fire Starter Kit
68. Urban Resources
69. Supplies for the Urban Abo
70. The PrimitiveWays Clan

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The PrimitiveWays™ Book

Calendar of Activities & Events

OCTOBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4 **Coyote Hills Knap-In** - Friends of Primitive Technology **Acorn Processing & Soaproot Brush** - MAPOM **Arrow Making** - MAPOM
5 **Coyote Hills Knap-In** - Friends of Primitive Technology **The Gathering of the Ohlone Peoples** (special event) at Coyote Hills Regional Park, Fremont, CA (10 am - 4:30 pm). Contact (510) 795-9385 for more info.	6	7	8	9	10	11 **Cordage & Net Making**- MAPOM

Acorn Processing & Soaproot Brush - MAPOM						
12 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at sean.clemenza@hgst.com for more info	13	14	15	16	17	18 **Third Annual Native California Peoples Fall Gathering** / San Luis Reservoir State Recreation Area / San Luis Creek Picnic Grounds / 10 am - 9 pm / Open to public / Contact Jennifer Morgan for more info at (209) 826-1196 ext. 534 **California Indian Games & Toys** - MAPOM / Instructor: Chuck Kritzon
19	20	21	22	23	24	25
26	27	28	29	30	31	

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

All activities and events are held in California, United States unless specified.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Photo Gallery 21

Acorn leaching

Casting an atlatl dart with a chamise foreshaft and a hafted flint point. The main shaft is made from elderberry.

Oak wedges made by Kennie Elvin. The wedges were used for splitting logs.

Hair comb made from monkeyface eel ribs.

Ken Peek demonstrating flintknapping
at the Ohlone Day event at Henry Cowell Redwoods State Park.

Photo Gallery 22

PHOTO GALLERY I

PHOTO GALLERY II

View "Friends of Primitive Technology" past activities

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Photo Gallery 22

Tule boat constructed by Linda Yamane
at the Gathering of the Ohlone Peoples event at Coyote Hills Regional Park.

Getting ready to smoke the buffalo hide.

Serpentine pendant

Ohlone Plant Foods booth at the Gathering of the Ohlone Peoples event at Coyote Hills Regional Park. Notice the large basalt mortar and the winnowing baskets in the front.

Clay bowl with quartz crystals.

Photo Gallery 21

PHOTO GALLERY I

PHOTO GALLERY II

View "Friends of Primitive Technology" past activities

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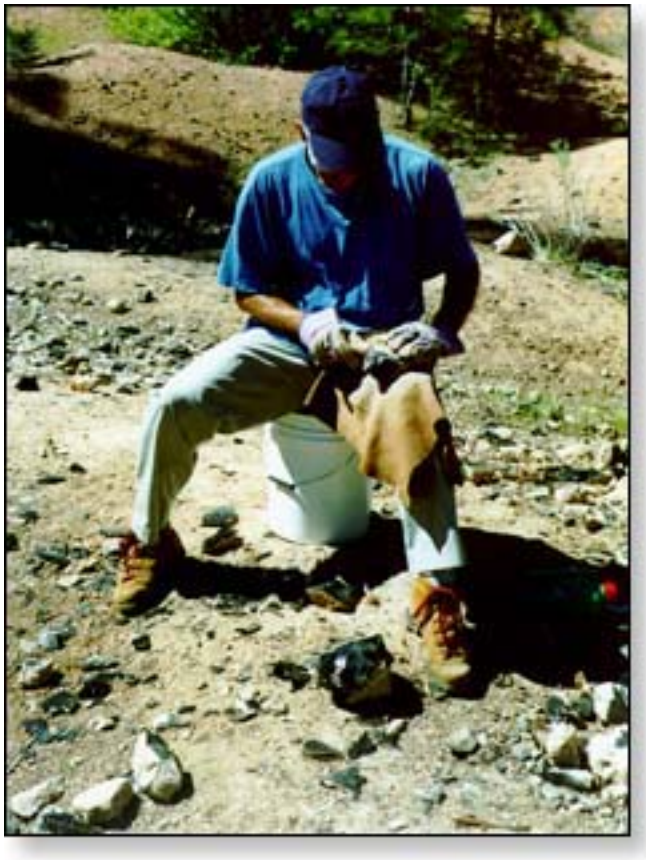
Photo Gallery 1

Many hands make light work.
Tired of starting a hand drill fire all by yourself? Team up and share the load.
When you need some water to put the fire out,
then grab the ends of the two person hand drill
and use it to dowse for water.



Obsidian knapping at Davis Creek in California using a hammerstone.

Clay deposit next to a river bed.
Open pit firing of clay pots at the Rattlesnake Rendezvous in Sunol, California.

Dick Baugh's primitive den.

Photo Gallery 2

Photo Gallery 3

Photo Gallery 4

Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

View "Friends of Primitive Technology" past activities

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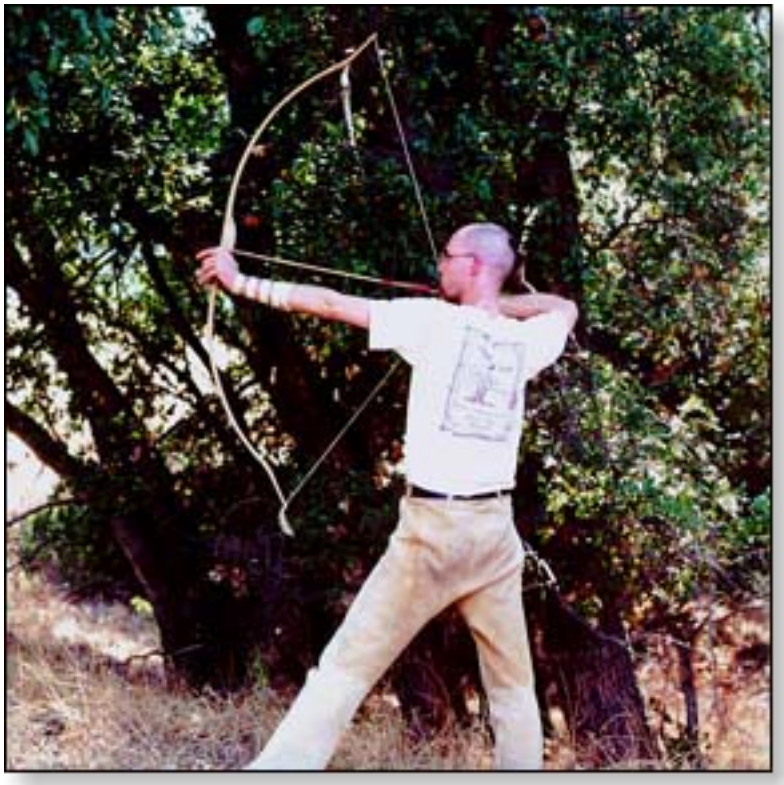
Photo Gallery 2



Dino shooting his osage orange bow and wearing a bamboo quiver.
Markus shooting his sinew backed recurve ash bow.

Bill sleeping in his grass bedding at the Rattlesnake Rendezvous in Sunol, California.

Basalt axes.
Chopping a branch with a hafted basalt ax.

A Paiute deadfall with twig barriers to guide the animal to the bait.

Photo Gallery 1

Photo Gallery 3

Photo Gallery 4

Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

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Photo Gallery 3

Bone tools (needles, awls, and whistle), a river cane needle case with a wooden plug, and the beginning of a sweetgrass coiled basket.

A deer scrotum medicine pouch.

Acorn toy buzzer and flax cordage. The cordge was twisted and pulled between the fingers causing the acorn to twirl and create a buzzing sound.

Fishing gear: dogbane fishing line (2-ply cordage), bone gorge, bone hooks, and stone weights (holes were drilled with a flint hand drill).
Produced by KAHIKO Artwork & Replicas.

A mussel shell mounted onto a mountain mahogany branch and wrapped with sinew and pine root. The tool was used as a hide scraper.

**A wooden bowl that was hollowed out using hot coals.
The decorations on the front were burnt in.**

Photo Gallery 1

Photo Gallery 2

Photo Gallery 4

Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

View "Friends of Primitive Technology" past activities

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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KAHIKO Artwork & Replicas

"My passion for art and early technology keeps me in balance."

Welcome to KAHIKO Artwork & Replicas. I'm Dino Labiste and I am the artist and craftsman for KAHIKO Artwork & Replicas. Each item that you see on this webpage is a one-of-a-kind piece. No two items are alike because each replica or artwork is individually hand crafted. Along with the esthetic design of the indigenous objects, all replicas are also utilitarian. I strive for the integration of function and form.

Contact **Dino Labiste** at **dlabiste@yahoo.com** or call **(510) 792-9755** to reserve the item(s) you are interestd in. Then fill out the Order Form.
If you want to commission a particular item, contact Dino. E-mail or call for any questions.

For a biography of Dino, access The PrimitveWays Clan webpage.
Visit **THE GALLERY** and view his previous artwork and replicas.

Dino has sold his replica to the Monterey State Historic Parks and had a replica displayed at the Native American Museum of the Maidu Interpretive Center.

All indigenous objects of the past served a practical or symbolic function. Adornment added to objects of practical use related to magic in aiding the power (mana) of the object and so improving its efficiency. All man-made things had a spirit life and were not regarded by indigenous cultures as inanimate "dead" objects, as western society now regard a bowl or a basket. The rule was utility first, decoration second. The symbolic or magical functions of the decorations made the objects and symbols more than things of art.

Definition of **Kahiko**: **1.** To think, act, speak in the old way. **2.** Ancient; a long time ago.

Item: Gourd Drum
Item Number: GD14

Description: Drum made from a gourd with a deer hide drumhead. The rawhide is lashed with 2-ply agave fibers and dogbane cordage. The lower ring is made from willow wrapped with tapa (paper mulberry bark). The designs are burnt on the gourd.

Dimensions:
Height: 11 1/4" (28.6 cm)
Diameter of drumhead: 9 1/4" (23.5 cm)
Diameter of base: 5" (12.7 cm)

Price: $75.00

Shipping & Handling: $9.00

Total Cost: $84.00

Item: Obsidian Knife
Item Number: OK11

Description: Knapped obsidian blade hafted to a juniper handle. A mixture of pine pitch and powdered charcoal was used to adhere the obsidian to the handle. Sinew was wrapped around the hafted area.

Dimensions:
Blade length: 2 1/2" (6.3 cm)
Handle length: 3" (7.6 cm)
Overall length: 5 1/2" (14 cm)
Widest blade width: 1" (2.5 cm)

Price: $40.00

Shipping & Handling: $5.00

Total Cost: $45.00

Front and back view

Item: Obsidian Blade

Item Number: OB12

Description: Knapped obsidian blade.

Dimensions:
Blade length: 6 1/4" (15.9 cm)
Widest blade width: 1 3/16" (3 cm)

Price: $50.00

Shipping & Handling: $6.00

Total Cost: $56.00

Item: **Pine Pitch Sticks**
Item Number: PPS13

Description: A mixture of pine pitch and charcoal.

Dimensions:
Pitch length: 3" (7.6 cm)

Price: $2.00 / pine pitch stick
A minimum of 5 pine pitch sticks per order.

Shipping & Handling: $5.00

Total Cost: $15.00 for 5 pine pitch sticks

Thumb Loop Hand Drill Fire Kit

KAHIKO Workshops

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KAHIKO Artwork & Replicas

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	Total Due	

Make a check (check must have a United States address), money order, or cashier's check payable to:
Dino Labiste

Send a copy of the order form, along with a check or money order to:
KAHIKO Artwork & Replicas
4768 Cortez Avenue
Fremont, California 94536
United States

Any questions, contact Dino Labiste at e-mail **dlabiste@yahoo.com** or call **(510) 792-9755**.

KAHIKO Artwork & Replicas * Dino Labiste (artist / craftsman)
4768 Cortez Avenue * Fremont, CA 94536 * (510) 792-9755

The PrimitiveWays Clan

DICK BAUGH

Dick Baugh has been interested in ancestral skills since childhood. When he was eight years old, his dad and he tried unsuccessfully to start a fire with a bow drill. He finally achieved ignition 25 years later. With so many people boasting about the speed with which they can start a friction fire, who do you know who can do it that slowly?

Dick has graduate degrees in electrical engineering and has had a 40+ year professional career in electronics research. He has worked on atomic time keeping and storage of computer information with magnetic bubbles, rigid disk drives and magnetic tape.

Dick gets particular enjoyment in applying modern scientific analysis and measurement techniques to primitive technology. He wrote a paper, entitled "Atlatl Dynamics", published in *Lithic Technology*, which analyzes high speed video data taken of a projectile being thrown with an atlatl. He has also published several articles on fire-by-friction in the *Bulletin of Primitive Technology*.

His other interests are archery equipment, lithic technology, didjeridoo making and playing, creating steel knives and teaching primitive technology to children.

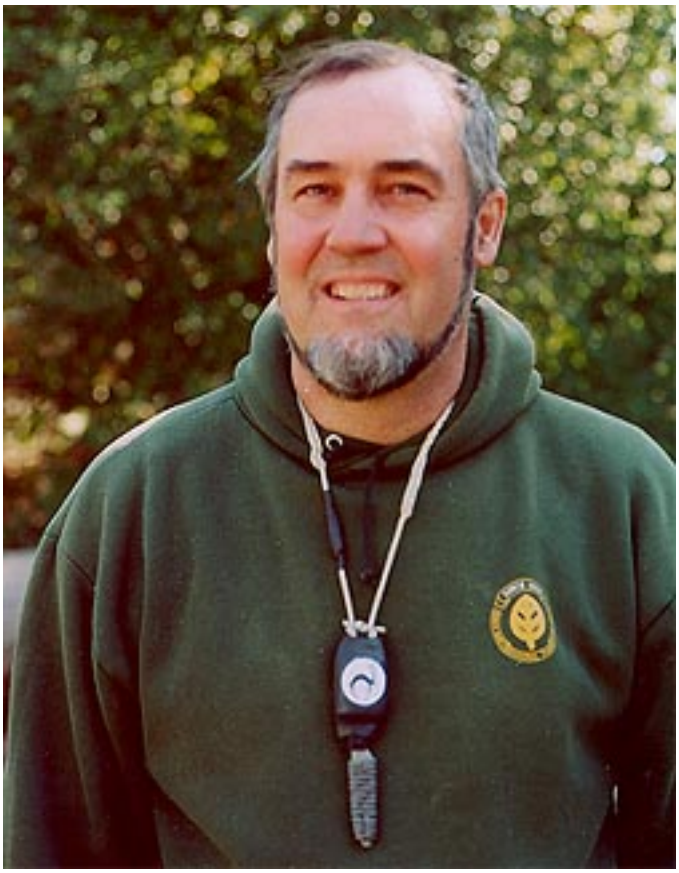
Dick Baugh can be contacted at dick_baugh@compuserve.com

BOB GILLIS

Bob Gillis, owner of Shelter Systems, a tent company, has a long history of design in the tent industry. He has licensed tents to The North Face, Sierra Designs, Mountain Hardware, Marmot and others. Bob has been granted twelve U.S. patents, from structural concepts to the molded clips used in the construction of Shelter Systems' dome tents. He revolutionized the tent industry in 1976 by designing the first geodesic backpacking tent, The Oval Intention, using tensegrity design principles. Most of the backpacking tents using flexed poles that you see on the market today are covered by his patents.

Bob has a strong interest in making things with his hands and in how our "primitive" ancestors used their hands and mind to survive and flourish. He feels that by learning about who we were, we begin to understand who we are. The best way to know this is by doing. Bob feels the PrimitiveWays website is an important and excellent way to share the "how to".

Bob Gillis can be contacted at shelter@best.com



NORM KIDDER

Norm Kidder has always felt most at home in the outdoors, growing up in rural Indiana and New Jersey. He was an Eagle Scout back when Scouting emphasized old style campcraft skills. Norm has a degree in Biology from Antioch College, Yellow Springs, Ohio, where he focused on the evolution of human behavior compared to social primates and social predators. In 1972, he started work as a Naturalist with the East Bay Regional Park District at Coyote Hills Regional Park, where his main interest was the interpretation of the local Ohlone Indians. At the urging of his wife and fellow Naturalist, Jan Southworth, Norm began replication of artifacts and houses. He assisted her in 1979 with the construction of a Tule Boat that she paddled across San Francisco Bay. That same year they took a class from Craig Bates in Yosemite and got more seriously into skills such as fire and cordage, netting and woodworking. The Tule Boat voyages also brought Norm together with Dick Baugh. They then collaborated on the first Old Ways Workshop (1980), Stone-Age Olympics and Stone-Age Weekend (now the Rattlesnake Rendezvous). He began instructing at the Rabbitstick Rendezvous in Idaho in 1992 and at the Winter Count Gathering at its inception in 1995. Since 1996, Norm has been the Supervising Naturalist at Sunol-Ohlone Regional Wilderness. He was selected as a Member of the Board of the Society of Primitive Technology in 1997. Norm has contributed many articles to the *Bulletin of Primitive Technology*. Although Norm can teach most of the basic primitive skills, he likes to emphasize the basics: fire, fiber, shelter and simple tools that are the heritage of all humanity.

Norm runs a small business - The Old Ways Workshop, through which he consults, constructs exhibits and replicates artifacts for teachers and museums. He also sells artifacts and artwork (woodcarving and gourd containers) to the public, teaches outdoor survival skills and markets survival kits.

Norm Kidder can be contacted at atlatl1@aol.com

DINO LABISTE

Dino Labiste's love of nature came from growing up in Hawai'i. Surrounded by the lush maulukua (forest) and the deep blue moana (ocean), he enjoyed hiking in the mountains as well as surfing in the ocean swells. Dino learned to place an offering of a stone wrapped in a ti leaf at the beginning of each hike, asking for safe passage for entering the tropical forest. He also learned to respect the power of the ocean and to be sensitive to her many gifts of seafood.

Dino's interest in ancient Hawaiian culture was fueled by the Hawaiiana classes in grade school and his first visit to the Bishop Museum. How did the ancient Hawaiians create all those beautiful crafts with just stone tools and cordage? He began pouring over books on Hawaiiana and talking to people who were still into the old ways of making things.

His studies in art and graphic design soon took Dino to California to receive his bachelors degree at the California College of the Arts in Oakland. The various wilderness habitats in California opened up new opportunities to explore the mountains, shorelines, as well as the deserts. While on the Mainland, Dino soon turned his interest to the Native American indigenous cultures and Stone Age technology. His thirst for knowledge took him to the Miwok Archaeological Preserve of Marin at the Point Reyes National Seashore, the Rabbitstick Rendezvous in Idaho, Winter Count in Arizona, the Coyote Hills Workshops in Fremont and the Caning Shop in Berkeley. As well as the various museums throughout California.
Dino is currently pursuing his college education in the Biological Sciences and working for the East Bay Regional Park District as an interpretive aide. He enjoys helping visitors learn about the cultural and natural history of Sunol-Ohlone Regional Wilderness.

Dino has written for the *Wilderness Way* magazine and the *Bulletin of Primitive Technology*. He has also taught at Winter Count in Arizona and the Rattlesnake Rendezvous in Sunol. Dino has done demonstrations of indigenous skills at the Indian Education Center in Marysville, Ohlone Day at Henry Cowell Redwoods State Park , The Gathering of Ohlone Peoples at Coyote Hills Regional Park, the Native California Fall Gathering at San Luis Reservoir State Recreation Area,

and the Coyote Hills Knap-In at Coyote Hills Regional Park. He was also an aikido instructor at the Enbukan Dojo in Mountain View, California. Dino is currently teaching at his school called KAHIKO Workshops of Native Skills. The old saying, "Know truth by your own direct experience," is basic to learning any skill. You learn by observing, deducing and applying, which leads to a deeper understanding and respect of life and your environment. Start your journey with shoshin, a beginner's mind.

Dino Labiste can be contacted at dlabiste@yahoo.com
Check out the Trading Post for artwork and replicas for sale by Dino.

CHUCK KRITZON

Chuck Kritzon's interest in the past and old ways skills has been with him for a long time. When he was 10 years old, he was fortunate to see some Chumash Indian cave paintings in the Santa Barbara Mountains. The same year he visited the California State Indian Museum (SIM) in Sacramento with his family. Looking back, he realized that this was when he began his journey to gain the knowledge and skills that have become his passion in life. Many years would pass before his real education would begin.

In 1991, by chance, Chuck heard about Ishi Day to be celebrated at the SIM. There was to be someone there demonstrating obsidian knapping. On that rainy October day, he was fortunate to meet the first of many mentors and teachers. When he arrived, Brian Smith (Wanasi), was sitting in the corner of the museum on a large tarp knapping arrowheads. Chuck spent the rest of the day sitting on the floor watching, listening and asking a zillion questions. Chuck was fortunate to find a first teacher who spoke to the very heart of his desire to learn. Brian taught primitive skills from a Native American viewpoint: having respect for

the natural world, making offerings and giving thanks for materials gathered. Trying to sense what the earth and all the plants and animals are trying to tell us. An entirely holistic view of old ways skills. This may seem "out there" to many, but it was exactly how Chuck wished to learn.

Brian told Chuck that he taught classes a Point Reyes National Seashore at the reconstructed Coast Miwok village there. A whole new world was opening up for Chuck. He could not get enough of the classes being taught there by Brian and others. It was not until later that Chuck realized how fortunate he was having the caliber of teachers he did. Peg Mathewson, Steven Edholm and Tamara Wilder, Bill Mulloy, Joe Dabil, Bev Ortiz and many others.

The day Chuck met Brian, he also learned that docent training for the SIM would begin soon. Chuck signed up, but the training was delayed a year due to budget cutbacks. This proved to be fortunate. By the time Chuck became a docent, he was glad to have a venue to practice and share the many skills he had been learning. Chuck had the opportunity to demonstrate flintknapping, making cordage, fire and arrows, as well as pecking and grinding. During this time he threw himself into learning all he could about California Native Culture. Chuck also began to educate himself about the Rock Art of the California Indian People, which eventually lead to Petroglyphics, his company that replicates petroglyphs and pictograph images on natural stone and bone pendants and slate coasters.

It was at this time he learned about the Society of Primitive Technology and became a member. In the first bulletin, he read about another California Bay Area based teacher, Norm Kidder. During a visit to Norm's area on one business day, Chuck stopped in at Coyote Hills Regional Park and introduced himself to Norm. Learning that Norm and Dick Baugh also taught skills there, Chuck became a regular attendee at the monthly classes for the next few years and began to participate in the "Rattlesnake Rendezvous / Stone-Age weekend" that Norm held every year at Sunol-Ohlone Regional Wilderness.

Over time, Chuck began helping Norm and Dick with the classes at Coyote Hills and even taught a few classes at the Rabbitstick Rendezvous one year. During his time at the SIM, and currently at Indian Grinding Rock State Historic Park in Pine Grove, California, Chuck has organized and presented enrichment training for other docents and park staff.

The focus of his study of Rock Art became increasingly world wide and in the summer of 1999, Chuck was invited and presented a series of lectures and demonstrations about the cave painting of paleolithic Europe at The California Academy of Science in San Francisco, in conjunction with the "Missing Links Alive!" exhibit.

In 1998 and 1999, he also participated in presenting classes in Alberta, Canada for the Junior Forest Wardens youth organization.

Along with his Petroglyphics business, Chuck is also teaching classes at the Maidu Interpretive

Center in Roseville, California.

Chuck said, "I am pleased to be part of this on-line endeavor with Norm, Dick, Bob, Ken, and Dino. With the combined knowledge, skills, and enthusiasm of this group, I am confident that it will grow and flourish into an important educational resource for both experienced and novice old ways skills practitioners."

Chuck Kritzon can be contacted at chuckk@petroglyphics.com

KEN PEEK

Ken's life-long interest in nature and the outdoors began with numerous family camping trips to the Sierra Nevada range as well as the Northwest and Southwest. It seems he's always wanted to make things by hand, and this interest was mentored early on by his great-grandfather, a make-anything carpenter from the Old Country, and a favorite uncle whose hobbies included woodworking, metalworking, jewelry, and lapidary work. The rockhound in Ken was encouraged early on, and to this day he still spends most of his time studying the ground while outdoors! Later on, when an interest in flint-knapping developed, it proved to be the best of all worlds: being out in nature, rock collecting, and hand-crafting at its most fundamental, all rolled into one! In the late 90's, Ken was instrumental in organizing the first Coyote Hills Knap-In in Fremont, CA, which has become an annual event attended by numerous Bay Area knappers. Although stone-working was his first love, he's since branched out and tried his hand at everything from gourd-crafting to basketry, and just about any craft involving plants and natural materials. After thirty-plus years with the California Native Plant Society, he definitely considers himself to be a "plant person", and is constantly seeking new ethnobotanical information regarding plant uses. Ken's demos on Native technologies and plant uses have been incorporated into his children's school curriculum, and his local school board recently awarded him a certificate of recognition for

"bringing history alive" and "inspiring many future archaeologists and historians."

"Working with kids and generating enthusiasm in them has definitely become a focus for me," Ken says. "If there's one message I like to leave with them, it's that everything we have, need, and see around us comes from the Earth. I hope that my interests will help people re-connect with the natural world that sustains us all".

Ken Peek can be contacted at kspeek123@earthlink.net

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Old Ways Workshops - 2003

Norm Kidder

Sunol-Ohlone Regional Wilderness
P. O. Box 82, Sunol, CA 94586
Information: (925) 862-2600
E-mail: Atlatl1@aol.com or Svisit@ebparks.org
Reservations: (510) 636-1684

Planning Meeting & Swap Session

Join the Friends of Primitive Technology at the Sunol-Ohlone Regional Wilderness Visitor Center to plan out classes, field trips and gatherings you'd like to see happen (and are willing to help with) for the coming year. Come early and bring lunch for an informal show and tell gathering as well as materials you'd be willing to share/swap. Starts at noon until 4:00. Call Norm for information.

JANUARY 11 (Sat)
12:00 pm - 4:00 pm
The meeting is open to the public. Come on down and meet new friends.

Survivor - California *Course #3080*

Ever wonder how you would do in a survival situation? The key is in knowing your environment. Find out how basic awareness of nature and a little knowledge of human physiology and psychology can help assure that you will always be a survivor - even in winter. Ages 10 years and up. Registration required - call (510) 636-1684 for reservations. Sunol-Ohlone Regional Wilderness

JANUARY 25 (Sat)
10:00 am - 3:00 pm
Fee: $25 (adult) / $15 (child) ($29/ $17 for non-Alameda or Contra Costa County residents)
Instructor: Norm Kidder

Basic Twined Baskets *Course #3079*

We will use sandbar willow to make a basic storage basket (open twined) or woodpecker trap. We will also learn the variety of basketry types and their role in local native culture. For adults 16 years and up. Registration required - call (510) 636-1684 for reservations. Sunol-Ohlone Regional Wilderness

FEBRUARY 8 (Sat)
10:00 am - 4:00 pm
Fee: $35 ($40 for non-Alameda or Contra Costa County residents)
Instructor: Norm Kidder

The Incredible Edible Wild *Course #3237*

As we explore the park, learn which plants were a part of the Ohlone Indian diet , which were used for fiber, medicine, baskets, and more. We will sample some of the more abundant edibles during lunch, then make string from dogbane that we can use to make a soaproot brush. Ages 10 years and up. Registration required - call (510) 636-1684 for reservations. Sunol-Ohlone Regional Wilderness

MARCH 8 (Sat)
10:00 am - 3:00 pm
Fee: $25 (adult) / $15 (child) ($29/ $17 for non-Alameda or Contra Costa County residents)
Instructor: Norm Kidder

Springtime Tracking

Spend the morning reading natures newspaper as we look for clues to what has been happening in the wilderness. We will learn animal tracks plus the signs left by insects, water, and wind. Sharpen your observation skills and get a better understanding of the world around you. Ages 10 years and up. Registration required - call (510) 636-1684 for reservations. Sunol-Ohlone Regional Wilderness

APRIL 12 (Sat)
9:00 am - 12:00 pm
Fee: None
Instructor: Norm Kidder

Mother Nature's Bloomers

Immerse yourself in the beauty and lore of California's native wildflowers on a fairly easy three mile hike. Learn their names and their structures, their goals and their uses as we enjoy the residents of Nature's spring garden. Ages 7 years and up. Registration required - call (510) 636-1684 for reservations. Sunol-Ohlone Regional Wilderness

APRIL 12 (Sat)
1:00 pm - 4:00 pm
Fee: None
Instructor: Norm Kidder

Tule or Not Tule?

Learn how to identify this native marsh plant. We'll talk about its botanical characteristics, find out how California Native People have utilized tule (too-lee) and make a tule bittern. Registration required. Call 925-862-2601. Sunol-Ohlone Regional Wilderness
JUNE 7 (Sat)
10:00 Am - 11:30 am
Fee: None
Instructor: Dino Labiste

Wilderness Skills: The Nature of Survival *Course #3932*

Learn how our ancestors thrived in the "wilds" by using the same principles as many other species to find shelter, food and water. We will also look into the cultural and practical significance of uniquely human technologies of fire, cordage and simple stone tools. (Ages 10+) Sunol-Ohlone Regional Wilderness
JUNE 14 (Sat)
10:00 am - 2:00 pm
Fee: $25 (adult) / $15 (child) ($28/ $17 for non-Alameda or Contra Costa County residents)
Instructor: Norm Kidder

Wilderness Skills: Knots with Knorm

Learn how our ancestors thrived in the "wilds" by using the same principles as many other species to find shelter, food and water. We will also look into the cultural and practical significance of uniquely human technologies of fire, cordage and simple stone tools. (Ages 10+) Sunol-Ohlone Regional Wilderness
JUNE 21 (Sat)
10:00 am - noon
Fee: none
Instructor: Norm Kidder

Summer Solstice Sunset Celebration

Do what cultures
around the world have done for thousands of years - celebrate the longest day of the year. Bring a picnic to enjoy, then don your decorative attire (mask, costume), pick up your musical instrument (rattles, whistles, drums, etc.) and join the procession to Red Hill Top for the bonfire and merrymaking. We'll share marshmallows as we "put the sun

to bed". (All ages) Coyote Hills Visitors Center.
JUNE 21 (Sat)
6:00 pm - 8:30 pm
Fee: $5/person; $10/family (($7 / $12 for non-Alameda or Contra Costa County residents)
Instructor: Norm Kidder & Jan Southworth

Volunteer Opportunity - Tule House Repair

The Tule House we built five years ago with stone-age tools is in need of repair. We will be straightening up the framework, and replacing and repairing the thatch. This is a rare chance to go back in a time machine and experience the past. (Ages 10+) Register at 925-862-2601. Sunol-Ohlone Regional Wilderness
JUNE 28 (Sat)
10:00 am - 4:00 pm
Fee: none
Instructor: Norm Kidder

Tule Boats & Cordage of Native California *Course #3225*

EDUCATORS ACADEMY: Check out the East Bay Regional Park District website - ebparks.org for more details on this program. Register at 510-636-1684. Coyote Hill Regional Park
JULY 26 (Sat)
9:30 am - 4:30 pm
Fee: $45 ($51 for non-Alameda or Contra Costa County residents)
Instructor: Jan Southworth

House Repair Redeux

We will do more work on the tule house begun on June 28. Call 925-862-2601 to sign up. Sunol-Ohlone Regional Wilderness
AUGUST 9 (Sat)
10:00 am - 4:00 pm
Fee: none
Instructor: Norm Kidder

Rhythm and Blows

FRIENDS OF PRIMITIVE TECHNOLOGY: Join Dick Baugh for an adventure in didjeridoo and drums, knocker sticks, rattles, etc. Call Dick for more information at 650-493-5125.
AUGUST 16 (Sat)
Instructor: Dick Baugh

A Day in Pre-Columbian California *Course #3229*

EDUCATORS ACADEMY: A taste of life as it may have been before crowds and modern technology replaced direct contact with nature. We will spend the day as hunters and collectors, finding resources to accomplish a variety of tasks. Then sitting on mats under a shade shelter, cooking, eating and practicing the skills needed for daily life I the stone-age. Go home with a friction fire set, basic stone tools, a bone awl, a full belly and an understanding of house construction, fire, tracking, hunting, fishing, foraging and much more. This workshop will give you a personal, meaningful context for teaching about California Indians or early humans. Call 510-636-1684 to register. Sunol-Ohlone Regional Wilderness
AUGUST 23 (Sat)
9:00 am - 5:00 pm
Fee: $45 ($51 for non-Alameda or Contra Costa County residents)
Instructor: Norm Kidder

The Rabbitstick Rendezvous

By BACKTRACKS: Join many local primitive technologists in Rexburg, Idaho for a week of old ways classes. Call Dave and Paula Wescott at 208-359-2400 for information and registration. Dave is one of the founders of the Society of Primitive Technology and deserves your support. They will also be happy to sign you up for membership in the Society of Primitive Technology or sell you back issues of the "Bulletin of Primitive Technology" or books.
SEPTEMBER 14 - 20 (Sun - Sat)

The Coyote Hills Knap-In

Join local flint knappers and members of the Society of Primitive Technology in front of the Coyote Hills Visitor Center for demonstrations of primitive skills. Call Norm at 925-862-2600 for information. Coyote Hills Regional Park
OCTOBER 4 - 5 (Sat & Sun)

10:00 am - 5:00 pm
Parking Fee: $4

Gourd Crafting

FRIENDS OF PRIMITIVE TECHNOLOGY: Join Ken & Betsy Peek, and Chuck & Betsy Kritzon in an exploration of gourds, natures own container. These relatives of pumpkins were one of the earliest plants domesticated and continue to amaze modern folk with their wide range of uses, from cooking pots to musical instruments. Call Ken & Betsy at 510-537-1215 for details for this all day class.
NOVEMBER 15 (Sat)

All programs at the Sunol-Ohlone Regional Wilderness begin at the Visitor Center (Green Barn).
DIRECTIONS: *Take I-680 to the Calavaras Rd./Dunbarton Bridge exit. Follow Calavaras Road south for 4 miles. Turn left on Geary Road. Follow Geary for 1.5 miles to Sunol Park. Take the first left turn after the gatehouse. The Barn is next to the parking lot.*

EAST BAY REGIONAL PARK DISTRICT - www.ebparks.org

THE OLD WAYS WORKSHOPS

E-mail your comments to "Norm Kidder " at atlatl1@aol.com

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Replicas and Artwork

by Norm Kidder

Pomo Pattern Stick Dice with Counters ($40 +Tx & shpg.) .....Decorated Bullroarer ($9 + Tx & shpg)

Deer Bone Hand Games Set .....'Gorge' Fish Hook on Dogbane String

Seal Bowl

Otter Bowl

.....Otter Spoon.....Redwood Mush Paddle - Wappo Style ($10 + Tx & shpg)

Elderberry Clapperstick.....Atlatl with Antler Hook

Fish Spear - Deer Bone with hafting, Ohlone style

Call Norm Kidder at (510) 794-9415 or e-mail him at atlatl1@aol.com for details.

The Trading Post

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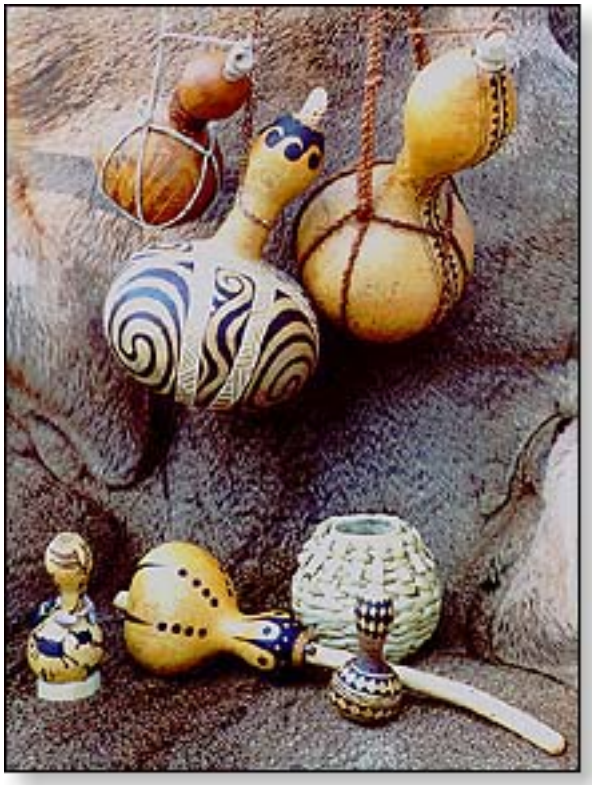
The Trading Post

Stone Age and Replicated Traditional Items for Sale

The Trading Post sells contemporary items which reflect our common stone age heritage. We also offer a marketplace for artisans and craftspersons who have a respect and skill for replicating traditional technology.

KAHIKO Artwork & Replicas

Dino Labiste (artist / craftsman)



Replicas and Artwork by Norm Kidder

Tools for the Traditional Craftsman from Beavertooth Tools

Arrowplane

Kennie's Didjeridoos and Rattles

The PrimitiveWays™ Book

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Tools for the Traditional Craftsman from Beavertooth Tools

Arrowplane

The price is $25.00. plus $5.00 for shipping and handling for a total of $30.00 if ordered by mail. In California add $1.90 for sales tax.

Send your order to:

Dick Baugh
490 Gary CT
Palo Alto, CA 94306

Bow Scraper

The price is $20.00. plus $5.00 for shipping and handling for a total of $25.00 if ordered by mail. In California add $1.50 for sales tax.

Beavertooth Knives

Send your order to:

Dick Baugh
490 Gary CT
Palo Alto, CA 94306

Call Dick Baugh at (650) 493-5125 or e-mail him at dick_baugh@compuserve.com

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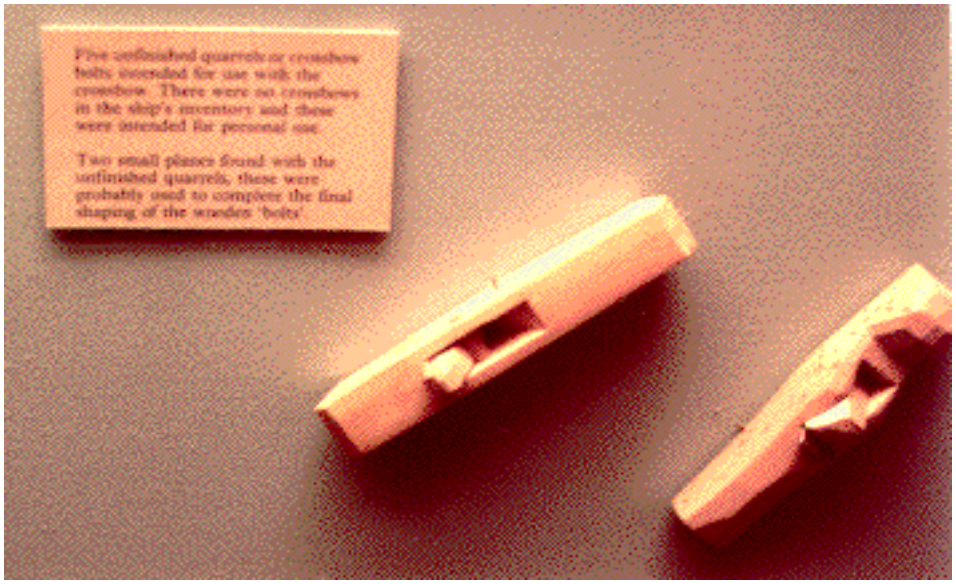
Arrowplane

The inspiration for the Arrowplane came from the Mary Rose Exhibit in Portsmouth, England. The Mary Rose, a Henry VIII warship, sank in the English Channel in 1545 and was salvaged in 1982. Among the longbows, arrows and other treasures brought up from the wreck was a woodworkers tool chest and inside the tool chest were two small planes, each with a rounded groove on the bottom. Replicas of these were on display at the Exhibit. The conjecture is that they were used in the making of arrows. The two originals were of traditional plane design which uses a wooden wedge to hold the cutting blade in place. I made up my mind that I HAD to make one when I returned home. The traditional design is quite labor intensive because of the effort needed to get everything to fit properly.



Replicas in the Mary Rose exhibit and the Arrowplane

My design is much easier to produce in large quantities. The blade, 1095 carbon steel, has a very hard, sharp edge. Each blade is tested for hardness. If the steel can be scratched by a file then it is rejected. Each blade must be sharp enoiugh to shave the hair on my wrist. In order to re-sharpen the blade I recommend holding it in some sort of fixture which will maintain the correct angle between blade and whetstone. The blade is held in the plane body at an angle of 40 degrees so the bevel on the blade should be from 30 to 35 degrees. Use medium and fine whetstones followed by either a hard Arkansas stone or a Japanesewater stone to get maximum sharpness. In order to prevent rust occasionally wipe the blade with an oily rag.

Using the Arrowplane

Making arrows from natural materials, whether sawed or split from a board or from saplings is a combination of straightening, planing, rasping, scraping, straightening, planing... There is no one tool which will do it all. The Arrowplane works best on straight grained wood. If the grain is not parallel to the surface then you must plane in the direction which prevents the plane from digging in. Adjust the depth of cut by loosening the wingnut and sliding the blade so it is barely visible. Tighten the wingnut and then check the cut on a piece of scrap. One way of making slight increases in the depth of the blade is to loosen the wingnut, brace the plane against a solid surface and then tap the top of the blade with a small metal hammer.

The price is $25.00. plus $5.00 for shipping and handling for a total of $30.00 if ordered

by mail. In California add $1.90 for sales tax. Send your order to:

Dick Baugh
490 Gary CT
Palo Alto, CA 94306

Call Dick Baugh at (650) 493-5125 or e-mail him at dick_baugh@compuserve.com

More Tools for the Traditional Craftsman from Beavertooth Tools

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The Bowscraper

The Bowscraper is the tool of choice for shaping wooden bows. The handle is osage orange and the blade is 1095 carbon steel. The blade has been hardened to Rc 62 or greater to insure durability.

How To Order the Bowscraper

Send $25.00 to:

Dick Baugh

490 Gary Ct.

Palo Alto, CA 94306

Questions? Call (650) 493-5125

Call Dick Baugh at (650) 493-5125 or e-mail him at dick_baugh@compuserve.com

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Beavertooth Knives

This knife is razor sharp. It is made from high carbon steel, type 1095, and the cutting edge is very hard so it will stay sharp a long time. The color difference between the cutting edge and the back of the blade is due to differential tempering. The edge is left in a very hard state and the remainder of the knife is heat treated to increase its durability. The plain carbon steel that the blade is made from will rust if it gets damp. To prevent rusting wipe the blade with an oily rag once in a while.

When you sharpen this knife DON,T use a "crock stick or any other type of round sharpening rod. Instead, use a fine whetstone or diamond hone which has been lubricated with either oil or water. The finer the sharpening stone the sharper the edge will become. The reason I don,t recommend sharpening rods is because they tend to make tiny nicks in the edge if too much pressure is applied when sharpening. Sharpening rods work well for the softer steel found in mass produced knives but not for this one. The edge is already beveled at the proper sharpening angle for wood carving. You can maintain that angle while sharpening by pressing down on the bevel with your finger nail when you sharpen.

Prices range from $20.00 to $80.00.

Call Dick Baugh at (650) 493-5125 or e-mail him at dick_baugh@compuserve.com

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Kennie's Didjeridoos

Kennie Elvin sells didjeridoos from Australia, plus ones he makes himself.
He also makes rattles made from kelp and sea shells.
Contact Kennie Elvin at (408) 578-8933 for questions and information.

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KAHIKO WORKSHOPS I

"We don't stand apart from Nature, but rather we are a part of Nature."

The World Was Tied Together

Creating cordage from different plant fibers

The ability to twine, braid, twist, roll or weave fibers into cordage is one of the oldest of mankind's primitive skills. The materials from which to ply and braid cords or ropes are in abundance everywhere. Any fibrous material that has reasonable length, moderate strength and is flexible or pliable can be utilized.

Lashing dwellings, making mats, containers, clothing, snares, fishnets, hammocks and bow strings are a few of the uses of cordage. Lacking nails, bolts and screws, and having little to use for adhesives, indigenous cultures tied their world together.

In the class we will talk about the extraction and preparation of various plant fibers. Techniques of plying the fibers into cordage will then be explored. Also, the efficient method of leg rolling cordage in one direction will be practiced. Cordage will be made from dogbane, tule (bulrush), cattail and New Zealand flax.

Fee: $25

The Art of Calling Down the Sun

Various methods of creating fire

Fire was considered sacred because it was so essential for the welfare of humans. Fire was necessary for survival. It provided warmth, protection, cooked and preserved food, a means to shape weapons and tools, furnished light and boiled water.

There are several methods for starting a fire. We will cover and demonstrate the various techniques of fire by friction (fire pump, fire saw, fire plow, bow drill and hand drill), as well as fire by percussion (flint and steel) and compression (fire piston).

There will be hands-on activities using the hand drill and the bow drill. We will also construct a tinder bundle and start a fire. Identifying various local plant materials for fire making will be discussed.

Fee: $25

Wet Scrape Brain Tanning

Before the development of textiles, aboriginal cultures around the world depended on the making of leather for clothing and other goods in their daily lives.

We'll be teaching a way of tanning that is known as wet scrape brain tanning. The procedure transforms a deer hide into a soft and washable piece of leather, without the use of any chemical or toxic products. Nature provides all of the necessary ingredients for this type of tanning.

You will experience the whole process of scraping and stretching the hide to smoking the softened buckskin. Four students will be assigned to one hide and each person will walk away with 1/4 of a brain tanned buckskin.

Fee: $75 for two days

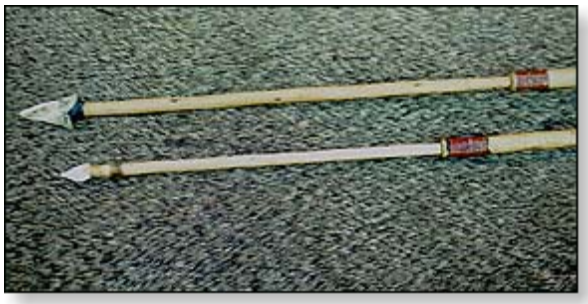
Making a Tree Fly

Arrow making

Historians suggest that early man progressed from stone throwing to an atlatl, then to the bow and arrow. This latter invention was an integral part of most cultures around the world. The bow and arrow bears witness to the fact that we have a common heritage as hunters and gatherers. In the workshop, we will deal with the mate of the hunter's bow . . . the lightning stick.

The basic parts of an arrow are the nock, fletching, shaft, foreshaft (if it has one) and point. We will create a functional arrow utilizing natural, raw materials. The points will be made of obsidian, as well as other natural resources. Due to the limited time, the obsidian points will already be knapped.

Fee: $35



KAHIKO Workshops II

KAHIKO Workshops III

KAHIKO Workshops IV

Course Schedule for 2003

Registration

Thumb Loop Hand Drill Fire Kit

KAHIKO Artwork & Replicas

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"He (Ishi) looked upon us as sophisticated children - smart, but not wise.
We knew many things and much that is false. He (Ishi) knew nature, which is always true."

Saxton Pope (from *Ishi in Two Worlds*)

 **ll things are interrelated.** Everything in the universe is a part of a single whole. Everything is connected in some way to everything else. It is therefore possible to understand something only if we can understand how it is connected to everything else.
We are not separate from our environment, but interconnected. Only in our minds are we separate from the whole. We are individuals, but in order to exist we must have relationships with all our relatives. In every moment of our existence, we are in a relationship with something: the gardener with his vegetables, the violinist with her violin, the hunter with that he pursues. This concept of relationship carries through all levels of existence.

Nature is our greatest teacher. In the great outdoors, we learn about ourselves and learn to care for the land we all use. The more a society becomes isolated from their environment, the less respect they have for the earth and themselves.

In learning native skills, let's not forget that plants, as well as minerals and other living organisms on earth, also serves a purpose other than that of human utilization. With this in mind, let's utilize nature's bounties wisely by not taking more than what is needed and by not wasting what is taken.

KAHIKO Workshops I

KAHIKO Workshops II

KAHIKO Workshops III

KAHIKO Workshops IV

Course Schedule for 2003

Registration

Thumb Loop Hand Drill Fire Kit

KAHIKO Artwork & Replicas

PrimitiveWays Home Page

KAHIKO WORKSHOPS II

"The more you know, the less you need."
Aborigine saying

Atlatl and Dart
Hand thrown projectiles

The atlatl and dart dates back over 40,000 years. As man evolved from the close range interaction of thrusting spears, to a need for long range weapons to be used against faster and smaller game, the atlatl was a natural solution. The atlatl, in many versions, had almost worldwide distribution, and many illustrations are presented of the variety of designs, materials and modifications employed in the various geographical areas that it is found. The other important part of the system was a flexible dart or projectile that was either hafted with a point or incorporated a detachable foreshaft.

Since there are different types of atlatl, we will concentrate on making the style that uses leather finger loops. We will also create a flexible dart out of bamboo that will have a detachable fire-hardened, wooden tip.

Fee: $65 for two days

Seasonal Bounties

Useful and edible plants in California

The availability of plants and their use is governed greatly with the seasons. Certain plants found during the Fall may have matured and become too bitter to eat, while the tender leaves and shoots of the same plant are edible during the Spring. The properties of plants differ depending on the seasons and conditions they are gathered in.

The class will consist of a hike and lecture, while discussing the aboriginal and modern uses of different species of plants found in California. We will walk along a creek in the area and also visit local, wilderness locations to look at the flora and discuss their uses.

Fee: $20

Dogbane *(Apocynum cannabinum)*, Soaproot *(Chlorogalum pomeridianum)*, and Cattail *(Typha latifolia)* rhizomes.

Bone tools and adhesives/glue

The hunter-gatherer of old had various materials available for creating simple and essential tools. Bone was one of the raw resources that was used to create harpoon and knife blades, pendants, needles, projectile points, fish-hook barbs and numerous other items. Whether they hunted an animal or simply made use of "found" sources, bone provided an ideal material for shaping into the necessary tools of everyday, primitive living.

The class will consist of a lecture on specific bone characteristics and capabilities for fashioning tools. We will make needles, fish gorges and an awl from beef bone.

There will also be a discussion/demonstration on how to create adhesives and glue (pine pitch sticks, soaproot adhesive and hide/fish glue).

Fee: $30

Forming a Vessel From Nature's Greenery

Basket making

Archeological studies indicate that basket making is the oldest craft. People in every early civilization needed to carry home nuts, berries, herbs and meat from their foraging and hunting expeditions. Food needed something to gather it in, something in which to prepare it, something to cook it in, something to store it in . . . hence, baskets. Expediently, nature has provided each habitable region in the world with plants that can be woven into baskets to fill that need.

Despite centuries of civilization, invention and progress, a basket still cannot be made by machine. In the workshop, we will create a basket that is either twined or coiled. You will have the choice of doing a twined tule basket or a coiled grass basket.

Fee: $35

KAHIKO Workshops I

KAHIKO Workshops III

KAHIKO Workshops IV

Course Schedule for 2003

Registration

Thumb Loop Hand Drill Fire Kit

KAHIKO Artwork & Replicas

PrimitiveWays Home Page

KAHIKO WORKSHOPS III

"You have to have patience in everything you do. Then you learn."

Huewai Pueo

Hawaiian gourd water bottle

All living things need a lot of water to carry out their life processes. We require water for drinking, cleaning, cooking, bathing and basically survival.

In areas where gourds are found, indigenous societies used gourd water bottles for drawing, transporting and keeping a quantity of water at home. Light, practical and easily replaced, they are suited for this purpose.

We will make a Hawaiian gourd water bottle called a huewai (also named an ipu wai). A gourd water bottle of the hourglass shape was called huewai pueo. We will process and clean this type of gourd to produce a functional water container.

The Hawaiian craftsmen also developed a unique technique with coir cord loops by which the water gourds could be carried and hung up at home. We will also create the coir support called 'aha hawele.

Fee: $65 for two days

Stone Thrower

Making a cordage and leather sling

The sling is one of the most ancient of hunting weapons. In its oldest form, the sling is a leather or hide strap, with a string fastened to each end. Its simplicity belies the sling's deadly stunning and stopping power. It was probably the first weapon designed to hurl a stone with more force than a person could deliver with their hand and arm.

The workshop will start with plying either dogbane or flax fibers to create the two cords. One end of the string will have a finger loop and the end of the other string will have a knot. The center strap or pouch to hold the stone will be cut from leather. We will also mold clay balls for ammunition. Each person will have the opportunity to decorate their leather strap with personal symbols using a berry dye.

Fee: $25

Pump Drill

The pump drill was a useful, primitive tool that gave a consistent performance for making small, round, conical holes. Holes were drilled into bone, shell, wood, or soapstone with this device. The four main components of the pump drill were: 1) the vertical spindle, 2) the horizontal crosspiece, 3) the flywheel weight, and 4) the drill bit.

In the workshop, the pump drill will be made from wood, a leather thong, a clay or soapstone flywheel, sinew, and a knapped, chert drill bit. A properly designed and tuned pump drill is not only a pleasure to use, but also has a primitive aesthetic beauty to its operation.

NOTE: Limited attendance for this workshop. Only a maximum of 6 students.

Fee $65

Fun with Indigenous Toys & Games

In early cultures, the making of toys and playing games during childhood were a prelude to the primitive skills that were needed in adult life.

The workshop will consist primarily of fun. We will make toys out of acorn, tule, cattail and New Zealand flax. The projects will include a Miwok acorn buzzer called luna'a, a ball and acorn cup toy, spinning tops made out of nuts, leaf puzzles, willow deers, leaf whistles, tule bittern, cattail fish and more. I hope all will be of interest in some way, either for their beauty, use, humour, or simply their curiosity value.

Fee: $25

Basic Percussion Knapping and Stone Pecking




Ever heard of the "Hertzian Cone" or conchoidal fracture? What has that to do with primitive skills? These two principles will be discussed and applied to a class involving basic percussion knapping. After the lecture, we'll experiment with flaking off some obsidian spalls with a hammerstone.

For those who want to practice some stone pecking, cobble stones will be available to peck out a small, stone mortar.

Fee: $20

KAHIKO Workshops I

KAHIKO Workshops II

KAHIKO Workshops IV

Course Schedule for 2003

Registration

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Photo Gallery 6

Tule thatched house and shade shelter at Sunol-Ohlone Regional Wilderness in Sunol, California.

Bark house and roundhouse (front and side view) at Indian Grinding Rock State Historic Park, California.

Gathering dogbane *(Apocynum canabinum)* for a dogbane net.


Neck pendants
Produced by KAHIKO Artwork & Replicas.

Two replicas of diigubuhu toys made out of tule. The original, which resides at the Brooklyn Museum, was made by Susanna Graves in 1906. Diigubuhu is the Eastern Pomo word for a water bird, the American bittern.

When a predator approaches its nest, the least bittern stretches its neck (which is colored like the surrounding withered reeds), thrust its beak upward, and sways gently like reeds in the wind. Also, the dark and light lines on bitterns help them to blend in with vertical shadows cast by the vegetation they live in.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

Photo Gallery 4

Photo Gallery 5

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

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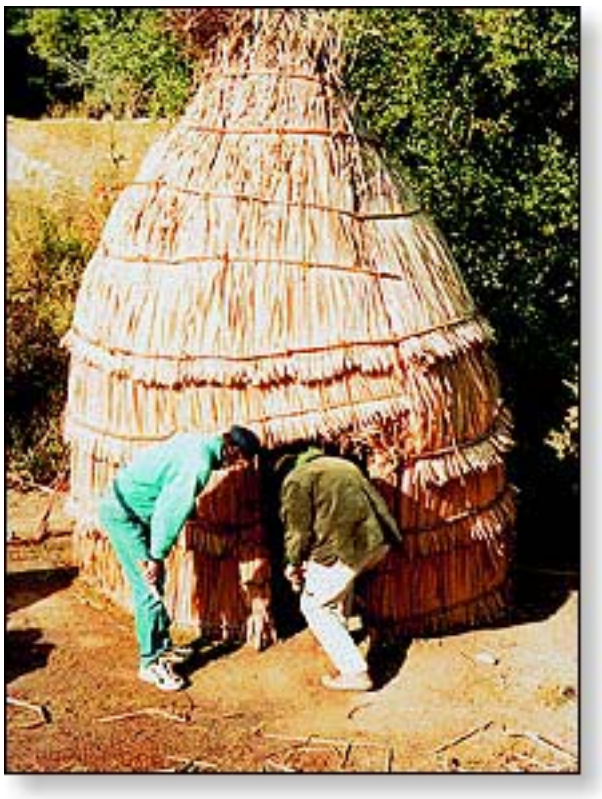
Photo Gallery 4



Norm Kidder's thatched, Ohlone style house constructed during his shelter building class.

Ken blowing his pu'ohe (bamboo trumpet) from Hawaii.

Markus smoking his buffalo hide at the Rattlesnake Rendezvous in Sunol, California.

Norm Kidder's "Bone Tools" class at Sunol-Ohlone Regional Wilderness in Sunol, California.

Gathering watercress for a watercress soup.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

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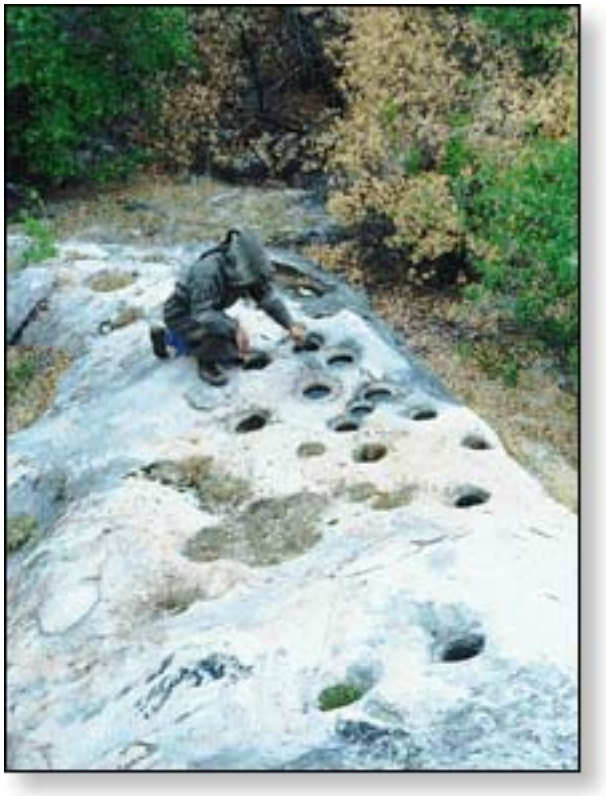
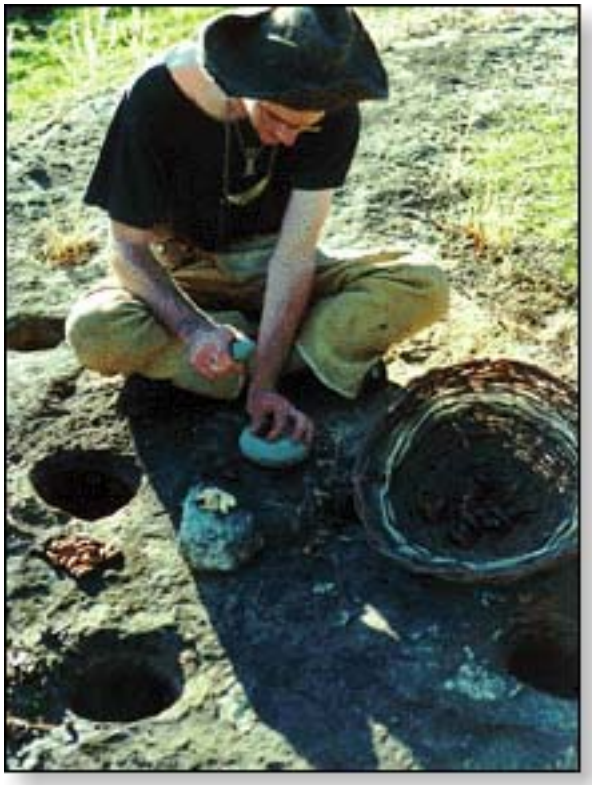
Photo Gallery 5



Acorn grinding holes found at Los Padres National Forest, California.



Markus husking some acorn nuts.

Markus leached some acorn flour in a nearby stream for a few days. Then he made acorn mush out of the leached flour.

Bear carving

Deer hoof pin cushion. The bones were removed and then filled with wood shavings.

Dick Baugh's alter ego - the Claw.

Dino Labiste's twined quiver made out of tule.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

Photo Gallery 4

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

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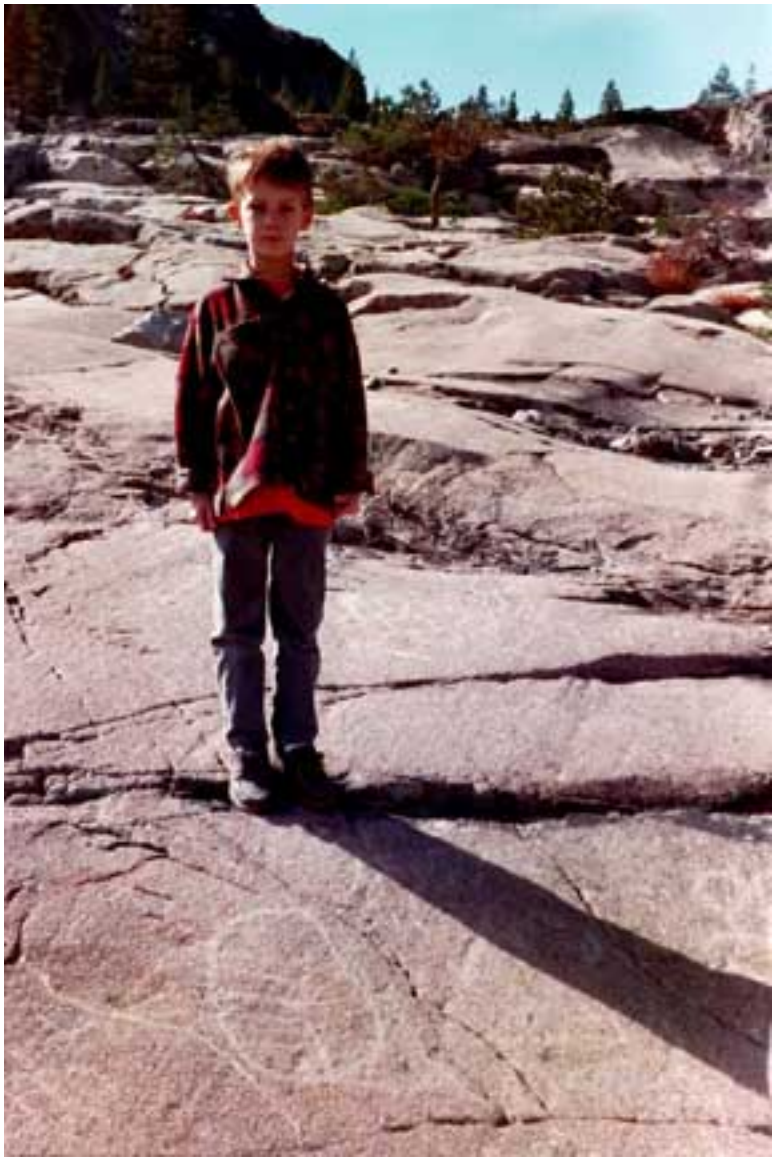
Photo Gallery 7

Hawaiian ko'i (stone adze) made from fine grain basalt.

Deer scapula saw for cutting tules.

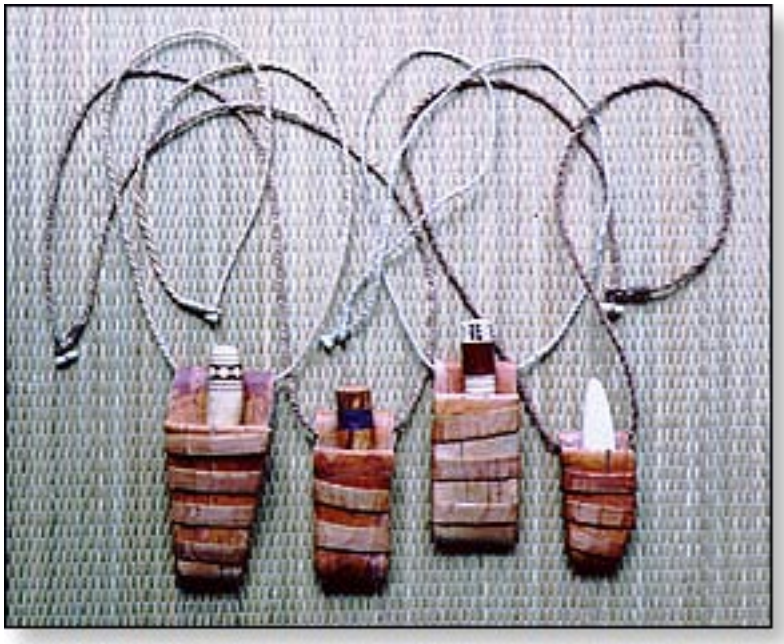
Tule *(Scirpus acutus)*



Petroglyphs near Donner Pass.

Stinging nettle *(Urtica dioeca)* in the early spring.

Gathering stinging nettle in November for cordage material.



Small obsidian knives in a birch bark sheath.
The knife and sheath are hung around the neck from a dogbane or milkweed cordage with a bone toggle.
Produced by KAHIKO Artwork & Replicas.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

Photo Gallery 4

Photo Gallery 5

Photo Gallery 6

Photo Gallery 8

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

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Useful and Edible Plants of California / Stinging nettle (Urtica holosericea)

- Grows in wet, rich soil (along streams and redwood forests).
- New leaves and shoots of young plants were a vitamin-rich, tender vegetable when cooked.
- Careful of the tiny, stinging hairs containing formic acid (wear gloves when gathering).

- The stalk fibers made good cordage.

Useful and Edible Plants of California / Sticky monkey flower (Diplacus aurantiacus)

- Grows in chaparral areas.
- The bright orange flowers were edible. The ends of the flowers have a nectar that is sweet in taste.

Useful and Edible Plants of California / Soaproot (Chlorogalum pomeridianum)

- Found in dry slopes and mesas.
- The bulb was used as a soap source.
- The outer fibrous mesh surrounding the bulbs was used to make a fine brush and also as fire tinder.
- Crushed bulbs were used to stupefy fish.

Useful and Edible Plants of California / Snowberry (Symphoricarpos albus)

- Found in most habitats.
- The small bundled stems were made into brooms.
- The straight shoots were made into arrow shafts.
- The larger stems were used for pump drill spindles.

Useful and Edible Plants of California / Poison oak (Toxicodendron diversilobum)

- Thriving on disturbance, it has ventured into a wide range of different plant communities.
- The resin from the poison oak causes an irritating rash in people who are allergic to the plant.

Useful and Edible Plants of California / Poison hemlock (Conium maculatum)

- Common to irrigation ditches, roadsides, cultivated fields, meadows, marshes and disturbed sites.
- Highly poisonous.
- Look for the purple blotching at the base of the main stems and the white flowers to identify the plant.

Useful and Edible Plants of California / Pineappleweed (Matricaria matricariodes)

- Grows in hard packed dirt.
- Dried or fresh leaves and flowers were used to make a wild tea.
- Pineapple aroma stronger in April, May and June.

Useful and Edible Plants of California / Osage orange (Maclura pomifera)

- An introduced tree planted in urban and orchard areas.
- Tress were used as hedge plantings.
- The wood was rot resistance.
- It made excellent bow wood.

Useful and Edible Plants of California / Oregon grape (Mahonia aquifolium)

- Grows in coastal forest.
- Berries are edible in mid-August when fully ripe.
- The roots made a yellow dye.

Useful and Edible Plants of California / Oak gall

- Found on a variety of oak trees.
- Tumor like growth, produced by the tree in response to its tissues being irritated by tiny wasps laying their eggs in there.
- Used for dyeing and as tinder for fire starting.

Useful and Edible Plants of California (3)

DISCLAIMER: ***A website is insufficient to convey the knowledge a person needs to safely and responsibly use wild plants. Before eating or using any plant, seek hands-on field training with a qualified professional in the proper indentification and use of wild plants. Gather only what you need or use. You should leave more than enough for the plant to easily reproduce and grow. Also know that gathering in State and National Parks and wildlife preserves may be detrimental and/or illegal. Be sure to get permission from the landowner of private property before gathering wild plants.***

Oak gall

Oregon grape

Osage orange

Pineappleweed

Poison hemlock

Poison oak

Snowberry

Soaproot

Sticky monkey flower

Stinging nettle

Storkbill

Sycamore

Toyon

Valley oak

Watercress

Western redbud

White alder

White alder

Wild cucumber

Wild ginger

Wild grape

Wild radish

Wild radish

Wild rose

Willow

Woodland rose

Wood sorrel

Yarrow

Yerba buena

Spanish bayonet

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Useful and Edible Plants of California / Storkbill (Erodium cicutarium)

- Grows in open grasslands and disturbed areas.
- Introduced Mediterranean native.
- Leaves are edible.

Useful and Edible Plants of California / Sycamore (Platanus racemosa)

- Found near streams and streambeds.
- The leaves were used to wrap food for pit oven cooking.
- The wood were carved into bowls.

Useful and Edible Plants of California / Toyon (Heteromeles arbutifolia)

- Grows in chaparral, grasslands and open woods (needs sun).
- Do not confuse toyon with the toxic cotoneaster (the edges of cotoneaster leaves are smooth, whereas those of the toyon are coarsely toothed).
- Berries ripen in December.
- The ripe berries were either roasted or boiled, then eaten (may be too bitter and astringent for some people's palate).

Usefull and Edible Plants of California / Valley oak (Quercus lobata)

- Seeks canyon bottoms with permanently high water tables, although never grows with its roots directly by a stream or river. Also found in woodlands and open meadows.
- The acorns were ground into flour, leached and made into mush or bread.

Useful and Edible Plants of California / Watercress (Nasturtium officinale)

- Found in slow and shallow streams.
- Watercress will absorb harmful bacteria into its leaves if the stream is polluted.
- Even if the water is not polluted, boil watercress to kill any germs before eating.

Useful and Edible Plants of California / Western redbud (Cercis occidentalis)

- Found near streams and streambeds.
- The red outer bark was used for weaving patterns into baskets.

Useful and Edible Plants of California / White alder (Alnus rhombifolia)

- Found near streams and streambeds.
- The bark was used for dyeing.

Useful and Edible Plants of California / White alder (Alnus rhombifolia)

- Found near streams and streambeds.
- The bark was used for dyeing.

Useful and Edible Plants of California / Wild cucumber (Marah sp.)

- The plant grows with phenomenal speed to several feet long, often climbing and scrambling over other vegetation in their hurry to reach the sun.
- The fruits are spiny and poisonous.
- The seeds were used to stupify fish.

Useful and Edible Plants of California / Wild ginger (Asarum caudatum)

- Strictly a dark forest plant, requiring deep forest compost and ample shade to survive.
- Tastes like commercially available gingerroot, with the exception that the leaves are more strongly flavored than the roots.

Useful and Edible Plants of California / Wild grape (Vitis californica)

- Grows along streams banks and canyons (will often blanket whole trees).
- Grapes ripen in September and October.
- Thick branches made good fire hearthboards.

Useful and Edible Plants of California / Wild radish (Raphanus sativas)

- Widespread throughout the area in disturbed or cultivated ground.
- Seedpods appear soon after the plant begins to flower.
- Seedpods are good raw in salads (has a radishy-hot taste).
- Young leaves are also added to salads.

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- Young leaves are also added to salads.

Useful and Edible Plants of California / Wild rose (Rosa sp.)

- A hedge forming, stream following species.
- Rose hips can be eaten raw or made into a wild tea.
- The straight shoots were made into arrow shafts.

Useful and Edible Plants of California / Willow (Salix sp.)

- Found near streams, creeks, narrow canyons, broad flooded plains and permanent waterways.
- The shoots were woven into baksets.
- The bark was used for cordage and lashing material.
- Frames for shelters were made from willow.

Useful and Edible Plants of California / Woodland rose (Rosa sp.)

- Grows along areas where the soil is sufficiently moist (streams and springs).
- Rose hips can be eaten raw or made into a wild tea.

Useful and Edible Plants of California / Wood sorrel (Oxalis sp.)

- Found in shady, moist places (also occurs in redwood forests).
- The leaves, stems and flowers can be used in salads to add a vinegar-like flavor (not too much, as the leaves are quite sour).

Useful and Edible Plants of California / Yarrow (Achillaea millefolium)

- Grows in a variety of habitats: wooded, bushy, open hills, coastal bluffs and salt-marsh borders.
- The leaves are astringent: slows bleeding from wounds.

Useful and Edible Plants of California / Yerba buena (Satureja douglasii)

- Grows in forests, brush and on open, coastal hills.
- Makes a good wild tea.

Useful and Edible Plants of California / Spanish Bayonet (Yucca baccata)

- Found on dry chaparral slopes and the mountains of southern California.
- Flowers and buds are edible raw, although light cooking improves their flavor.
- The fibers of the leaves were used for cordage, sandals, mats, paintbrushes and baskets.
- The leaves and root were a good soap source.

Photo Gallery 8

Twined grass knife sheath (similar to the Iceman's grass knife sheath).

The Peek family practicing their archery skills.

Sagebrush bark sandle: (left to right) sagebrush bark cordage for the warp base of the sandle, completed sagebrush bark sandle (10" long by 4 1/2" wide), and raw sagebrush bark

for the weft material of the sandle.

Bill and his daughter, Aliese, stretching a deer hide to soften it.

Gourd water container made by Dino Labiste (KAHIKO Artwork & Replicas).
A burning processing was used to create the design.

"Bone Whistle" workshop taught by Chuck Kritzon at the Maidu Interpretive Center in Roseville, California.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

Photo Gallery 4

Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 9

Photo Gallery 10

PHOTO GALLERY II

PHOTO GALLERY III

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Photo Gallery 9

Twined basket made from deer brush *(Ceanothus cuneatus)*. Also called wild lilac or buck brush.

One of the processes of wet scrape brain tanning:
Scraping the deer hide to remove the hair, meat, epidermis, and grain.

Monty pressure flaking an obsidian knife blade.

Lynn's pelt quiver and obsidian arrows.

Bone baton used for casting dart shafts.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

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Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 10

PHOTO GALLERY II

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Photo Gallery 10

Obsidian knife with deer antler handle made by Ken Peek.

Scott wearing a brain tanned buckskin cape.

Dick Baugh's reindeer antler handle knives (Beavertooth Tools).
1st PHOTO: The blade on the left is made from dacite and the blade on the right is made of Illinois chert.
2nd PHOTO: A knife sheath was made from birch bark for the chert knife.

Markus Klek and his buffalo hide on a rack.

Cone-shaped bark slab house at Kule Loklo in Point Reyes National Seashore.

Photo Gallery 1

Photo Gallery 2

Photo Gallery 3

Photo Gallery 4

Photo Gallery 5

Photo Gallery 6

Photo Gallery 7

Photo Gallery 8

Photo Gallery 9

PHOTO GALLERY II

PHOTO GALLERY III

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Kule Loklo

Kule Loklo (bear valley) is an interpretive Coast Miwok village at Bear Valley Visitor Center in Point Reyes National Seashore. Kule Loklo is co-sponsored by the Federated Indians of Graton Rancheria (Coast Miwok) and the National Park Service.

Kotca (place where people live)
Coast Miwok houses, or kotca, were made of various materials.
Extended families of five or more individuals might have lived in one structure.

Kole Kotca (thatched house)

Roundhouse
Assembly house for dances and ceremonies.

Granary
Umpa (acorns) were the staple food of the Coast Miwok Indians.
The umpa were gathered in the fall. Hundreds of pounds of umpa were stored in granaries for future use.

Lamma (sweat lodge)
Large sweat lodges were used by men for both spiritual and physical cleansing. Women were generally not permited to enter. Smaller family sweat lodges were used by both sexes.

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Photo Gallery 11

Mountain lion tracks at Modoc National Forest.

Stone tools by KAHIKO Artwork & Replicas.

Deer hoof rattle

Percussion flaking an obsidian blade using an antler billet.

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

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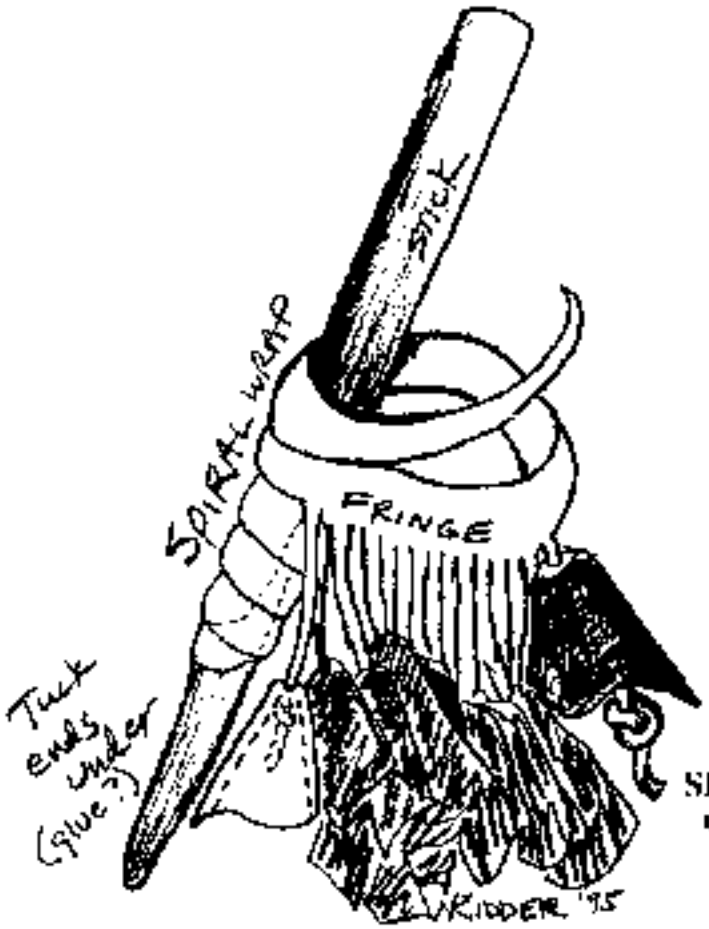
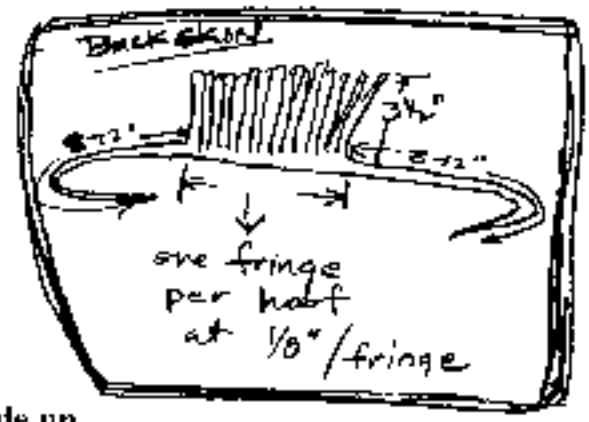
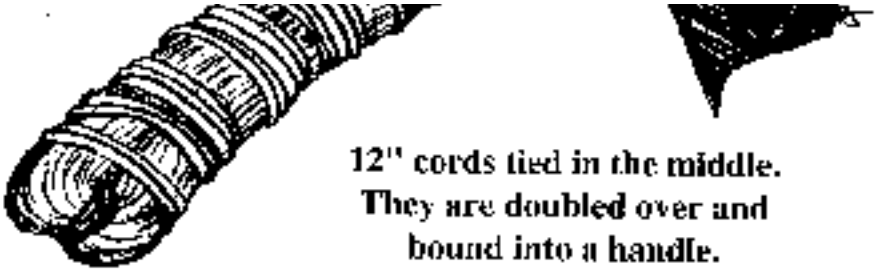
Deer Hoof Rattles

by Norm Kidder





Slide up over knot.



12" cords tied in the middle. They are doubled over and bound into a handle.

For more information on how to remove the deer hooves from the animal and details on how to construct the deer hoof rattle, access the "E-mail - Miscellaneous" section. There is a response from Norm Kidder concerning an e-mail question on the above topics. The information is in the first e-mail response: http://www.primitiveways.com/pt-questions_miscellaneous.html

This article was first published in The Bulletin of Primitive Technology (Spring 1995, #9)
E-mail your comments to "Norm Kidder" at atlatl1@aol.com

E-MAIL Q U E S T I O N S

Fire Making	Primitive Skills and Plants	Projectiles and Tools	New E-Mail Questions

QUESTIONS & ANSWERS

Miscellaneous

Donald L. McCracken, Jr. wrote:

I need information on how to make the deer hoof rattle. How to get the hoof from the foot to the final product.

Thanks,
Don

Don, I believe there is an article in the Society of Primitive Technology Bulletin #10 by Tamara Wilder on how to remove the deer hooves from the legs, but in a nutshell:

1. Acquire a dead deer.
2. Remove the lower legs.
3. If fresh, soak in hot (almost boiling) water for five minutes (longer, if not).
4. Using pliers, or the like, twist one hoof off at a time (I have the best luck twisting into the

center).
5. While still wet, cut off the tip of the hoof down to where it is hollow, leaving a hole (or let dry and cut on a bandsaw, or drill into the side).
6. [one method for attaching the hooves] Tie one hoof to each end of a 12 inch string. Repeat this process with another 12 inch string until each hoof is attached to the ends of individual strings, then fold all the strings in half and bind them up to make a handle.
7. [another method for attaching the hooves] Or take a piece of buckskin about 6 inches wide and cut fringes, leaving a one inch wide uncut band. Extend this band to make a length of 6 or 8 inches to tie with. Insert a piece of fringe into each hoof and tie a knot. Wrap the whole piece in a spiral fashion around a stick (or bone) and secure the ends.
9. Shake it.

Hope this helps,
Norm

"Backwoodsman" wrote:

Mr. Kidder;
Wonderinig if you would be so kind to advise me as to the best way to safely remove the deer hooves from the deer foot bone. We have a reader who would like to make a rattle and could use any information that you could give.

D. Sloan
Backwoodsman Magazine

Ms. Sloan;
Here is what I know about removing deer hooves. First, I've only had luck with hooves that are either fresh or fresh frozen. Fresh meaning still moist. Once they have dried, they stick to the toe bone. My method for removal is to boil a pot of water, then take from the fire and stick the deer legs into the hot water. Leave for 5 to 10 minutes or so. Take out a leg, and with pliers, twist each hoof inward, or which ever direction works. If they don't come off fairly easily, I put them back in the hot water for a few more minutes, but some just don't want to release, especially if they aren't really fresh. Once removed, I cut the tip off of the hoof with a knife and maul to expose the hollow so I can thread it on the rattle. There is an article on this by Tamara Wilder (the pictures are of me) and an illustration of two ways of making a rattle in the book - "Primitive Technology, a Book of Earth Skills", Dave Wescott, editor for the Society of Primitive Technology, Gibbs Smith Publishers, Salt Lake City, 1999. Pages 239 -240. Hope this is helpful,

Norm Kidder

PS
Are you familiar with the Society of Primitive Technology? It puts out the Bulletin of Primitive Technology twice a year including articles as above, plus there are two compilations - the one cited above and a second. Check the website at www.primitive.org.

Bryant Gipson wrote:

Hello, my name is Bryant Gipson and I'd like to start by saying I love your site. I had no idea a place like this existed on the Internet.

Anyhow, my question is about a "semi-primitive" technology. Specifically I've been looking to try to make glass from beach sand/other readily obtainable elements, but have no idea where to start. Most of the sites and articles on the web detail modern glass making processes which require kilns and furnaces capable of several thousand degrees.

Obviously cultures world wide were making glass items of various clarities for many years before acetylene torches and high-pressure environments existed. I suppose my question reduces to three elements.

How does one make a "primitve" kiln, or at least a fire hot enough to melt silicates?

What was used as a crucible for holding the glass?

What kind of clarity can I expect to find in glass made in this way?

Sorry if this question is a bit too modern, but I'm really not sure where to look for resources of this kind. (I'm also interested in smelting basic metals from ore for instance.)

Thanks,
Bryant

Hello Bryant,
Quartz sand, which is silicon dioxide, has a VERY HIGH melting point. In order to get something which melts at a lower temperature you mix quartz sand with sodium carbonate and limestone. You can probably get a hot enough fire with a blacksmith's forge. Use a fire clay crucible to hold the ingredients. Clarity will depend on how pure the quartz sand is. Manganese dioxide was added to remove the color due to iron impurities. Colors can be obtained by adding iron, copper, or other minerals. Look in the encyclopedia for more information.

Get busy!
Dick

Is it true that the custom of wearing leis comes directly from the worship of demon gods of the islands? Also the original people of the islands made leis and placed them around the statues of their gods to appease them, hoping to prevent their demands for human sacrifices?

Bernie
Miami, Florida

Hello Bernie;
I'd like to give you a few excerpts from a book entitled, "Ka Lei", by Marie A. McDonald:

"In every part of the world where man has lived and lives, he has made himself a lei, a necklace, a crown of various materials to adorn his body, to ward off evil spirits, to bring good fortune, to please his gods, to denote rank among men, to give as tokens of love, and for pure and simple enjoyment. It is true that these leis have a common character, but it is also true that the common character was enhanced by each culture that produce them.

Leis, in Hawai'i, started on the Asian continent and as people migrated west to the Mediterranean region and north to the temperate zone, and east to Malay to the easternmost part of Polynesia, and from the Society Islands to Hawai'i, they took with them the lei itself or the idea of the lei. The original idea is probably lost to the ages, however, the outgrowths still thrive. The early Hawaiians used the lei in the healing rites of the kahuna lapa'au, the healing priest; it appeared in the fields with the farmer when he invoked the blessing of the gods upon his fields and crops; it was a necessary ornament for the dancer; it was worn by the nursing mother. It was the mark of chiefly rank. It was offered to the gods. It was a symbol of love and love-making. It belonged to the festivals and it brightened up the routine of daily life as well. Children made them. Men and women made them. Gods and goddesses favored them. The poets sang their praises.

A greater and richer variety of leis was made in Hawai'i than in any other Polynesian group. Some of the leis were of a more permanent nature while others were made only to endure a short period of time. The permanent leis included those that were made of such materials as feathers, shells, seeds, ivory, and teeth of various animals. The temporary leis was made from flowers, leaves, and fruits. Most of the natural fresh materials of the temporary leis were selected because they were beautifully scented. Other materials were selected for color and still others were selected for mobility. Some were selected for healing powers. The lasting quality of the material was least important. The beauty of each type of lei, whether permanent or temporary, was no less beautiful

than the other. They were valued more for what they represented."

I hope this answers your question.

Sincerely,
Dino Labiste

P.S.
Your wording of the Hawaiian akua (gods) as "demon" gods connote the idea of bad or evil. Many of the Polynesian deities rendered spiritual and supernatural help in the needs and activities of early Hawaiian life.

(E-mail statement concerning the article entitled "Bamboo Rice Cooker")

Bob,
Learned how to do it from the Negritos in the Phillipines during JEST (Jungle evasion and survival training). Get a section of bamboo12-18 inches long closed at both ends. Make two cuts in the middle of the top of the cylinder about 2-3 inches apart with each cut angling down 50-60 degrees towards the cylinder end. Use your knife to connect the ends of the cuts and remove the resulting wedge sideways. Add rice and water, replace wedge - set on coals - cook - remove wedge and eat. Neat thing is the cooking container can be used to carry the uneaten rice. The Negritos could make one in less than a minute with their handmade machete's.

Thanks,
Mickey

Hi, Bill:
Thank you for your excellent knot page on the PrimitiveWays website. My lack of memory of what I used to know about birds is only overshadowed by my lack of memory of what I never really got about knots in the first place. My question is, you have what you are calling a "Highwayman's knot" on your page. Do you know the falcolner's knot? Are they the same knot?

Thank you!
Leha Carpenter

Hello Leha;

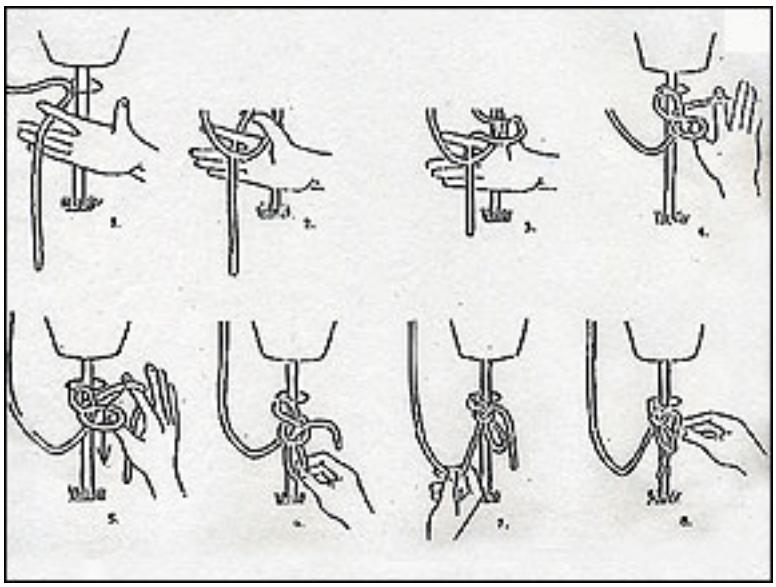
Thank you for checking out our site. To tell the truth, I've never heard of the falconer's knot before. A quick search of the net found this site http://www.falconryinscotland.com/knot.html. From what I can make out of the rather small pictures, it is not the same knot. The text mentions that it can be tied and untied with one hand. I don't think the Highwayman hitch can be tied with one hand, although it is designded to be untied with a quick jerk of one hand. The falconers hitch appears to be designed to be a quick release as well. I will do a bit of research, and hopefully come up with a better answer for you.

Bill Scherer

Hi Bill;
I have a drawing of the Falconer's knot. Last year, I did some volunteer work at the Sulfur Creek Nature Center in Hayward. It's a rehabilitation center for injured wild animals. They nurse the animals back to health, then release them back to the wild. If the animals cannot survive in the wild due to their injuries, they are cared for at the center. The animals become part of the educational programs about wildlife and nature.

Anyway, the volunteers were trained and taught to use the Falconer's knot when handling the raptors (hawks, falcons, and owls). If Lela is still interested in the knot, I can scan the drawing and do the knot itself, then forward it to you or to her.

Dino Labiste



Hi, Bill and Dino:
Thank you so much - yes, this is the knot, and it is done with one hand. I recognized it once I saw

it, although I might have a hard time remembering how to do it based on the tiny pictures. I can try blowing them up in a graphics program and see if I can figure it out.

These pictures are great! You guys are terrific. Thanks again!

Leha

Dear Mr. Baugh,
I still remember your visit to my second grade class at Walter Hays Elementary and the bows and stone tools you brought with you. I just came across your Primitiveways website while searching for information on using yucca stalks as firedrill spindles. It's great to know that there are groups of people in our culture still striving to learn and teach the gathering of resources and fashioning of useful items directly tied to the rhythms of nature, as well as trying to learn about the world views of other cultures. Do you have any information on attempts to fish with bone or shell hooks? Also, do you have experience using agave stalks to make didjeridoos? Do you have any information on didjeridoo making posted online?

Thanks,
Ashok Sadrozinski

Hello Ashok,
It's always gratifying to find out that someone remembered what I did and even better, is interested in learning more.

I know very little about bone and shell fishhooks. I have, however, made and played lots of didgeridoos. I have heard some excellent agave didj's. The key to success is to hollow out the stalk, get it nice and smooth and then seal it inside and out with resin. For good strong, bright sound, the wall of the didj should be smooth and hard. Peter Spoecker's web site has stuff on making didj's (or can steer you to another site which has details). Another site which I found today is www.navaching.com/shaku/didge.html. I don't know if it is any good because I haven't read it yet. The only didj' analysis I have done is not yet online.

Dick Baugh

Hi,
Around 1998 I bought, at Sorensen's Lodge (Alpine County), a tule decoy by Davin George (Washo?). I just saw at Univeristy of California Berkeley's PA Hearst Museum a duck decoy by

DAVID George, son of the famous Northern Paiutes, Wuzzie & Jimmy. Was Davin the son of David? Any information you have would be most appreciated, since I want to keep my collection properly documented.

Many thanks,
Dean A. Silvers

Dean,
My information is that yes, David George is the son of Wuzzie and Davin is the son of David. I assume they are all Paiute. I have a David George decoy on loan in my collection, and Coyote Hills Regional Park, where I used to work has two Davin George samples (one full size, one small) purchased in the late '80's or early 90's. As compared to the illustrations in the book entitled, "Survival Arts of the Primitive Paiutes", the David and Davin samples look made for sale. They are neater, and use a pre-made head and neck where the book shows a cruder body and the duck skin with skull intact and the neck stuffed, then the whole thing pinned onto the body. Models from Lovelock cave are somewhat like the for sale models, so both are probably authentic. Hope this is what you need. You might also try Bev Ortiz at Coyote Hills Regional Park, as she purchased the Davin George ducks.

Norm

Hello;
Looking at your website, I had a couple of questions for you that I was hoping you would take the time to answer. When making the quail call, should I use bone or wood

I used wood.

and how deep should the dip in the middle be?

About 1/8" on each side of the band.

Also, when making the reed flute, do you have any drawings of any kind on the making of it (to give me some kind of a diagram to follow)?

I don't have a diagram.
Just copy the photo and see if it works for you. If not, make another until you get it to work. Have someone who plays the flute try to get a sound out of yours, as blowing is critical to getting it to

work.

Bob Gillis

Thank you very much.

Sincerely,
Anthony Arva

Hi Norm,
This was a very interesting article! We are trying to bend balsa wood into an arch. We are trying to do this to build a bridge with an arch for a science fair project.

The wood is a 1/4 inch by 1/4 inch stick. The book we were using said to soak it for 2 days and it would bend. It is not working - it breaks when we try to make the arch. The stick for the arch is 16 inches long. The base we need to glue it to is 12 inches and the supporting piece that goes in the middle of the arch is 4 1/2 inches.

Do you have any ideas?

Thanks!
Shari Rhodes

Shari, balsa wood is pretty weak stuff, but it might respond to boiling. If you have a shallow pan long enough, try boiling the stick for about 20 minutes. When you bend it, use a form, maybe a coffee can or large soup can, and form the stick over it while holding it tight against the can wit oven mits. Go fairly slowly, a bit at a time. That might keep it from breaking. Keep pressure at the top of the curve until the wood cools completely.

Good luck, let me know how it worked.
Norm

Hi Dino,
I really enjoyed your article on shark hide tanning.
I live in a coastal town in South Africa, and sharks are processed here but the skins are thrown away and thus wasted.

I am looking for data on tanning sharkskins using modern methods and I would like to market the skins - there seems to be lots of potential in that line here.
Can you guide me to where I can find sharkskin tanning methods? Any ideas as to marketing possibilities?

Regards,
Gletwyn Rubidge

Hello Gletwyn;
Thank you for visiting our website. I don't have any data on modern tanning techniques. You'll have to do some research on that matter.

Try contacting Tom Delohre at Delohre Shark Skin Leather Goods. His website is:
http://www.lohre.com/delohre/
He may be able to help you in marketing your shark skins.

Hope this info helps,
Dino Labiste

"Cchea Nugent" wrote:

My tribe is from South Louisiana and we have found reference to a flute/whistle in our writings called an akt. It is described as a reed instrument curved into a hook.

Have you ever seen or heard of anything like this?

I've never run into an instrument such as you describe. You might try a source closer to Louisiana (we are in California) - abotech.com has a bulletin board and is in the south.
Mediaprehistoria@yahoo.com should put you in touch with Scott Jones in Georgia, and he might be able to help you.

Good luck,
Norm

I recently read your article on shark skin tanning, and I thought it was really interesting. I'm going to try it. I'll also be trying to make a primitive bow. I'm also going to try to make my own quiver, like the one you had pictured. I have never done anything like this before. I was wondering if you had any advise on the matter, both the skin tanning and the quiver making.

I love your webpage. It is very educational. I am recommending it to my friends. Any help you give I'd be very glad to recieve. Thank you for your assistance.

Leonard Ortega

Hello Leonard;
Thank you for visiting our website.

As far as the shark skin tanning is concerned, the article on the website only pertains to turning the skin into rawhide. It does not describe how to tan the shark skin. You will have to do your own research on that subject.

For the quiver, I used a section of bamboo that was wide and long enough to hold about 8 arrows. To get rid of the nodes on the inside of the bamboo, knock them out with a wooden dowel and a hammer. Place the dowel inside of the bamboo and punch out as much of the node section as possible. Do not remove the last node on the bottom of the bamboo. Bind the outside of the bamboo with waxed cordage around each node area. The cordage whipping should be at least 1/2 inch wide. This will keep the bamboo from splitting further if it happens to crack. Attach either a wide strip of leather or braided plant cordage around the bamboo for a carrying strap.

Good luck on your projects,
Dino Labiste

Bob;
I really enjoyed your site. I have a question. Do the bone flutes or whistles have a plug in the lower end? I have not tried to make one yet, but was just wondering if being plugged would make the tone more proper. Thanks in advance.

Regards,
Kris Tuomala

The ends are open. All flutes to my knowledge are open. Some whistles are open such as the penny whistle and some are closed. Pan pipes are closed.

Bob Gillis

Norm,
Advice for steaming 40mm x 50mm kiln dried oak. We made a steam box which works very well, but our problem arises when we put the dried oak to the former and tried to bend (it won't budge). We steamed it for 2 hours.

Thank you,
Steve from Cornwall

Steve, I've never tried a piece like you describe, but I've heard from friends who have. My suggestions would be to soak the wood first (for a day or so), and to maintain the steam longer.

Good luck,
Norm

I can't wait to try one of these simple flutes.

Just wanted to caution you and any readers that supposedly (I haven't really researched this) bone dust is toxic to the lungs. Wouldn't want any one to get sick. I've used bone and antler for knife handles but my poor lungs have been exposed to many nasty things over the years. I thought you would be interested. Sorry, I can't remember where I got this info.

Good luck.
Ray DePriest

Good point; thanks. We will add your commits to our site.

Bob Gillis

Any type of fine dust is toxic to the lungs. Always work in a well ventilated area when working on bone or antler to minimize dust inhalation. If the dust becomes a problem, wear a dust mask or even better, an air filter mask to cut down on the health hazard.

Additional comments by Dino Labiste

"Mound Builders" wrote:

Great Photos! I wish you folks lived closer to Ohio. I've been looking for skilled, motivated people such as yourselves. I host several primitive events in central Ohio at Flint Ridge State Memorial. Lots of flint knappers, not many basket weavers, potters, bone tools makers, and shelter constructers. So much more to life than war and hunting. Thanks, for sharing info!

Hapi, Education Specialist
Ohio Historical Society

P.S. If any of you come to Ohio, call or e-mail me and I'll show you 2,000 year old Hopewell earthen
monuments in Newark at The Newark Earthworks. Breathtaking!

Dear sir;
I'm trying to steam bend some 1 by 1 strips of wood and have questions. I have a oval glass that fits into a entrance door. I need to replace the moulding around this glass. I'm using oak wood. I have made a plywood template to bend the wood around. The steam box we are using is plywood. It is fueled by propane hooked to a burner with a stainless steel tank on it. My problem is that when I bend at the sharpest point, my wood fails. I have tried to soak the wood for up to five days. I seem to get more flexablity when I soak ,but still fails. I have soaked it, then steamed it and seems to lose some of it's flexiablity. Tell me if I'm not steaming long enough or too long. Hour per inch when I steam.

Please give me some ideas.

Thank you,
Winthrop Gregor

I've thought about your problem and have a few thoughts. Look for molding pieces with the straightest grain (running parallel) so there is the least weakness to start a splinter. If you soak the wood for five days, you might be weakening it, soak it less time - overnight, then use dry heat to soften it - I use a hot air gun. If all this fails, try making a series of curf cuts on the inside of the curve. When it is bent, you can fill any open spaces in the curfs with wood putty or wax before painting or staining it. (Curf cuts are saw cuts from the inside of the curve and can go two thirds of the way through the molding. They are more effective if slightly pie shaped in the area of greatest bend.).

Good luck,
Norm

Bob,
I saw your bit on crystals on the primitive ways homepage. I had a couple of questions: how long/hard do you rub the crystals together? (I know, 'til they glow, right?) Really how long does it take.

You need to push the crystals together hard and then rub them back and forth vigorously. They should start glowing immediately. When you stop rubbing them the light goes out. Also, you need two pieces each with at least one smooth side. They should be reasonability flat.

Can this be a polished stone from a flowerchild shop?

No, unless it is quartz.

Do you know where to get quartz in 'the wild'?

Melody

Quartz is found in many areas. I have found it in the mountains and in creeks. It can be crystals or cobbles. They are clear or translucent.

Bob Gillis

Dino:
I build furniture and have been interested for some time now in designing a writing desk with an inlaid shagreen writing surface. Where might I purchase the skins for this project?

Bryan Van Horn

Hello Bryon;
Check out this website. They don't sell shark skin rawhide, but processed shark skin leather. I can't vouch for the company because I haven't ordered anything from them, but take a look at their website.

http://www.motherofpearl.net/

Sincerely,
Dino Labiste

From: Robert Guntren

Dear Sir:
I found you on the net. I am in the process of replacing the wood on a l4 feet Larson row boat, I need to bent the strips of wood to conform to the hull of the boat. The wood that I intend to use is white oak, straight grained and approximately l-l/4 x 3/4 by l5 feet. Could you suggest a plan for me to use to bent this wood. I thought I would take a 2 inch pipe and cap it on one end and then slip the wood as mentioned above into the pipe and heat to boiling. Will this work? I do not have access to a boiler. Sure would appreciate your help.

Thanks

Robert, greetings.
How you go about bending wood for your rowboat project depends a bit on how much you need to bend it. The method you propose - of inserting the wood strip into a 2" diam. pipe and boiling the water inside is similar to what a friend of mine did to make bent wood rocking chairs, but he had to bend the wood alot. The other option for making bends that are of relatively minor arc is to soak the wood overnight, then heat it and bend it over a piece of 3" pipe which is heated from the inside by a propane torch. If this piece of pipe is securely mounted, you can run the wet wood back and forth over it until it is hot enough to bend. This method is especially handy if you only need to heat

bend part of the piece, as might be the case with a boat. If you use the long tube method, you will of course have to tilt up the open end so that steam doesn't build up pressure, but keeping the whole length of pipe boiling will require several heating units. The other way is to find a large tea kettle and place the open end of the pipe over the spout and fill the tube with steam.

Good luck, let me know how it turns out,
Norm Kidder

p.s. - if you are interested in old ways of doing things, check out the Society of Primitive Technology at primitive.org.

(E-mail pertaining to the article, "Can You Name These Plants?")

Guesses:
1) ?

2) Smilacina (False Solomon Seal)

3) Thalictrum (Meadow Rue)

4) Actea Rubra (Baneberry)

5) ?

6) Rubus of some sort

7) Oxalis (sorrel)

Best of luck,
Josh and David

Hi my name is Margaret Rizzo, I am in the process of making a healing wand and I was wondering where I might be able to purchase some sinew in order to tie it together. Is this at all possible? Is it manageable and easy to work with? I read some of the article on your website and appreciated the store list, but I do not know which of the retailers would have it - if they would at all. I am slightly pressed for time so I would appreciate it if someone could get back to me asap.

Marg

Hello Marg;

Michael Foltmer is a very reliable source and I would recommend him to anyone who is looking for raw resources like rawhide, braintain buckskin, porcupine quills as well as sinew. He sells deer or elk sinew. The cheapest price for his deer backstrap sinew (12" to 17") is $2.50 ($2.00 shipping & handling and 15 cents on each additional strip). Contact him for other price quotes:

Michael Foltmer
1330 Brantner Rd.
Evans, Colorado 80620
(970) 339-5608

The other alternative for sinew is The 3 Rivers Archery website (www.3riversarchery.com). Here is a link to their supply of sinew:

http://www.bowsite2.com/acb/showdetl.cfm?&User_ID=252170&St=7925&St2=-36317887&St3=66488762&DS_ID=8&Product_ID=3465&DID=15

For your project, what you want is the backstrap sinew, which is longer than the leg tendon sinew. To process the backstrap sinew, all you have to do is smoosh the sinew between your hands to seperate the thin threads of sinew. Seperate as many threads of sinew for your use. Soak the sinew threads in water to soften it. Then pat dry the sinew before applying the hide glue. To adhere the sinew to something, go to your local hardware store and purchase an adhesive product called Franklin's Hide Glue (if you don't have your own home-made hide glue. Also, 3 Rivers Archery sells hide glue in dried form). Squeeze out a few drops of hide glue from the Franklin Hide Glue plastic container onto your thumb and forefinger fingertips. Run the thread of sinew between your fingers, then apply the sinew to your project.
To use the sinew for sewing, you must first soak it in water, pat it dry, then roll or twist the sinew into 1-ply thread. Give it a good tug to set the twist, then use it as sewing thread (don't apply hide glue for making sewing thread). During the old days, the sinew was just placed in the mouth, lightly chewed and the saliva in the mouth softened the sinew. Now, you don't know how the sinew was processed and dried if you bought it. Unfortunately, putting it into your mouth may not be wise.

Good luck on your project,
Dino Labiste

Hello "Norm".
Enjoyed your article on steam bending. I am a Timber framer with an interesting challenge coming up. Our firm has been asked to make a timber roof truss system, with a twist or should I say "a bend". The bottom chord is to be bent or cambered. The specs call for solid (not laminated) timbers. The dimensions are 8" x 10" x 24'. This is bending on a different scale! The bend depth is 24" and the species is most likely Douglas Fir. Your input would be most appreciated.

Jason Beamish

Jason, whew, what a challenge. Your project is way beyond anything I've ever attempted. Actually bending the beam you describe would require a jig of NASA proportions and would probably split out on the top of the curve. If you have beams to experiment on, you could try drilling 1/4 inch holes to allow better steam penetration, which would close up with the bending. My only other suggestion is to laminate only the end you are bending, assuming the bend is close to one end. Use a really good bandsaw to slice the beam into something like 1" slats, steam that (a challenge in itself), bend it around a jig and clamp it. After it sets, glue it. You'll need to measure it from the top, as you'll pobably have to cut off the slats that slide down when bending. The rest of the beam will still meet specs. That's all I can think of

Good luck
Norm

Dear creators of Primitive Ways:
Well, I realy enjoy your site. It is full filled with interesting photos, and very simple text explanation, which is the most for a 'electronic device' to show a 'primitive way'. I'm from Argentina, actually develop an IT support office (a.k.a MIS) for a multinational corporation.

It's sad to me been so far away from the place where you develop your courses and training, but I hope to be again in US with enough time to take one of the courses, if not all!!!

Well, that's it. Just a 'good job and keep working' from a down-south place.

Regards,
Marcelo Ferrarotti
IT Support
Advent International Corporation
Latin America

Bob;
Saw the bone flutes on the PrimitiveWays webpage. Is the end opposite the blowing end a closed end?

No, it is open.

I assume it is played held straight out like a clarinet and not held sidewise.

Yes.

Sincerely,
Bob Gillis

Thanks,
Dranu

Hello. I am Mechoopda, Chico Rancheria, and a student at CSU-Chico. I very much enjoyed this page [Native California Fall Gathering at San Luis Reservoir State Recreation Area]. For my Exhibit Research and Design class, I am preparing a display case depicting an aspect of cultural anthropology. I would like to use one of the pictures demonstrating the soaproot hairbrush. May I? I would give proper credit to your website and organization.
If you could let me know in the next couple days, it would be much appreciated.

Thank you,
Arlene Ward

Hello Arlene,
Thank you for asking permission to use one of the pictures demonstrating the soaproot hairbrush.
Yes, you can use the photo for your Exhibit Research and Design class.

> I would give proper credit to your website and organization.

Thank you for doing that.

Good luck on your display case,
Dino Labiste

Hey, man. I totally support your website and your views on modern technology. I am an Anarcho-primitivist (no doubt you heard about us taking on downtown Seattle, DC, LA, etc.). We basically 'subscribe' to the thinking of Ted Kaczysnki in that technology takes away our autonomy, our happiness and our ability to be fulfilled by work that has a direct effect on our physical well-being. I was just wondering what your opinions are on Anarcho-primitivism and Ted Kaczynski. Thanks!

NiK

NiK, greetings. I'm glad to hear you like our site. Your e-mail gave me an excuse to re-read the article you mention. As to anarcho-primitivism and Ted Kazinski, there are some ideas of his that I may have some sympathy for, but his methods for dealing with the problems was counterproductive as well as personally destructive. The problems created by technology appear at this time to be terminal, but there is a very real race on to find real solutions, so I try to keep an open mind, and not put all my eggs in any one basket. We are all part of a very interesting transitional time, and putting too much stock in anyone ism makes you non-adaptable. As in life, diversity of cultures, beliefs, and behavior offers the best chance that there will be one lifestlye that can survive. In the meantime, we each pick and choose among all the available technologies and lifestyles (we're both communicating by computer). Some go all out high tech, others to low tech. It may be in the future there will be permanent cultures of technos, the unwilling poor, and the intentional poor (primitives) serving roles similar to carnivores, herbivores and scavengers in a natural system. Time will tell, in the meantime, find a more productive way to push your ideas than Ted did. Revenge only feels good for the time it takes to realize that it didn't change anything. During the anti-vietnam war days, I saw many of my friends fall victim to the desire to be dramatic (egoistic) rather than do what was affective. I found teaching to be more affective - Gandi was the true radical.

Keep thinking and growing,
Norm

Amanda, Bob Gillis referred your question about the movie to me. The Gods Must Be Crazy is a film made in South Africa many years ago that stirred up a bit of controversy in its depiction of

Black Africans. Basically, the movie makes fun of civilized folk of all types and contrasts them to the pure logic of the unspoiled Bushmen. It deals with the events that evolve from a pilot dropping a coke bottle into an area where there are Bushmen unaware of civilization (oh, that there really were!) After they find many uses for the bottle, which they think was sent to them by the gods, they decide that it is actually evil and destructive to their social order, so their leader sets off to throw it off the edge of the world. On the way he encounters a group of whites who are having their own adventures and gets involved in an incident with revolutionaries and so on. The film contrasts his purity and basic understanding and skills, with the complex, nonsensical dealings of the modern world. It has some great humor and scenery shots, and portrays some good hunter/gatherer skills. Its a low budget sort of film but I love it.

Norm Kidder

I have a copy of the Gods Must Be Crazy, its one of my favorite movies. I've seen the Edge, interesting, but not as fun (pretty intense) and of course there is Cast Away, largely influenced by the Society of Primitive Technology. Steve Watts started calling a volleyball Wilson after he, Dave Wescott and Dave Holiday found it on the beach while they were training the screenwriter in survival skills. If I get any time (ha), I'll try and write up something longer on the first and last of these. Other possiblities are Iceman, Quest For Fire, Clan of the Cave Bear.

Norm

Saki Yoshisada wrote:

I like your organization. It's helping me a lot in constructing weapons for amtgard. If you don't know what amtgard is, just type it in on the web search and click on the amtgard web site. . . . In any event, do you know any websites that tell how to make a Japanese Basket Hat? If so please tell me where to go. I appreciate your efforts.

Are you referring to the basket hats that were worn by the Zen Buddhist sect called the komuso (priests of emptiness and nothingness). If so, then try doing a search on "komuso". It might lead you to a link on how to make the basket hats. Or try searching the word "tengai". The komuso were identified by the large baskets (tengai) which they wore over their heads to symbolize their detachment from the world.

Sincerely,
Dino Labiste

Just wanted to say that I am very impressed with the site. First time I have ever been on it. Have been making self bows for 8 years and have gotten more and more into the associated technologies every year. Have done cordage, fire, tanning, arrows, knapping and tools.

Have taken 2 deers with primitive equipment. Only thing I haven't done yet is made a good bowstring. Chicken to put one on a good hard earned osage bow. It is on the agenda for this winter. Will then have the complete package.

Really appreciate all your research and hard work. I have picked up a bunch of articles and not through with all the articles yet. Keep up the good work.

Alan Warner
(Lonely Primitive Technologist in the land of corn and cows)
Casey, Iowa

Where is the sinew in a deer? I always hear it's in the legs and the back. Is that sinew covering the backstrap?

Thanks for your time,
Ray

Hello Ray,
The two locations for "useful" tendon are the two you mentioned. Body tendons do not have the correct elastic fiber properties.

Dick

Helen, I was forwarded your e-mail regarding mistakes in the movie Quest For Fire. It's been quite a while since I've watched it, but from what I remember, the biggest problem was in the variety of different stages of evolution being portrayed at the same time. In one of the early scenes the principle tribe is attacked by hairy apemen who don't really resemble any stage in human or ape development that I'm aware of - they are too big for Australopithecenes and too apelike for anything later. The only concurrent apes would be proto-gorillas in Africa and Gigantopithecus in

Asia, but the movie version doesn't fit even these very well. The main group appears to be based on either Neanderthals or possibly Homo erectus. They encounter at the end of the movie a group of totally modern people. In so doing, they are spanning too many millenia. They also show the more primitive group as using only chimp like language (done very well as coached by Desmond Morris). Current evidence suggests that even the early versions of Homo had the capacity for speech. The other problem I remember noting at the time was the ease with which the primitive group was able to take up atlatls with immediate accuracy. Also, their atlatl darts were very short and poorly made. They didn't look like they would work at all. Other than these problems, the fire making sequence was real, and lots of other aspects well portrayed. Hope this has been useful.

Norm Kidder

Bob,
Saw the piece on reed flutes at primitiveways.com. Was wondering how can you keep the holes you drill in the flute from splitting.

If the reed is seasoned there is no need to reinforce the holes. I used a knife to cut the holes. If you use a drill bit make sure it is sharp and drill the holes slow. You can also burn the holes with a large nail held in a vise grip and heated red hot with fire or a propane torch.

The picture seems to show some type of reinforcement added around the circumference of each hole, what is this material?

You are seeing the edge of the holes (since the holes were knife cut).

Bob Gillis

Thanks in advance for your reply.
Lance Stewart

Primitiveways;
I represent the National Paleolithic Society, Inc. We are about to embark on a national membership drive via the web. I can't tell you how much I enjoyed my visit to your site. I would really like to speak to you about reprinting some of your stuff. Would you please send me a phone number at which you can be reached or give me a call on our toll free line at (888) 828-6188. You can check

us out at http://www.natlpaleo.org. There isn't much in the way of content out there yet, but there is enough information to at least give you an idea what we are about. I think our "articles" link will be of particular interest to you. Hope to hear from you soon.

Ken Jensen

Sir:
What kind of crystals do you use to create the light as described on the web site. I am currently stationed at Eagle Base in Bosnia.

They are quartz.

Bob Gillis

Fire Making	Primitive Skills and Plants	Projectiles and Tools	New E-Mail Questions

E-MAIL Q U E S T I O N S

New E-Mail Questions	Primitive Skills and Plants	Projectiles and Tools	Miscellaneous

QUESTIONS & ANSWERS

Fire Making

Dear Dick,
I just read your article on the Australian aboriginal fire saw, and I can tell you that the exact same method was used in Japan. Only there they used bamboo. I also managed to use bamboo while alone. It is important to have a bamboo that has not started to degrade yet. This you split in half. The fire board will be one half of the bamboo, the inside down with in the hollow a bit of conventional tinber. (You are looking at a bamboo with a 1/2 inch diameter or so) Right above where the tinder is, you have to drill a hole that goes all the way through the bamboo to the tinder. Now you place the other half of your bamboo on the hole and start sawing. (make sure you abrade a bit of the top bamboo so there is a slightly larger surface area.)

Let me know if it works,
Anthonio Akkermans

Hello Anthonio,
Well done! Where could I find out more about the Japanese method? That's one I will have to try. I

have seen Mountain Mel DeWeese start a fire very quickly with a Filipino Negrito fire saw which resembles the Japanese one which you describe. It is made from a very large diameter (6 or 8 inch??) bamboo which is very low density. Instead of drilling a hole he cuts a longitudinal groove on the inside of the hearthboard and holds some tinder in it to catch the char. He created an ember very quickly. I have tried it but never been successful.

Regards,
Dick

Hi ;
I live in southern England. Can you suggest some native English types of wood that might work with a bow drill? I've tried ash and beech, but only seem to get smoke. The char never gets to the ember stage. I know its all down to experimentation, but can I use greenwood, or should I dry any I cut? Would it be better to try fallen branches as a source? I'd rather use local materials than have to go to a sawmill for bits.. .. ..

Be grateful if you can help me.

Thanks,
Andy Winchester

Andy, sorry to take so long in getting back to you, the spring has been rather busy. I don't know which woods you might have in England that would work for fire drills. When I was there a few years ago I didn't get to try any. To start though, with a bow drill, I would use dead wood, though not too rotten. You might try willow, or even better, a large willow root for the hearth board. A well weathered willow stick might work for the drill. Do you have any Elderberry? (Sambucus sp.) One of ours works very well. We also use a type of horse chestnut (Buckeye), if you have anything in this family it might work also. Another thought would be to contact someone in the UK, the Society of Primitive Technology has a few members there. You can contact Dave Wescott the SPT manager at dwescot@aol.com and request contacts.

Good luck,
Norm

This is a request to use all or part of your article "The Miracle of Fire-by-Friction" on our website.

As you can see from my signature, I am the Webmaster for SABC3, one of the channels of the South African Broadcasting Corporation. We will be running the CBS "Survivor - Africa" show, and I need material to put on the Survivor Website that we will be putting up. With the approval of CBS, we are using material from their site, and adding more local copy from here. The struggles of the two teams to make fire seemed to make a short piece on the right way to do it, very relevant! I would be glad to credit the author and website.

Our Survivor site is not up yet, but you can look at our Channel website at www.sabc3.com.

I have contacted Dino Labiste, and he replied:
All the articles on Primitiveways.com are copyrighted. If you want to use any article for your website you must:
1. Contact the author for permission. The author's e-mail is at the bottom of each article. If you do get permission from the author, we would like you to credit the authors name and the website it came from (namely Primitiveways.com).
2. I would like to also see your website to see if our articles are appropriate for your site. We don't want to be associated with certain radical groups that are not in our best interest or the authors best interest. E-mail me when you get approval and I would like to check out your site before I give the final OK.

I would be happy to credit the author and website.

Paul Galpin
Webmaster
SABC3

Yes, go ahead and use it, acknowledge our web site and please also say that it first appeared in the Bulletin of the Society of Primitive Technology.

Dick Baugh

Hello Dino!
What is your opinion of the magnesium firestarters? I've tried to light wet tinder with these starters with no luck. The magnesium simply does not burn long enough to ignite the wet tinder. My opinion is that these starters are simply over rated. Sure, they'll start a fire with dry materials, but you can forget it in wet conditions. I'll take a candle any day!

By the way, I teach wilderness survival skills in the East Texas area. I constantly experiment with

different methods and technigues for starting and maintaining fires. The information on your website is very good and quite helpful. Good job!

I would really like to hear your suggestions on starting fires in wet conditions. It's obvious you're very knowledgable at what you're doing.

I look forward to hearing from you.

Have a good day!
Joe Musselwhite
Joe's Wilderness Survival Skills

Hello Joe;

Thank you for visiting our website.

The magnesium firestater is like any other fire making device, whether it be matches or hand drill, they work fine with dry materials during ideal conditions. Wet tinder can be a problem when you're drenched and cold. Starting a fire during or after a rain storm can be very frustrating. Even early morning conditions when the ground has been saturated with moisture can be a problem when you're scavenging for tinder.

One possible solution for wet tinder, when using the magnesium firestarter, is to shred your tinder as fine as possible. Less mass will dry out faster and may also catch on fire faster. For example if you had bark tinder that is wet, try shredding the tinder as fine as possible. The magnesium starter may ignite the fine slivers of bark for a moment. The problem I can see is that if your tinder is wet to begin with, the fine slivers may ignite but you'll never achieve a flame unless you have dry material to extend that glowing sliver. You're back to the same problem of wet tinder. You could try and dry out the wet, shredded material by placing it under your armpits, around your belly area or any part of your body that will generate heat to slowly dry it out. It might take a while until it dries out sufficently to use, but what's the alternative - no fire.

Sometimes logs that have turned into "punky" wood will be soft enough to split easily. If the "punky" material is dry on the inside of the core, it will make a good coal extender. You'll still need to find a more dry, fibrous material to get a flame. Downed logs may provide some dry material. Even after a heavy rain storm, the inside of a thick log may still be dry. The water may not have penetrated the core of the log. If you can find a way of splitting the log, you may find the core dry enough to gather some tinder material. You could mash small pieces of wood with a stone until it's soft enough for tinder material.

Also, if you root around the base of trees, you may find some dry material for tinder. If enough leaves have fallen around the base of the tree, the layering effect of the leaves and debris may keep

the rain from penetrating to the lower layers that may contain dry material. Crumble the dry, dead leaves that you find to make fine powder for tinder material.

If your clothes is still dry, that can be also used as dry tinder material.

Some indigenous cultures around the world carried a lighted burning ember in some wrapped dry material, like bark or a dry, herbivore dung patty, to maintain a constant fire starting coal for the next campsite. Other cultures used a ball of bark cordage that was lighted at one end to carry the ember. In post-contact times, some of these balls were made of cotton cloth cordage. If you're moving from one area to another, why not bring a fire starting ember with you, so that you don't have to always rely on your fire starting equipment for the next fire.

Just a few thoughts that might help. I'll forward your e-mail to Dick Baugh, one of the other members of our website. He has dealt and experimented with wet hearthboards and spindle. Maybe he can offer other insights to your problem. Have you checked out his article entitled, "Fire by Friction with Damp Materials", on our website? It's under the Fire Making category.

Hope this helps,
Dino Labiste

Hello Joe,
My opinion of magnesium fire starters: Why bother? The only thing that magnesium is good for is to create a very hot spark which glows and burns very quickly. As you pointed out, that's OK if you have dry tinder, but what if everything is soggy? A big hunk of magnesium is good for creating thousands of hot little sparks but in an emergency situation you just want to start one good fire.

Mountain Mel Deweese, survival instructor for Navy pilots during the Viet Nam unpleasantry, one of my mentors, racanteur and all-around character says "Everything in your survival kit should have at least two uses." What's the second use for that chunk of magnesium? What you need to carry instead is some concentrated fuel which can dry things. The most obvious choice of natural materials is pitch from a pine tree or other conifer. Mix it with powdered charcoal and you have the adhesive which was used by Indians to attach stone arrow points. Even more practical but not quite so natural is Vaseline soaked into a ball of cotton. Fluff up the cotton and it is easy to make it ignite with a hot spark from a "flint". You can use the Vaseline for soothing blisters and chafed spots. Even more high tech: Take along some cotton balls and a tube of Neosporin anti-biotic ointment. Neosporin is 89% petroleum jelly, so in addition to its germ fighting properties, it also burns very well. Vaseline (petroleum jelly) is a very high-energy fuel, about twice as many calories per pound as alcohol. The only disadvanatage is that you can't eat it. Someone should experiment with animal and vegetable fats which can be eaten or used as fuel. Arctic people used seal oil both as fuel and as food.

I hope this answers your question.
Dick Baugh

(Question pertaining to the article entitled "Starting Fire With a Lens Made From Ice!")

Clever, Mr. Gillis, I like it. But . . . how do you boil the water to be rid of the gas . . . if you don't have a fire? Did I miss something?

Thanks,
Russ Mitchell

Good point. I suggested the boiling as a way to make ice to practice the art. Often you can find clear, clean ice on a lake or pond. When water freezes slowly, as it often does on a lake or pond, it degasses. If the ice is not too thick, you can use a rock to crack out a section big enough to create the lens.

Bob Gillis

Mr. Baugh,
My name is William McCormick, and I am a pharmacy student at Rutgers University and a summer intern for Pfizer Consumer Healthcare. On your website, you recently recommended that Neosporin can be used to aid in fire-starting due to the fact that it contains "99% petroleum" In truth, Neosporin contains only 89% petroleum, though this still is potent enough to sustain a flame. As an Eagle Scout since 1996, I never actually used the contents of my first aid kit to start a fire, but in retrospect, Neosporin would have made a fine addition, both in terms of emergency wound treatment and when dabbed on a bit of gauze for kindling.

Regards and my compliments to your wonderful website.

William McCormick, Summer Intern
Ernest Mario School of Pharmacy
Rutgers, The State University of New Jersey

Hello William,
Thanks for your enlightenment and generous endorsement. I don't know where we got the 99% figure. I will pass this on to our webmaster. The tube sez, among other ingredients: cocoa butter, cottonseed oil, olive oil and white petrolatum. I would think that the total percentage of flammable oils would be most relevant to fire starting. Try it.

Regards,
Dick

(Pertaining to the article entitled, Starting Fire with a Lens Made From Ice!)

Robert Hallinan wrote:

Bob Gillis:
Is the ice lens shaped like a discus or is it concave. I can't believe this works!!

Bob

It is convex (lens shaped). It does work.

Make the lens of clear ice. Large in diameter. Use it in the middle of the day. Have your tinder dry and of dark color. Hold the lens so it is perpendicular to the sun's rays. Focus the sun's rays on the tinder so that they are as small as possible. Hold the lens steady. If the lens is melting, avoid getting any water drops on your tinder. When the tinder is glowing, gather more tinder about it and blow it gently into a flame.

Bob Gillis

Hello, I'm a primitive skills practitioner and I have to say that your info has really helped me progress (a lot) in fire making; thank you. With the help of books, articles, and lot's of experimentation I've gotten the bow drill to work on numerous occasions but have run into a few problems. When using nylon cord it gets damaged by the friction and after about eight attempts(successful or not) the string can't bear the streatch and friction, causing it to snap. Is this normal? I'm afraid to try out using buckskin as the cord because I see how it eats through nylon. Why don't I explain my setup so what I may be doing wrong will be more apparent. I use a two foot ridged bow tapering from 1" to 3/4" in diameter that I string tightly with a nylon cord. I've

mostly been using cottonwood and hazel spindles with a diameter between 1 and 3/4" and about 8" long. The hearthboards also cottonwood and hazel; 2"wide and 1/2 to 3/4" thick. Anyway, when I wrap the cord around the spindle it streaches a lot. Sometimes when the cord slips I loosen it and give it two wraps. This works for nylon but I hope to advance to buckskin and nettle cords. I just feel like maybe I'm using an axe to do a tomahawk's job. Any suggestions? I'd appreciate any help that you can give.

Take care,
Christopher Bootz

Hello Chris,
There are several factors which will prevent your bow drill cord from wearing out.
a. Be sure the bow is tilted properly. When I use a bow drill I keep my hand low and the far tip of the bow high. As a consequence the string does not rub on itself. The correct angle makes a big difference in string wear.
b. I use old nylon drapery pull cord. That is about the optimum thickness and it lasts a long time.
c. The ultimate in long wearing is to use the Egyptian bow drill configuration wherein the cord is almost twice as long as the bow and tied in the middle to the spindle. (See the PrimitiveWays web site). My goal is to make a bow drill using doubled dental floss this way.
d. I have barely enough muscle power to get a fire with a 3/4 inch spindle. It takes a lot of physical effort and consequent string wear with a spindle that large. I prefer something smaller. I would think that it also takes a lot of tension in the cord with a large spindle and cord wear also depends on tension.
e. Hazel? Hazel is a fairly hard wood so that should take some pretty serious muscle to get an ember. Again, more muscle equals more string wear. I am always trying to find materials which minimize the effort needed. Try a cottonwood spindle, 1/2 inch in diameter and a hearthboard made from cedar or cottonwood root. That should cause less effort and string wear. I have successfully used cord made from shredded cattail leaves for that combo.

I hope this answers your questions.

Dick

Hello Dino;
I hope that this note finds you well. I just noticed the new article on bamboo cooking:
http://www.primitiveways.com/bamboo_rice_cooker.html

I had to chuckle, because, now that I've fully explored firecraft, I am now concentrating on primitive cooking, and this is one of the methods that I am planning to try. I haven't found a source

for bamboo yet.

I took my youngest son fishing recently and he caught a bass. After cleaning it, I seasoned it, wrapped it in cabbage leaves, and enclosed it in an inch thick layer of local mud/adobe. I placed it on some coals, as well as placing coals on top of it. After an hour, I cracked open the clay, and ate a very delicious fish. It's a lot of fun.

Keep up the good work,
Ken Youngquist

Hi Ken;

Good to hear from you again. I'm glad to know that you're still exploring the further boundaries of fire. I too have tried cooking in clay. Instead of bass, it was trout. Seems that the enclosed clay mold steams the fish in its own juices. Very delicious indeed.

If you're looking to try out the bamboo method of cooking, there is a bamboo nursery near Santa Cruz. They sell timber bamboo. Check them out if you're interested:

Bamboo Giant Nursery
5601 Freedom Blvd.
Aptos, CA 95003
(831) 687-0100
www.bamboogiant.com

Keep in touch,
Dino

Hi. I have been trying to get this bow and drill set to work but I can't do it. I won't give up, but I'm asking for some help. I "drill" the stick into the wood, but I think my base-board has the wrong set up. Could you maybe describe to me how to make each part yourself and how the "base board" is to be and explain how the "V" groove in the wood works. Thanks
alot.

Andrew Olszewski

Hello Andrew;

Several questions:
What kind of wood are the spindle and hearthboard?
Where did you obtain them?
Are they perfectly dry?
What is the diameter of the spindle?
Do you get smoke?
Do you obtain fine blackened wood powder collecting in the notch?

The "V" groove should go half way to the center of the hole. If it is made correctly, 90% of the charred powdered wood (char) should collect in the groove. You need to build up a little pile of char which is about 1/2 inch (1.25 cm) in diameter.

Good luck,
Dick

Dino,
I have heard about a "floating" technique for the handrill. Not only the handrill to make fire but also to drill stone. Do you know this technique? If you do, can you explain it to me? Supposedly, it allows one the ability to maintain the spin without having your hands "walk" down the spindle, but doesn't allow a lot of downward force. It is supposedly used in combination with courses of high downward pressure courses. It helps limit the number of times that you have to change your hand position.

Thanks,
John Rine

Hello John;
Yes, I am familiar with the "hand floating technique" for the fire hand drill. Unfortunately, it's one of those techniques that I feel is best shown rather than written to get the technique down. Basically, it involves keeping your hands stationary in one position on the drill. One hand will push down, with the fingers facing towards the ground and the other hand will pull back, with the fingers pointing upwards toward the sky. This process is alternated over and over allowing your hands to remain in one position on the fire spindle.

There's an article written about the "hand floating technique" in the Society of Primitive Technology Bulletin:

http://www.primitive.org/backissues.htm
http://www.primitive.org/backissuesA.htm

Dino

Message text written by Paul Dixon:

Dear Richard,
I was reading your article on the two stick hearth board, and since I have some problems cutting notches, I was extremely interested in it. I have some questions. Where does the dust collect, is this faster or slower than the normal method with the notch? Does it work with the same woods? Thank you for your time.

Hello Paul,
The dust collects in the junction between the two sticks. It will collect more or less equally on both sides and maybe you can get an ember on both sides. After one hole has been drilled you can start the nest hole close to the first one and most of the char shold collect in the old hole. It works with the same woods used for a conventional hearthboard but I don't think it is quite as reliable as cutting a notch. Its chief merit is that doesn't require any cutting.

Regards,
Dick

(Question pertaining to the article, "Starting Fire With an Ice Lens")

I will try it by digging the shape of the lens in a piece of wood, then freeze it, work it with a flint flake and polish it with fingers.
Do you think you can make fire with an obsidian flake lens???

I have yet to see clear obsidian but if you could find such I would think you could make a lens. Lens have been made of crystal but this is no easy matter in that they would need to be ground and polished to a high degree.

Did you ever try?

No.

Thanks,
Judee from france, sorry for poor grammar....

You did quite well.
Let me know how your lens works (send a photo).

Bob Gillis

---

bwshields@triton.net wrote:

What is the best wood to use for a bow drill and the string for a bow drill? And what is the best tinder when you start a flint and steel fire?

Hello,
The best wood is what works for you and can be found nearby. For the cord, the same applies. The Egyptian bow drill is most tolerant of poor quality cordage.

Good luck,
Dick

I just got the $5 Fire Starter Kit you sent. I just wanted to send you a note to let you know that I finally got that elusive coal (on the first try with your kit). I even used the tinder you sent and got a burst of fire but didn't keep it going. I'm sure I can do that part. Next step is to find local materials to reproduce your kit, then the bow drill.

Thanks for providing a guaranteed kit. It really helped get me that much closer to fire with a bow drill.

Brian Madera

Thanks for the kind words.
Dick

Dino:
I have been searching for horsetail here in North Carolina and have been told that it is quite abundant. I've looked in a variety of field guides and on the internet for a clear picture of what it looks like but am unable to find one that helps me identify it. Any hints?

Thanks,
Susan Richards

Hello Susan;
Are you looking for the plant "horsetail" or "horseweed"? These are two different plants. Your subject was entitled "hand drill fire" on your e-mail. If you are looking for a hand drill spindle, then the plant is commonly called horseweed or marestail. The scientific name is Conyza canadensis. If you do a search using the scientific name, you should get a better response. Be sure to enclosed the name in quotes when searching to be more specific in your internet search. Type in the search name as: "Conyza canadensis"

If you are actually looking for "horsetail", then the scientific name is Equisetum arvense. Do a search on the scientific name.

Also check out this website for photos on horsetail (scroll down on the categories of the common name list on the left of the webpage and click on "Equisetum arvense and other spp.":

http://www.ansci.cornell.edu/plants/alphalist.html

Sincerely,
Dino Labiste

Hi Dick,
I lead Pathfinders (Seventh Day Adventist Church's boy and girl scouts) and I would like to make fire without matches by flint and steel and bow-drill. I live in Northern California.

What woods can you recommend for the bow drill that can be acquired in my area. Can I purchase a bow-drill? What is good for tinder that is available here?

With flint and steel I have been able to get char-cloth glowing but have not been able to achieve a flame.

Jamie

Hello Jamie,
In Northern California I would make my hearthboard and spindle out of cedar, either red or incense. The cedar spindle should be 1/2 to 3/4 inch in diameter. Cottonwood is another good material. I would make the cottonwood spindle somewhat narrower.

I sell a bow drill kit for $15.00

For tinder, use shredded redwood bark, shredded dead cottonwood bark, dry fine grass.

If you get a glowing ember but can't get a flame try the following:
a. Add some very flinely shredded tinder to your tinder bundle. Put the ember on top of that.
b. Don't stop blowing and gently pinch the tinder so it is always in contact with the glowing ember.
c. Add some finely powdered ember extender to the glowing ember before you put it in the tinder bundle: powdered dry rotten wood, cow poop, or kangaroo dung.

buena suerte,
Dick

I have visited your website and would like to have our scouts try this. I am having difficulty with the bearing block. Can you tell me where I can get items to make them? We will need to get 12 kits and we are experimenting with materials located in Southern California. Not much hardwood here so we have to go to the store. Also what do you recommend for the string on the bow? We have tried cotton shoe laces, leather shoe laces, etc. Most seem to just spin around the spindle and don't get the friction grab we need. We read on another website about making an octagon shape on the spindle. Tried and failed.

Any help you can provide would be most appreciated.

Russ Levine
Scoutmaster Troop 419

Hi Russell;

. . . having difficulty with the bearing block. Can you tell me where I can get items to make them?

1. Bone material makes a good bearing block. Try looking for some beef bone at the supermarket. Ask the butcher if he/she has any beef bone that they throw away. Sometimes they will give them to you for free. Place the beef bones in hot water and cook off any clinging meat and tendons. Clean the bone and cut into appropriate sizes for a bearing block. Then drill a small hole in the middle for the spindle socket.
The knee bone from a ham hock has a natural hole that can also be used as a bearing block. Check with your local butcher.

2. Smooth river or creek stones can be pecked into bearing blocks. Check the creeks and rivers in your area. Find the stones that are smooth in texture, but not gritty like sandstone. Peck a depression in the center of the stone. Lightly greasing the socket hole on the stone will help lubricate the contact area between the wooden spindle and the socket hole.

3. Go to your local lumber yard and check out the exotic hardwood lumber section. Find a very dense wood and cut it into appropriate pieces for bearing blocks. Drill a small hole in the middle and grease or oil the socket hole. This will allow the spindle to spin loosely in the socket and will also keep it from burning.

4. If you can find tree branches that have a fork in them, the wood between the fork is much denser that the rest of the wood. Give that a try.

5. If all else fails, find man-made objects for bearing blocks. A small shot glass works very well. Careful of the glass breaking in your hands.

Also what do you recommend for the string on the bow?

For man-made cordage, I usually go to army surplus stores to buy their braided, cotton cordage (the type that's braided in the round). Get the appropriate diameter for your needs. These cordage are very tough and will take a lot of abuse. I would avoid the synthetic cordages.

If you still have difficulty finding cordage material, try tying your cordage using the Egyptian fire method. Go to our website (www.Primitiveways.com) and locate the category "Fire Making and Primitive Cooking". Find the subject entitled "The Egyptian Bow Drill" and open the webpage. There are instructions on how to prevent cordage slippage. Give it a try. It works very well.

You can always use natural fibers by either making a 2 ply or 4 ply cordage, depending on the

strength of the material. Try to keep the diameter of your cordage consistent to prevent any weak spots. The cordage will break along the weakest link.

Good luck on your pyro endeavors,
Dino Labiste

Can you point me in the right direction to find woods in the south Texas area that would make a good hearth board?

Remember the Alamo! Alamo is Spanish for cottonwood. Cottonwood, or better yet, cottonwood root is excellent fire-by-friction material.

Regards,
Dick

Hi, My name is Gareth and I live in Wales. I'm a member of the Pole lathe and greenwoodworkers society of the UK and so I found your site to be of great interest. I intend to e-mail the rest of the society to point them in the right direction. You are an inspiration!
p.s. do you have anything on making fires using flints? I've managed it a few times but inconsistantly, especially when I'm trying to demonstrate the method to friends.

Best Wishes,
Hwyl fawr Gareth.

Hello Gareth;
Thank you for visiting our website.

When using a HIGH CARBON steel striker (example: a high carbon file would work) and flint, be sure that your flint piece has sharp edges. Your steel striker should be hitting the edges of the flint. As the high carbon steel striker hits the edges of the flint, tiny slivers of high carbon steel are shaved off. The impact creates enough heat to ignite the steel slivers, thus creating sparks.

Another tip is to hold the small piece of char cloth next to the flint edge you will be striking. You'll get a higher percentage of the spark igniting the char cloth in this position.

Good luck on your pyro endeavors,
Dino Labiste

Dear Mr.Labiste,
I enjoyed very much in your articles making fire. It helped me also at writing my diploma. As a physics teacher I showed your ways making fire in class and students enjoyed, also.
Thank you very much and many greetings from Slovenia.

Ambroz Demsar

Dear Dick;
I just ran across your web site - it's great, thanks. My question has to do with trying to make a bowdrill fire with harder woods. A month ago, I completed the standard course at Tom Brown Jr.'s Tracker school and left with cedar material for making fire. My goal is to make a coal each day during the summer so that by the time I get back into the classroom I can easily make/teach fire to my 4th and 5th graders. So far, I've succeeded with increasing ease using the cedar fireboard and spindle. I've also done it with a mullein spindle on cedar (varying success) and maple spindle on cedar fire board. I'm trying to branch out into different as well as more difficult materials and maple was on my list of possible woods. I've been working most of the day with maple on maple and its not happening. Lots of smoke, lots of dust but no spark. The dust is also really black and cindery feeling.

I've tried varying degrees of pressure and it doesn't seem to work. Has the dust already incinerated? Any advice? The wood is really hard and was difficult to carve.

Thanks for any help,
Susan Richards

If the dust that you grind off is coarse and gritty then you are wasting your time. Coarse char has to be heated to at least 800 degrees F to ignite whereas very find char only has to reach 700 or less. That small difference in ignition temperature means success or failure.

Materials which are very good insulators take the least physical effort to start an ember. I have also had failure with wood which was slightly "punky" and rotten. In that case I think the wood disintegrates before it reaches ignition temperture.

Hi Dick,
I'm a recent transplant from Central Oregon to Massachusetts. In Oregon's High Desert, we bow drilled fires using Sage for spindles and juniper or sage for fireboards. I have heard that cedar is the best thing to use here in the northeast. Do you have any other suggestions? Other woods that may work better or other resources I could turn to?

This was my first visit to the primitiveways website. Keep up the great work!

Thanks,
Kevin Stapleton

Hello Kevin,
"Best" is whatever works. Part of the challenge is to use the local materials. You may not always be able to find cedar.

Dick

What do you think of this idea and, have you ever thought of it before, that is, to dry the tinder with the heat of the spindle and board somehow? If it's possible to dry the spindle and board to get a coal, which both you and I know to be the case, then, I wonder if, rather than let all that precious heat go to waste, it could also be used somehow to dry the tinder. I haven't done any experimentation with it yet but, was wondering what you thought of the idea and how it might be done. Pretty interesting idea in theory anyways. And, it would be the ultimate if there was a technique that allows it to be done. Then with some practice you could be assured that no matter what conditions you found yourself in you could get a coal and put it into some dry tinder.

My first thought is that the bow might knock the tinder off if you piled it around the spindle. Especially if you were using natural cordage and using the technique that Barry Keegan suggests to use. That is to hold the bow at a downward angle. This might knock the tinder away if it touched it. However, perhaps the technique of using the thumb to push down on the string would allow you to keep the bow on a level plain. Either that or get a fairly tall spindle. I have tried the thumb technique to press down on the string in general and I am not too successful because to use the technique you have to reverse the way you load the string. It doesn't seem to spin smoothly for me and has a tendency to make the spindle pop put. Do you use this method and do you have any suggestions to make it work for me? I find the bow much easier to control when it is wrapped the regular way and then I am able to use the bow at any angle I want with little problems.

Let me know your thoughts and ideas.

Cheers,
Eric

Eric:
Regarding the use of the bow drill to dry damp tinder: I am skeptical. The bow drill concentrates the heat over a very small area. When you are drying tinder you need to apply the heat over a large area. Solar power is ideal, but lacking sunshine, I still recommend body heat and patience.

Hope this makes my opinion clearer.

Dick

Larry wrote:

I am having a lot of trouble getting coal, I can get loads of smoke but nothing else is there any advice you can give me? HELP!!!!!!!!

Hello Larry;
Since you're getting smoke, that's a good start. Here's some trouble shooting comments on fire making. Whenever you get a lot of smoke and no lighted ember, it may be because the char dust that you're generating is burning before your char can accumulate in the notch. Is your char dust accumulating around the sides of the hole? Is the dust black and not brown? If it is black, then the char dust is burning before it can accumulate in the notch, thus creating a lot of smoke. It needs to filter down into the notch as unburnt, brown char. Check the size of your notch. If it is too narrow, then the char dust cannot filter down to the notch. Try widening the notch. Experiment on the size until you get the needed dust to accumulate in the notch. Also check the grit of the char dust. It should be as fine as flour. If it's too gritty, then you'll have problems igniting the char.

One more suggestion, go slowly at first to warm up the hearthboard. Then gradually apply more downward pressure to create friction and also slowly increase your speed. The downward pressure should start grinding the spindle and hearth board together, thus creating the needed char dust. When you start to see the char dust accumulate in the notch, increase the rotational speed, until the char dust ignites.

Good luck on your pyro endeavors,
Dino

Norm Kidder,
I appreciate the article on primitive cooking. I need all the tips I can get. Could you tell me what tools would be historically correct for maintaining a fire; helping it to catch or burn hotter is what I mean. I fan the coals or blow on them but I'd like a method that doesn't blow so much ash in my face! Actually, I'd like to use a pipe or something to blow through but since some of my camping is done at primitive rendezvous I'm not supposed to slip out of "time period."

Rosemary Meling

Rosemay, blow tubes go back at least to ancient Egypt. I take cane or bamboo that includes three sections, and burn or punch out the two nodes to make a tube, then blow from a safe distance, or use a basket to fan it. Once started, it's a matter of keeping the fuel at the right distance apart to maintain heat.

Good luck, Norm

(Question pertaining to wood materials for fire making in Ohio)

Chris, thanks for the kind words on the website. Being in California, I'm not very familiar with the woods available in your area. If they are the same as in Ohio where I went to college, then you might check out buckeye, elderberry, basewood and cedar. Another approach would be to contact someone in your area. I'd suggest logging on to Tom Elpel's site - www.hollowtop.com - where he has a listing of wilderness/primitive ways schools listed by state/province. Contact the school nearest you for local info.

Also, are you interested in bow drill or hand drill fires? I do sell fire kits, mostly hand drill, but could put something together if you need a bow drill. Check out the article on the Egyptian bow drill that Dick Baugh put into our website. It makes the bow drill even more effective.

Good luck, Norm

Dear Dick,
I have read with interest how the aborigines used a fire piston. I would like to make a simple one but have no idea how to get started. Have you ever made one?

Not successfully. A friend made one with brass tubing, O rings, etc. He lubricated it with WD40. It deisel'ed and tossed the piston across the room! On my computer at work I found a web site devoted to fire pistons. I'll try to remember to send the address to you.

I'll keep checking back.

Will you ever put the instructions to make one on the net?

Thanks,
Marcia

My attitude is that our web site should concentrate on topics that aren't covered elsewhere. Consequently I don't think we will do fire pistons unless we get pretty good at it.

Dick

(Question pertaining to fire pistons)

For Fire pistons check out:

http://www.geocities.com/ResearchTriangle/System/5102

In addition to Sotol, cottonwood, and Sagebrush, what woods would you recommend using for fire plow?

Jeff Stauffer

Jeff, I've only tried the plow with sotol, buckeye, blue elderberry and cottonwood, with sotol being the best. Another possibility that I haven't tried, but has potential would be willow root - if you can find a piece straight and big enough. Roots in general seem to be spongier and softer than

branches.

Good luck, Norm

Hello Mr. Baugh,
I'm a student at UCONN and I have a primtech calss this semester. I love the class. For my project, I am making fire.. I have got the bow drill made, I can get the stick spinning real well.. I get a lot of smoke . . . the char won't ignite . . . I've read what you wrote in Wescott's book.. and on the website http://www.primitiveways.com . . . It's very interesting and informative. I think my problem is that I'm using the wrong woods? But I want to use local woods I find around here . . . I am using an oak spindle and have tried very dry pine and local hemlock . . . the Char is too gritty I think . . . Is there another softwood I should try in this local area? Do you know where I could find out what the natives of this area used? In New England . . .Central CT?

Thanks, best regards,
Dan

Hello Dan,
I agree with you in that I don't think oak and pine or hemlock are the best choice of materials. My knowledge of New England flora isn't that great but I won't let that stop me. Can you find basswood, cottonwood, willow or cedar where you live? Generally I seem to have the most success with a spindle which is slightly harder and more dense than the hearthboard.

What did the indegenous people of Connecticut use? I don't know but I'm sure your univesity library has an anthropology/archaeology section. There is a web site, "NativeWay", I believe, which is devoted to crafts of the Native Americans of New England. Try www.nativetech.org. This is a Native American site from New England.

Best wishes,
Dick

Mr. Labiste,
I extend my thanks and amazement at the incredible job you and the other contributors to PrimitiveWays.com have done.

I have always been interested in fire by friction, and toyed with it when I was younger. As I grew

(like most boys) my mind turned to other things and I never succeeded in creating that fire or really even understanding the elusive ember. It wasn't until I saw the Survivor episode where NO ONE, not even the people who had looked it up, could start a fire. With that small spark (pun intended) I began to pursue my renewed interest in fire by friction.

My first stop was the local library for a copy the Scouting Handbook. I could find no other sources (at the time) for how to create and use a bow drill. Unfortunately, the Handbook does not go into nearly enough detail to be even remotely useful. After fiddling around with no success other than smoke (which greatly impressed my wife, but didn't satisfy my requirement for flame), I began looking for other sources that had more technical information. That was when I found PrimitiveWays. I cannot begin to tell you how fantastic and informative your site is, and my only regret it that you are on the opposite side of the country. Which brings us to the crux of the issue. I understand the concepts of the bow drill . . . spindle 3/8 to 1/2 inch slightly harder than the hearth board, notch to catch the char, char should be consistency of flour, don't press too hard at first, build char, then rapid motion to ignite the char. (Since I have yet to create the ember, I haven't even begun thinking about catching it to a tinder bundle . . . one problem at a time).

I am having trouble with materials. I live in Virginia and have not found any specific woods that work well (yet).

If you have plants like cottonwood, pau pau, black (or honey) locust, basswood, or willow in Virginia, try using the root for a hearthboard.

I know that some of this will come with the improvement of my woodcraft, but was hoping that someone had some knowledge of my area and an idea of which plants made good combinations forspindle and hearth. And do I strip off the bark or leave it on?

Yes, strip off the bark for your spindle. It's not necessary to strip off the bark for the hearthboard, but I would recommend taking the bark off.

And how thick should my hearthboard be?

A good thickness would be 1/2 inches. The thinner your hearthboard, the faster you'll bore a hole into the board. With a thin hearthboard, you'll be able to get a few embers from that hole. On the otherside of the coin, a thick hearthboard means you should be able to get more use out of a thicker hearthboard. The disadvantages of a thick heartboard are the spindle may bind in a thick hole and you'll have to carve out a lot of wood to create your notch.

And how would I make it that flat and smooth? (I have read the section on the two stick hearthboard, and played with that, but have not quite been able to get it to work either . . . I believe that my sticks aren't straight enough).

All you need is one flat side to your hearthboard, so it'll lay flat and stable on the ground. If you take a branch or root, you can split a flat surface by using a wedge made out of wood, antler or bone. Use a rock for the hammerstone. If your hearthboard branch or root is still uneven, just abrade the flat side of the split against an abrasive flat stone. Grind or abrade the wood until you get a flat surface.

I think that my hearthboard is the biggest problem right now as I haven't been able to consistently catch my char or keep it insulated enough to ignite. Part of the issue is that I don't want to go down to the lumber yard and buy a nice straight, flat piece of wood. I know the primitives had to have some simple way to make that piece of wood functional. How?

Again, thank you for the wonderful job you all have done in keeping this part of our common heritage alive.

Sincerely,
Russell Welfare

Russell;
Thank you for visiting our website.

Sincerely,
Dino Labiste

Dear Norm,
I just wanted to say that was a great essay you wrote. I agree with you on all aspects that were in your essay.

Well, any ways, just wanted to say a little about myself. Hi, I'm Nick and I'm fourteen years old and I just started to get inerested in the old ways and I wanted to ask one question, I have been wanting to try to make fire by friction using a bow and drill set but I am not sure of what materails to use, by the way I live in Northern IL. I hope you can help me or give some idea.

And here are a couple of things I want to share with you. You might allready know this stuff, but if you don't you might learn something. I have come up with a way to make fast and easy silverware for camp uses. You probably know how to make a fork out of a forked branch and you might know how to make a good spoon by taking a clam shell about three inches long and then taking a green hard wood stick split it then put it aside next take the shell and wash it out good with soap or you could use horse chestnut leaves crushed in warm water or better yet soap wart if you can find it any ways then you should cut two noches in the shell on both sides to about the width of the stick. Then wedge the shell into the stick and for extra security take siewn or thin string or cordage and wrap it around the stick and into the noches in the shell this is kinda hard to understand but I think you can get it. Also you can make a nice butter knife out of a clam shell . Find a shell that is long and almost flat at the lip after that take one of the halves and take a rock or a stick and begin to pound on one of the shells lines that form a ring if you are carfull it will crack along this ring and then you should break off the two ends where it wraps around the shell so you have a strait piece make this your blade by having it about four inches long and one inch wide then secure it to a stick the saame way as a the spoon I would be so happy if I could teach you some thing and if it is knew maby you could put it on the web,

Thanks for your Time
Nick GGGonverg@aol.com

Nick, thanks for the e-mail, it's exciting to know that people all over the world are connecting with our primitiveways.com website.

We are located in the San Francisco Bay area of California, so we're not very familiar with the plants available in Illinois for fire making. About thirty years ago I was a naturalist in Ohio, but it was before I was into fire (just edibles then). If you have blue elderberry, that works here in the west. I've made bow drill sets out of it. Cedars work, but not pines, Cottonwood works if you have any of that. Buckeye is another you might have. We use a lot of weed stems (like burdock) and shrub branches of types I don't think grow in your area. If none of these work for you, you might check another website - www.hollowtop.com where there is a list of primitive skills schools by state. You might me able to get some info from one of them.

Keep learning. I wish there were places to learn the old ways when I was your age. I had only the Boy Scouts.
Norm

Hi Norm,
Doesn't cooking directly on the coals as you suggest cause carcinogenic materials from the coals to

get on or in the food? Or am I thinking of something else like when you cook over a BBQ? If this is the case, then why is cooking over a BBQ carcinognic causing and over coals not?

Thanks and cheers,
Eric Waymann

Greetings. You're probably right about grilled food containing some carcinogenic material. I don't know of any differences between cooking on the coals and barbequing as far as this is concerned. If you are cooking fish or chicken with the skin still on, the carcinogins should stay on the skin. With steak you just have to take you're chances. If you sear the outside by cooking on the coals, then the inside steams in its own juices. If you are worried about the possible carcinogens, you can cut off the charred outer layer. If you are really worried about carcinogens, and health issues, you should probably avoid store bought red meat altogether and stick to deep water fish for your protein. Stone age folks had so few carcinogens in their environment that those in their food were probably not a problem, unfortunately we don't get to go back to stone-age conditions when we practice primitive skills, but it's still probably more healthy to eat grilled steak out in the woods than to eat healthier food in the city. (The healthiest way to cook most foods is to steam bake them in a pit oven, but is more work and firewood).

Keep thinking,
Norm

(Question pertaining to fire making classes)

Sam, first, as to tracking, I believe there is still a tracking club operating out of San Jose area, Sean Clemenza is the contact. The last e-mail address I have for him is clemenza@us.ibm.com. If that doesn't work, let me know and I'll ask around for a new one. As to firemaking classes, I'm doing a half day class July 28 at Coyote Hills Regional Park in Fremont. To sign up, Call (510)636-1684 and tell them you want to register for course #635, Fire by Friction. It costs $12. You'll end up with a set of sticks for a hand drill fire. The other opportunities to learn firemaking are the Rattlesnake Rendezvous in May (Memorial Day Weekend - Fri - Sun - $80) and at the Knap-in in October (first weekend at Coyote Hills in Fremont). Check the www.primitiveways.com website.

Hope to see you soon,
Norm

Dick,
Hi, Eric Waymann. We talked sometime ago about various aspects of fire by friction. Can you tell me what the hand socket is made from that is shown in the pictures of the egyptian bow drill set?

Cheers, Eric

It is an astragalus bone from a cow (dead). This is located in the heel. A deer astagalus is little and cute. One of the chief merits of this bone is it has a natural hollow which is perfect for a bow drill socket.

Dick

Message text written by Andrew DiFiore Jr.:

Dick, I'm doing research for a story that takes place during an Ice Age. If wood is scarce, how would one start a fire?

One method is to knock sparks from a piece of iron pyrite using a flint striker. One uses birch conk fungus whick has been toasted to catch the feeble spark. The glowing birch conk is place in a tinder bundle and you blow until it bursts into flame. Hopefully you have an oil lamp (Koodlik if you are Inuit).

How did the early Inuit start fires?

Bow drill and toggle drill were used. I have also heard that they used a piece of ivory (Australian Aborigines used a piece of bone) with a cylindrical hole stuffed with moss? instead of a wooden hearth board. I have tried that with a bow drill with no success.

I realize they used seal fat for fuel but how did they get it started?

See above.

Thanks in advance for your help.

Mr. Baugh,

For what it's worth, I achieved success and created fire by friction yesterday. And it is sort of magical ... a moment I got to enjoy right after I stopped huffing and puffing. Even had a beer to mark the occassion! And I wanted to make sure I passed along my thanks for the tips you've given me. I might have gotten there on my own, then again I don't know if I'll be alive that long.

Here's some of the things I learned:
First, having a mechanical advantage. Wether you'd call it a machine or a tool, it goes a long way toward making stumbling efforts bearable. I think it might be a good tool to use in a training class situation. Sure reduces the muscle power you need. The 'tool' I rigged up is nothing more than a big nut cracker made out of 2 x4s. There's a base, two uprights nailed in
opposite one another on one end, and a pivot arm connected to the uprights that serves as the upper socket (on mine I nailed on an aluminum block to minimize energy losses). The different hearthboards get tacked to the base board. You can go through lots of spindels, hearthboards, drill diameters, hole depths, and notch configurations in pretty short order. From what I knew about making fire a week ago, no way could I have actually done it without this kind of mechanical assistence.

And it's not just for garage practice either. I've got configurations in mind that could be gined up using naturally occuring limbs. Once I get my char twirling technique down pat, that's where I work next: coming up with a working fixture made of natural components.

Technique is the key. The 30 second warmup you mentioned is what, for me, made all the difference. By applying light pressure early, and heavy pressure only near the end, I've been able to grind out coals using three different spindel woods, including maple (using cedar as a hearthboard). Next parameter was to keep the working point of the spindel to about 3/8 of an inch in diameter. Funny too. When you get it right, the spindel tip takes on a remarkably consistent shape; almost flat, with burn marks on the outside and the inner core almost unchanged (if yet ground flat).

You might make mention, next time you write about F-by-F, that you have time once the coal is created (and it does take off by itself! From smoke to a glow ... as if you've awakened a sleeping spirit in the wood). The coal can sit there and cook for a very long time. Knowing that took a lot of pressure off trying to get everything timed just right. Precise timing isn't a problem, and isn't necessary.

I didn't want to tell you everything.

What is, is tinder preparation. I've reached ignition far more than I've been able to create actual fire (6 to 1 at the moment). Going from a tiny glow to flames is a very artsy crafty kind of task. Lots more difficult than I imagined. Lesson learned there: gather up as much of the char produced earlier and dope the cattail down beforehand. Even then, making that spark bloom is not a sure thing.

Yes. The tinder that you drop the glowing ember onto should be very fine.

So..., thanks again. I don't know how it is with other folks, but for me knowing how something works technically lets me attack the problem from a variety of angles. Your write ups helped, and got me to open the right doors. I've got a long long ways to go, of course, but the top of the fire-by-friction mountain doesn't look so imposing anymore, thanks to you. And now, if I ever find myself stranded in the middle of nowhere without matches, I can smile [maybe] and get to work instead of going into a panic. The fire is out there, just waiting to be coaxed into being.

Best regards,
Dave Boyle

Dick,
Have you ever thought that you'd end up looking like a blacksmith after a while, with one arm lots bigger than the other? It's jobs like this that make me wish I was ambidextrous!

Trouble is, I'm doing something very wrong. I get lots of smoke...but glowing embers? Not a one. I think it has something to do with the fact that the char I'm grinding out is brown, not black. I figure it's a pressure problem, though I'm not certain of whether it's too little or too much. Any thoughts / suggestions?

Sounds like too much pressure. I get the best success when I twirl with light pressure for 30 seconds at least, until there is medium smoke and then I go as fast as I can.

And trying to feel out which wood to use! Wow ... this rubbing two sticks together to make fire stuff is hard. I've made a bit of a mechanical advantage, and now I can get smoke in under 15 seconds. It's cheating, yeah, and far from what I could do in the 'real' world, but what the heck?

That's what experimentation is all about, yes?

Yes. You aren't an expert until you have failed 500 times.

Another thought: Wood which you gather from the beach will be loaded with sodium chloride

(table salt). Sodium ions are pretty good fire retardant. Any beach wood shold be rinsed to remove salt.

I thought I had this all figured out, though after this weekend, I'm not so sure. What I've gathered from what you said earlier and on the website: a) the pressure plate (on top) is supposed to be the hardest material (I've got an aluminum block at the moment - told I was cheating), b) the spindle a little less hard, and c) the hearth board the softest of the three. That right or wrong? And if there aren't a lot of different types available, which way is better to err?

Many people will use a spindle and hearth board made from the same material.

Initially I ended up smoking the pressure plate AND the hearth board, for whatever that says.

It says get a better pressure plate (Most of us call it a socket.). Try soap stone, a knot from a dead and down douglas fir tree, an astragalus bone ffrom a cow or deer, mountain mahogony, pismo clam shell. Lubricate it with ear wax, sebum, animal fat, oil from California bay nuts, live oak acorns... The lists are endless. If the socket is smoking then there is too much friction on it.

And I can build up a serious pile of char - all of which is brown. I even once had a piece of balsa (hearthboard) and a piece of plywood (pressure plate)(which I though was very hard), and I ended up smoking the plywood before the balsa ever got dark! Grrrrr. How can that be? I'm positive the balsa is softer than the plywood. I'm thinking there's something special about the spindel, only I haven't figured out what yet.

I did some practice and for the first time ever got a fire started by using a lit cigarette. Gads ... even that was hard to do! And whatever do you use if you don't happen to have cattail fuzz to work with?

The ember can be extended with crushed dry mugwort leaves, powdered dry rotten wood, fungus from trees,...

Whoever the Neanderthal was who figured this all out was either pretty smart or really really determined (I think he had a sweetie on the line, but she wouldn't come to the cave until he warmed the place up). My cave is already pretty warm, but I'm still determined. Funny huh? Trying to find out about making fire on a computer.

Anyhow, if you see something here that's off base, or can give me hints on how to pick sticks, I'd appreciate it. Doesn't take much looking to see I'm in serious need of help!

What is our spindle made from and what diameter?

Thanks again,
Dave Boyle

David,
Regarding balsa wood and other very soft hearthboard materials**:** Don't apply too much pressure. You will wear away the wood before it gets hot enough.

Dick

Dick,
Thanks for the information. As soon as all the snow around here goes away, I'm gonna set up in my back yard and see what I can do with it. I'm really surprised abot a good spindle having a pith core. I might actually have used that as rejection criteria! Goes to show I know nothing - yet - about the subject.

I will follow up on one thing you mentioned. When I used the power drill for experimenting, I got smoke early on, and even hit just the right combination once to make a nice little pile of char that I got to the glowing stage (tissue paper, unfortunately, does not make for a good char-based fire starter). But thereafter, I got absolutely nothing. I was using balsa as a hearth board, real soft and real dry, but after getting that char all I did was drill through my board. Below you mentioned that someone got better results if they reversed the drill direction. Which makes sense now that you mention it. My spindle was burnished. And not that I think about it, all the outer layers had to be smoothed in one direction. Like a fine toothed file used only one way, the teeth simply got dull. With a real bow/drill, the teeth get used equally on both sides.

Too bad, too. Looks like using a power drill will just have to take a back seat to the the old fashion way!

Thanks again. And I most likely will have more questions ... after my next round of experiments.

Dave Boyle

Hi Dick,
I am enjoying your Fire by Friction information a lot. Starting afire that way is something I have always wanted to do. After seeing the bogus "fire by friction" that was done by Tom Hanks in the movie, Castaway, I resolved that I was going get off my duff and finally do it...

The screen writer for "Castaway" went to Baja with the former owner of the Boulder Outdoor Survival School, their chief guide and the president of SPT to learn survival skill. They introduced him to the fire plow. I cannot think of 3 better qualified people to learn from.

I am trying to do this with materials I obtain myself within walking distance of my home on the central coast of California. I live in Oceano, about a mile from the beach. I have been collecting materials for a couple of months and I think I have the right stuff. I'd like to use incense cedar for the hearthboard, but will only use it if it floats up on the beach which is highly unlikely. I do know where there is some Mule Fat a few miles inland, and will get some of that in the next day or so. Right now I have some some elderberry and cattail spikes that I have cut for spindles and have been drying them in the sun for the last five weeks. I found some nice redwood on the beach after the last series of storms and have been drying that too. I found a nice piece of soapstone that I have worked a socket into and it serves quite nicely for a bearing block. I'm using no steel and am cutting the spindles, etc. only with stone tools I have made myself, mostly out of chert.

My first attempt (a few days ago) was the "hand method" using the redwood hearthboard and a 1/2" elderberry spindle, with my wife holding the bearing block. I got a lot of smoke the very first time and that was exciting, but after that I could only get a light glaze and charring on the hearthboard and no smoke, even after dressing the hole in the hearthboard and cleaning the tip of the spindle. Do you have to make a new hole in the hearthboard every time?

The important thing here is that you don't want any friction on the sides of the spindle. 99% of the friction should be on the bottom of the spindle. If the old hole gets too deep you can either start a new hole, ream out the old hole(make it wider) or twirl off from verticle in order to open up the hole.

Can you keep using the same spindle?

Eldeberry spindles have a pith core. The bottom part of an ederberry shoot will be about 1/2 wood and 1/2 pith. That's good. As you wear away about 5 inches of the spindle you will come to a region where where the wood is only 30% and the pith core is 70%. That seems to be marginal.

Any ideas as to why I was so (partially at least) successful the first time and then no luck afterwards, even though I was using the same materials?

Don't give up. Try a willow root hearthboard.

Any information will be appreciated...
Thank you,
Norm Hammond

Hi again! While stressing about this project and trying to decide how I can tie in physics, I started to wonder if you, by any chance, might know the coefficient of friction AKA mu of wood against wood. That is vital information if I want to figure out any formulas which would realte physics in this experiment. I know that this project is all physics but I just don't know how to incorporate it in my paper. Any ideas would, once again be greatly appreciated.

Thanks again,
Allison McDonnell

Hi Allison,
You and I think about things the same way. I'm the analytical type too. Here's my take on the problem: There are two situations. #1 is the use of a human powered drill and #2 is the use of some external power like an electric drill.

With a human powered drill you don't care what the coefficient of friction is. Your physical effort, expressed in watts, watt hours, calories or whatever is all dissapated as friction between the spindle and hearthboard. That power dissapation causes the wood to get hot and wear away. In the beginning the friction coefficient is not so high so you push down hard. If the friction coefficient is high then you push down with less force. You automatically put more or less the same "horsepower" into the effort by adjusting the downward pressure.

With an electric drill you are probably going at constant revolutions/minute so the power dissapation will depend on the coefficient of friction. My experience with an electric drill tells me that when you begin the friction coefficient is very small between uncharred hearthboard and uncharred spindle so you push down harde. As things heat up and the wood starts to char then the friction coefficient increases and you use
less pressure.

The 1954-55 edition of the Chemical Rubber Company Handbook tells me the
friction coefficient of dry wood on dry wood is .25 to .50.

Best wishes,
Dick

Hello,

I'm doing research on a novel I'm writing that takes place in Rockingham, N.H. in 1669. While I am reasonably sure that they had kerosene lamps in those days. I am not sure how they lit their fires since matches were not invented yet. I wonder about flint and steel, but it's hard to imagine a houswife in 1669 lighting a stove that way. I've been searching through the Google search engine and can't seem to find a reference to this information. Can you help, or direct me to where I might find answers for this time frame?

Thank you.
Teri Brown

Hello Teri;
Unfortunately, I don't have an exact answer to your question. I believe fires for cooking, during the 17th century, were started with the flint and steel method using tinder to start the fire. The use of matches came about during the early 19th century.

When doing your internet search, try using quote marks to isolate your search more. Also use + signs to include other reference guides. For example, you can type in this information in the search boxes:

"flint and steel" + cooking + "17th century"

Good luck on your cyberspace investigation.

Sincerely,
Dino Labiste

Mr. Baugh,
I was actually already thinking of using the power drill instead of my own arms. Today we bought the spindles in oak, walnut, cherry, and mahogany.

Whoa! I should have told you to use something like cedar, poplar or bass wood. The ones you mentioned are probably on the hard side.

They are .5" in diameter and about 2.5' long. They fit into the drill and we made our floorboard out of oak (I would call it the hearthboard.).

See above comment.

We also drilled an indentation into it, which to my understanding, allows for the presence of air?

The notch should penetrate 1/2 way to the center of the hole. It's purpose is to collect the fine charred wood that is rubbed off from the hearthboard and spindle.

As we started drilling, smoke appeared almost immediately and a black, flaky material appeared as well.

A simple test is to pick up the "black, flaky material" and rub it between your thumb and forefinger. In order to ignite it must be fine and powdery like flour. If it is coarse and gritty then the woods aren't correct.

Sparks weren't created and nothing else happened. I don't really know what I'm supposed to do next and or what I'm doing wrong. Some help as soon as possible would be greatly appreciated because as you can tell, I'm clueless.

Thanking you in advance,
Allison McDonnell

Hello Allison,
Don't give up! I first tried this with my Dad when I was eight years old. We failed because we had the wrong woods. I succeeded 25 years later. I tell students they won't become experts with fire by friction until they have failed 500 times.

Regards,
Dick

Hello my name is wilbur and I am interested in this two stick hearth board. I have tried a few different kinds of wood.My question is what kind of wood would you recomend using to do this?

It all depends on what's available where you live. For the article on the web site I used mule fat (Baccharus salicifolia) for the two stick hearthboard and the spindle. It is a common shrub which grows in stream beds which dry out in the summer in the western states. Another candidate would

be cottonwood, both wood and root for the hearthboard and cottonwood wood for the spindle.

Another question is is it ok to use the same kind of wood for the drill?

Yes, although I frequently use a slightly harder material for the spindle.

I am trying to get this together for the reason of teaching my son this on one of our family outings.Well if you wouldn't mind sharing your little secrets then I would be greatful if you could answer these questions.Also if you wanted you could send me anything of this sort to me weather it be your own or something you learned someplace else.Thank you very much and I am sure my son would thank you also.I hope to hear from you soon.

Wilbur

Dear Mr. Baugh,
My name is Richard McCollum. I found your site whilest searching for ways to start a fire without a lighter. I read your bio at http://www.primitiveways.com and it said that you know a little about starting a fire-by-friction.

Please sir, would you tell me the secret to making fire with no modern tools? I have 4 little ones that I would like to teach some basic life skills to. Making a fire is the first step in cooking a rabbit. (do you know how to snare a rabbit?)

I will repay you by sending you pictures of our fire making experience.

Sincerely,
Richard McCollum
(Owner) GreatNorthern.net

You don't want much do you? With no modern tools I would use either a hand drill or an Aboriginal fire saw. The materials must be chosed carefully for dryness and low thermal conductivity. If you have the muscle power then a fire plow will work.

For rabbit snares, read "Outdoor Survival Skills" by Larry Dean Olsen.

Best of luck,
Dick

Mr. Baugh,
I appreciated your website. As a junior in a high school physics class, I am entering a model where I create a friction fire, into the science fair. Do you have any more information or websites that you could send me?

Thanking you in advance,
Allison McDonnell

Hello Allison,
Just do a web search on "fire by friction". There is plenty out there. Another suggestin is instead of using your muscle power, use a power drill..

I hope this helps. Feel free to ask more questions.

Dick

Mr. Baugh,
I have, through my wife's diligent searching, just discovered 'primitiveways.com'. I have had a burning desire (please excuse the pun) to know how to start fires 'the old fashion' way for a very long time. I am, therefore, in your debt for the information you have presented. I was about to put together a rather extensive design of experiments, and you have reduced that effort considerably.

Even so, I find I have many questions. Some materials related, some process.

I gather that the hearth board needs to be a soft wood (like cedar), and very dry. But what about the drill? Where should it fall in the soft to hard categories? I am presuming it needs to be at least relatively strong - and thus hard - to withstand the pressures to be applied. Would oak make a good drill? Or maple? Both are readily available in my neck of the woods.

Where on the curve does drill diameter fall? Smaller leads to higher revolutions per second and high per square inch contact pressures. Increasing diameters would seem to decrease both, which in turn would tend to be counterproductive. Maybe a tapered shaft, small on top to increase revs, and larger on the bottom to increase edge velocity and, I presume, friction (After having always tried to reduce friction forces, it's a bit of a twist trying to figure out how to increase it).

These issues, in turn, lead directly to questions of hole/drill shape and depth. Is a slender point best, or one that is blunt? Intuitively, I would guess the latter. And how far into the hole is the notch to be cut? And what exactly is the notch intended to do? Is it the accumulator for the char? Or an overflow valve where the char drizzles onto the kindling and is later ignited at the top like a fuse?

The catch for the char seems to be the most critical aspect of the whole endeavor. Cattail fluff is a forehead slapper - "Of course!" Except that cattails don't always grow where you need them, nor do kangaroos leave their calling cards in any of the woods I frequent. But dried deer pellets? And how about bits of clothing (which, as a survivor, I should still have on). I'm thinking of cotton socks, and maybe even navel lint. Dry grass sounds nice, too, though maybe a bit too dispersed to catch a tiny volume of char.

I'm going to be doing some experimentation (and I'm going to cheat and use my power drill before I go to the hand drill - which of course our ancestors didn't have. Then again, they didn't have to put up with traffic in the morning, either), but any help you could give me with the above parameters would be greatly appreciated.

Lastly, I think the idea of a primitive ways site is a great idea. I have to shake my head sometimes when I think of all the knowledge that's been so painstakingly acquired . . . and then lost. Sites like yours might help spark the quest to keep that knowledge alive. I'm going to keep an eye open and see where you folks get together. I think I might just sit in, a time or two. And in the meantime, keep up the good work.

Dave Boyle

Hello David,
Thanks for the interesting letter. You ask a lot of the right questions. I'll try to answer them.

The drill/spindle: I have the best results with drills of a slightly harder composition than the hearth board. Another thing that helps is a spindle with a pith core (elderberry, Sambuca nigrans) which is about 1/2 to 1/3 the outer diameter. Oak would not be my first choice. Maple might work well. I've never tried it.

Drill diameter: For a hand drill, I use something about 3/8 inch. I have about 98 to102% of the muscle power needed to do a hand drill fire so all the parts have to be well tuned. For bow drills I have one with a 1/4 inch spindle (see the Bow Drill Challenge on our web site). That's not the most reliable. 1/2 inch seems to work most easily for me. Some of the stronger, younger people use 1 inch diameter. That spreads the effort out over a larger area so you need more horse power. At the Winter Count someone demonstrated a toggle drill made from 5 inch diameter cottonwood. It was

twirled by two men on opposite sides of a rope. At the Winter Count, I also saw an Egyptian style bow drill wherein the cord was long enough that it was tied securely to the center of the spindle and then wrapped around multiple times. Consequently the cord NEVER slips. Very clever those Egyptians. The spindle wants to be blunt on the bottom.

The notch: Half way to the center of the hole works well. It collects the char as it is rubbed off. I like to put a little piece of dry bark under the notch to chatch the char. I have seen un-enlightened but otherwise very intelligent people catch the glowing char on the blade of their knife. I guess that individual, whom I respect highly didn't know about martensite and the iron-carbon phase diagram.

Tinder and ember extenders: Any fine, dry plant material will work. Use your imagination. When I teach fire by friction I show the students a plastic box with 18 compartments, each with a different tinder material.

Power drill: At the Rabbit Stick Rendezvous someone demonstrated frictin fire with a battery powered drill. He seemed to have better success when he periodically reversed direction. I don't know why.

PrimitiveWays: We live on the San Francisco Peninsula. Our Rattlesnake Rendezvous is Memorial Day weekend. If you can't make that then, come to the Winter Count or Rabbit Stick. If you can't do that then at least join the Society for Primitive Technology (phone 208 359-2400)

Feel free to ask more questions.

Dick

Hi Norm;
My name is Mark Morris and I live in Jupiter, Florida. I found your piece on friction by fire and of course had to try it myself. So far to date, lots of smoke, no ember. I have tried different types of woods without success. I would really appreciate it if you could send me some wood to make the various components,. Of course I would be willing to compensate you for your time and trouble.

Yours sincerely
Mark P. Morris

Mark, greetings. Friction fire is often frustrating. It took me two months to get my first fire, and two years to get reliable at it (that is with the hand drill). The wood is quite critical to success,

along with good technique and callouses. I don't know what you've already tried, but alot of easterners swear by burdock stems for the drill. Cedar roof shingles (heavy duty) work well for the hearth board. Having the notch correctly done is also important. If you have sawdust coming up the hole and making a circle around the drill, you need to make the notch a little bigger. Go for speed first, then apply more downward pressure, and be sure to spit on (or otherwise dampen) your hands first. I'm assuming you're working on a hand drill, rather than the bow drill method. If you still need a set, they cost $12 plus shipping ($5) for a set that I know works.

Let me know,
Norm

Hi Dick
My name is Mark Morris and I live in Jupiter Florida. I found your piece on friction by fire and of course had to try myself. So far to date lots of smoke no ember. I have tried different types of woods without success. I would really appreciate it if you could send me some wood to make the various components, of course I would be willing to compensate you for your time and trouble. My email is either mmorris.jupiter@worldnet.att.net or mmorris@oscs.varian.com .

Yours sincerely
Mark P Morris

Hello Mark,
Before I send you anything (which I'd rather not do), I'll ask around and find out what materials from your neck of the woods works.

Dick

Hello,
My name is Riley. I am having trouble trying to start a fire by friction. I have to do it for a science prodject. My friend and I have tried everything we know. We know how to get one started but we can't. We need some hints. We cut a notch in the wood where we spin the stick and put some cedar bark in it. We are using cottonwood. That is the kind that the boyscouts hand book said to use. We are from Texas so we do not have many types of wood to use. If you would write back and tell us some pointers it would help a lot. Thank you.

From: Riley Abbott

Hello Riley,
Cottonwood is a good choice for wood. Make sure it is perfectly dry and not rotten. Often I gather green cottonwood and dry it in my wife's oven. I prefer a spindle that is about 1/2 inch diameter for a bow drill. Use a top socket made from something hard (bone, antler, soapstone, very hard wood) and grease it to reduce friction. Use a heavy nylon cord on the bow. Adjust the cord tension with your thumb so it NEVER slips. The notch should go half way to the center of the hole in the hearth board. Start out by twirling slowly and steadily so you get just a thin wisp of smoke. After you have a thin wisp of smoke for about a minute then go hard and fast. Concentrate more on fast than high pressure.

I hope this helps. Feel free to ask more questions.

Dick

I'm having problems with the bow method. I'm not getting the char dust to ignite. I'm using eastern cedar for the spindle and hearth board. It only wants to smoke that is all. I even put the spindle in a electric hand drill and still no success. I don't know if it is the wood or what. What wood would be best. I live on the east coast, and I can't find the wood that you use.

Nate

Hi Nate;
Since you're getting smoke, that's a good sign. The eastern cedar that you're using may work. Here's some trouble shooting comments on fire making. Whenever you get a lot of smoke and no lighted ember, it may be because the ember that you're generating is burning before your char can accumulate in the notch. Is your char dust accumulating around the sides of the hole? Is the dust black and not brown? If it is black, then it is burning, thus creating a lot of smoke. It needs to accumulate in the notch. Check the size of your notch. If it is too narrow, then the needed dust cannot filter down to the notch. Try widening the notch. Experiment on the size until the char dust accumulates in the notch. Also check the grit of the char dust. It should be as fine as flour. If it's too gritty, then you'll have problems igniting the char. One more suggestion, go slowly at first to warm up the hearthboard. Then gradually apply more downward pressure to create friction and increase your speed with the bow. The downward pressure should start grinding the spindle and

hearth board together, thus creating the needed char dust.

Good luck on your pyro efforts,
Dino

Hi Dick,
I just read your article on making fire by friction with damp materials. It sure makes a lot of sense to take it easy with the spindle pressure until the wood dries out. I've never tried it as my experience goes back to Boy Scout days when the object was to make fire first in order to win from the competition. So I always kept my spindle, hearth and tinder near as warm a source as possible and kept my fingers (oil) away from the working areas.

I was never a very good Boy Scout. Also, I have never been interested in seeing how fast I could get a fire started. My attitude has always been "I enjoy doing this. Why should I be in a hurry in doing something I love doing." But I digress again, I just wanted to comment on drying out the damp tinder method wrapped in a bandana and placed next to the abdomen. When the only book of matches I had got too wet to ignite, In desperation, I had no choice but to place the match book in the warmest part of my body, namely in my crotch for about 5 minutes and the matches were dry enough to ignite.

Dick

Hi Norm and Dick,
For the better part of 62 years I have deceived myself into believing I was the only person left on earth who could make fire by bow and spindle and flint and steel. Now, thanks to the computer and internet I know I am not alone in practicing this skill. Primitive Ways is a great site. Thanks for creating it.

But I must say you have been far more active and investigative whereas I have only demonstrated what I had learned as a Boy Scout and tried a few different woods but mostly have stayed with yucca as it was until recently supplied by the national supply service of the BSA.

As a boy I used ordinary pine with which to perfect my bowing and form as yucca would get used up too fast and was costly. Once or twice I succeeded in getting a "char". And as stated, no char was associated with gritty friction products.

In 1940 at New York's Madison Square Garden on the occasion of a massive Scout Show in honor of one of the founders of the BSA, Daniel Carter Beard, and one who would be proud of your organization, our Boy Scout Troop demonstrated fire by friction using a "giant" set.

It consisted of a 6 foot tall cedar spindle bowed by a turn of 1/2 inch manila and pulled by 3 Scouts on each side of the spindle. The "thunderbird" or top bearing was a paddle with two handles held by two Scouts on either side of center. For weight a young Scout sat on top of the thunderbird holding on to the shoulders of the paddle bearers who also were standing on the hearth to keep it from sliding around. I was one of the team and I can proudly say that we got char that day and made fire using shredded cedar bark. So cedar can work. It was aromatic that's all I know about it. It was also very dry as it was kept in the troop equipment locker and only used on special occaisons.

Norm in your paper "Fire by Friction" you describe other ways compression makes fire, e.g., flint and steel where the iron is torn away and the rise in temperature is enough to make the spark. Recently it was brought to my attention that a chemist had studied this reaction and came to the conclusion that the "spark" in fact was a bit of nacent iron oxidizing as it is exposed to air for the first time after being formed. I supposed much like a meteorite.

And speaking of which, Lord Avebury in his book "Prehistoric Times, As illustrated by Ancient Remains and the Manners and Customs of Modern Savages" Publisher, Williams & Norgate, London 1913, tells of Eskimos in NW Alaska making fire using two pieces of quartz. One piece is rubbed in sulfur and struck with the second piece. Other Eskimos near Hudson Bay I believe it was, struck iron pyrites with flint like we do with steel.

And speaking of which, the Bronze Age "Ice Man" found in the Alps has been described as making fire with a piece of flint but I don't remember if it was iron pyrite or magnetite which was the "anvil". My preference is to strike the steel a glancing blow with a piece of newly "napped" flint. (before I forget I just found out the origin of the term, skin-flint. Yup, it's napping an old piece of flint to get some more life out of it when used in flint lock).

But I digressed and almost forgot that recently I have been trying to find a piece of bracket fungi which when scraped like the recent Nova film on the Ice Man showed being done, can be used much like "charred" cloth to catch and nurture the spark.

I have found fungi shaped like a horses hoof which is what they showed on Nova and it came from a dead beech tree, But the scrapings just don't nurture the spark.

After trying several samples of different decay appearances I suspect that the samples which will work are those that have been "burnt" by ground fires and charred much like I prepare linen by charring in a partially sealed can.

So my next step is to char the bracket fungi and give it a try. Why not. I can just put myself in the place of a bronze age hunter who sitting by a fire noticed that a bracket fungus thrown into the fire seemed to glow long after it should have been consumed like wood burning. So he pulled it out and blew on it and it flared up. The next step was to scrape it and save the blackened flakes. He would try it in place of the belly button lint he had been using with great difficulty.

Hello VeeSook,
Thanks for the absolutely beautiful letter. If you are are still interested in the "Old Ways" run, don't walk to the nearest recruiting office and join the Society for Primitive Technology. We put out a bulletin twice a year which is a real gold mine of ideas. Call (208)359-2400.

Warmest regards,
Dick

I read your article on www.primitiveways.com entitled "miracle of fire by friction". It was very interesting. I was drawn to learn about making fire after seeing the first installment of survivor 2 after the super bowl on sunday. Neither of the two "tribes", consisting of eight people each, could make fire! The failure was particularly acute seeing as they went to bed hungry and cold. I wondered to myself - could I make fire?

It's a good challenge and I always welcome a good challenge. This is great because I can also involve my 5 year old boy in the undertaking. I will try this weekend and see what happens.

Any suggestions on finding suitable wood and technique to use. Thanks.

Regards,
Joe Simone

Hello Joe,
I am hoping that the "Survivor" program, corny as it is, will whet other peoples apetites for traditional stone age skill. It took me over twenty years to learn the skill. The first time I tried it with my dad when I was eight years old. I didn't succeed until I was about thirty. It is a thrill every time I do it. Suitable materials? It all depends. If you lived in Maine I wouldn't send you off to look for yucca. If you lived in southern Arizona I wouldn't suggest cedar. If you lived in a big city a lumber yard would be the best place to go. Cottonwood, cedar, yucca are all good candidates for

the hearthboard. I like to use a spindle which is slightly harder. Larry Dean Olsen's book "Outdoor Survival Skills", ISBN 0-8425-0002-2, is truly inspirational.

Regards,
Dick

Message text written by Patrick Swanson:

I was reading over your article on the web...nicely done, by the way...and have made some initial attempts at doing this but have failed to make fire.

I was wondering about wood substitutes. What kind of options do I have? Are there any general guidelines, like can the baseboard be any hardwood...does the baseboard need to be harder than the drill or can the be made of the same wood?

I appreciate your time.

General guideline: That which works works. I usually use spindles which are harder than the hearth board. For minimum physical effort low density materials (wood, weed stems, yucca stems) are preferred over harder, more dense materials. I have had very poor results with woods which are "punky" or slightly rotten. Look up ethnogrphic records of the Native Americans who lived where you live. Frequently these references will describe fire-by-friction methods in detail. I can't tell you what to try in your area because I don't know where you live.

Dick

Clay wrote:
I was at you site primitive ways and tried to make a fire by hand and bow drill and don't know which is easier.

Easier is a matter of what materials you are using. With the right materials, I find the hand drill easier. The reason for that is less parts to fiddle with. You'll find that most indigenous cultures

around the world use the hand drill (or a variation of rubbing two pieces of wood together, for example the fire plow that Tom Hanks used in the movie Cast Away) as oppose to the bow drill. The bow drill requires making cordage, constructing a bow and finding a baring block. Too many moving parts in a bow drill. Although, there are three advantages I can see in using a bow drill. You can apply more downward pressure on the wooden spindle, thus creating more friction. The next advantage is that you can create more rotation with the sawing of the bow. You can last longer aerobically with the bow drill. The third advantage is that you can experiment with woods that are harder and denser due to the fact you can apply more pressure and create more rotation. My suggestion is to start out with the bow drill first. A lot of survival or wilderness schools tend to use this method because it doesn't poop out their students sooner until they get the lighted char dust.

When you've mastered the bow drill, progress to the hand drill. This is where technique and the right materials are very important for success. The hand drill only requires two materials: the spindle and the hearthboard. Less moving parts. The old saying, "Simpler is better" may also translate to easier.

Dino Labiste

As an assistant scout master here in North Carolina, we have just started to get some of our newest scouts busy on their cooking merit badge, and have worked with them on fire building. We have a bow and block kit that some purchased years ago, but we haven't been successful getting it going yet.

It seems that we could improve our method if we cut a path to the outer edge of the base, as in your pictures, and allow that to ignite some tinder. Also, I think we need to round off the tip to better meet the contour of the hole.

We'll keep trying. Thank you.

Todd Heil

Hello Deirdre,
Bob Gillis sent this on to me for a response, I'm one of the Board members of the Society of Primitive Technology, an Int'l organization dedicated to preserving knowlidge from the pre-industrial ages. Your question concerning the first use of fire is hard to give a good answer. There is currently no way to be sure when our ancestors first used fire. It is likely that Australopithecines were taking advantage of naturally occurring fire for a variety of purposes. Homo habilus, aroung

2 million years ago was making stone tools, and could have been using fire as well. By 1.5 million years ago, Homo erectus was using fire for cooking and warmth, leaving identifiable hearths. As a result, they were able to leave Africa and spread out into Europe and Asia, including rather cold areas. In addition to using fire for heat and cooking, they were also using it to shape weapons and likely other uses as well. There were two spears recently found in Germany with fire hardened points that dated to Homo erectus time 0 about 700,000 years ago. From this time on fire continued to be used for an increasing number of things. Light for caves, charcoal for cave painting, smokefor preserving food and hides, burning off the land to increase the food supply and improve travel conditions, fires to scare game over cliffs, etc... At the end of the stone-age, people learned to heat certain rocks (ores) to extract copper and tin, which could be combined to form bronze. Later ovens were developed to fire pottery, malt grains for beer, and eventurally to smelt iron. The invention of gun powder in China, and later India, preceded the technology to make gun barrels, so rockets were the logical alternative. (gun powder is a mixture of finely ground charcoal, sulfur, and nitrates).

If you have time for some research in the library, try - "Becoming Human" by Ian Tattersall and "Origins Revisited" by Richard Leakey for the early stuff, and "Technology in the Ancient World" by Henry Hodges for the later stuff.

Good Luck,
Norm Kidder

Deirdre - forgot to add info on methods of making fire when I e-mailed you yesterday. Again there is no real information on this, but the assumption is that people first learned to carry fire and keep it going, depending on natural fires from lightning and volcanoes as their source. Later, they learned to make fire as aresult of accidental discovery of friction methods. The most widespread method was the hand spun fire drill. The drill stick is spun between the palms of the hands while downward pressure is applied against a flat hearthboard. A notch lets the saw dust accumulate until enough heat is present to start the burning. There is an article on Bob Gillis's website under the primitve ways section on making fire. This method was probably discovered by someone trying to drill a hole in a piece of wood. Another good website to check is abotech.com, which has many articles available on different primitive technology subjects.

Good luck,
Norm Kidder

I am a student doing a short 15 minute video that includes Primitive Peoples first use of fire. I found your website but was unable to access any of the links or information. Basically, I would like to know who was actually the very first peoples that used fire and by what method (was it flint)?

We don't know who or when but the first fires used by humans were probably started by lightening. Things like fire by friction sets are very rare in the ancient archaeological record because when they wear out people toss them in the fire to burn.

Also, if you have any information on the Greeks

Don't know anything.

and the Chinese,

In the country side they still use flint and steel to start fires. I've seen people do it this way in Nepal.

that would be very helpful. You see I go from Stone Age, to Greek, to the Chinese, to India where they used the fire for Rockets used in battle. The interesting thing is I wonder why rockets were used before the flintlock riffle??

My guess is that a gun barrel is very difficult to make because it must be very strong. In contrast, a rocket can be made out of bamboo because the internal pressure is much less.

If you have any information on this it would be greatly appreciated. This is my thesis film so time is of essence. I hope you can guide me in the right direction. I will also, in turn, list your web site address at the end of my film in case people would like more information. Thank you in advanc for your time.

My pleasure. I hope this helps. Feel free to ask more.

Dick

New E-Mail Questions	Primitive Skills and Plants	Projectiles and Tools	Miscellaneous

The PrimitiveWays™ Book

The PrimitiveWays™ CD

PrimitiveWays Home Page

E-MAIL Q U E S T I O N S

Fire Making	Primitive Skills and Plants	Projectiles and Tools	Miscellaneous

Questions & Answers

New E-mail Questions

Dear Sir;
I am a primary school teacher, who is trying desperately to find a supplier for withes. If you know of anyone or of an establishment that supplies withes for sculpture work in school, I would be most grateful.

Thanks again
Becky Cowell
Teacher

Hello Becky;
Contact Margaret Mathewson at e-mail: margaret@peak.org
She sells willow withes that might fit your needs. Just tell her what you are looking for. Margaret Mathewson lives in Alsea, Oregon, United States.

I hope this information helps you.

Sincerely,
Dino Labiste

I live in Asia with my four boys. I can purchase Water Buffalo hides very cheap, but have no way of tanning them so my boys can tool on the leather as I did as a boy in S. Texas. Do you have a tanning recipe solution.

Regi Schexnider

Hello Regi;
The simplest tanning recipe is to use the brains of the animal as the tanning solution. After you have scraped and prepared the hide, take the brain of the animal and cook it in a pot. Then blend the cooked brain into a fine milk shake consistency (using a blender or mashing with your hands). Put the mashed brains into a bucket or tub and add hot water. You need add only enough water to the brain to cover the hide, plus a little more. If you can leave your hand in the hot solution without any discomfort, then the temperature is OK. Anything that burns your hand will cook and damage your hide. Wet your hide and wring it dry, then place it into the brain solution from an hour to overnight. When you are ready, wring the hide thoroughly and begin stretching until the hide is soft and dry.

Have fun on your tanning project,
Dino Labiste

Dino,
Thanks for writing me with this tanning solution for Water Buffalo hides. I am a little squeamish when it comes to animal brains but I have some neighbors that live above me that are from the Carolinas that I am sure have done this type thing. They have 3 girls and may not mind helping me on this project.

I am surprised there is no salt in this solution; I have prepared alligator hides in S. Louisiana with salt brine. Thanks again for your help. I'll ask my other Cajun family friends to start cleaning the Water Buffalo hides and making sure they get all the extra flesh off. I saw a documentary one time on Eskimos and they had their grandparents chew the excess flesh and the hide to keep it soft. We have no one old enough here to take this role, though my Cajun friends wife has lived on the Bayou a long time and would probably be suitable.

Thanks for your help,
Regi

Hello Regi;
If you don't want to use animal brains, here is another tanning recipe. I've used it on the American buffalo hide that I am working on. The hide is on a rack. I coat the solution with my hands, let it dry slightly, then using a wooden paddle that I made from an axe handle, procede to push and stretch the paddle into the hide. Here is the tanning recipe for one coating:

10 yolks
5 tablespoons of vegetable oil
Quarter bar of Ivory soap (grate bar of soap with cheese grater)
3 quarts of water

Depending on how soft and pliable you want the hide, I use 4 seperate coatings of the solution to make a buffalo robe. For each coating, I work the hide until it's dry, then pre-smoke it. Three coatings are done on the rack and the final coating is rubbing the hide on a cable.

Hope this information helps you,
Dino Labiste

P.S.
I suspect that your use of salt brine on the alligator hides was used for preserving the hide. The final smoking helps to preserve a softened hide, as well as keep the hide from returning to rawhide when it gets wet. Did your alligator hide turn into a pliable leather or just rawhide when you used the salt brine?

Jon, I really enjoyed your detailed information on how to build a bow from a sapling. I actually made a pretty good first bow. I'm not sure what the draw weight is. However, it shoots the arrow pretty fast and is fairly stout pulling it back to full draw. How is the best way to determine draw weight? Can I purchase a scale that measures the draw weight? Do you recommend using some sort of backing on a bow?

Please e-mail me back with any helpful hints.

Thanks,
Brian Rader

Hi Brian,
I measure draw weight on a tiller stick. It's actually a useful tool for tillering a bow.

Mine is a 2x4 with a U-shaped notch cut out of one end large enough to rest the bow's handle in. Then the board is marked in one inch increments. Little notches are cut on one side.

If you stand the thing on one end with the U-shaped notch upwards, the bow's handle goes into that. Then you can pull the bow string down and put it into the notches at the 1 inch intervals. This lets you stand back and look at the bow when you are tillering it.

To measure the draw weight, put the tiller stick onto a bathroom scale and pull the bow string down to a desired draw length. You can read the draw weight off the scale and the draw length off of the marked increments on the tiller stick.

This actually lets you tiller a bow to a desired draw weight. You just keep pulling it to just below the desired draw weight (never past it) and tillering the limbs until it gets to be about 5 pounds more than the final weight at the final draw length. The last 5 pounds you lose with sanding and breaking in.

Jon Jeffer

I was hoping for info on how to grow my ti plant that I recently purchased while on the Big Island. There were no instructions in the package. I put the ti plant in a pot horizontally and continue to water the plant. My plumerias are doing fine but nothing is growing on the ti plant. Thanks for any help you can give me.

Cheri Clow

Hello Cheri;
There are 2 methods for planting ti cuttings. One is planting the ti upright at a slight angle with the nodes above the surface of the ground and the other method is to lay it flat on the ground. Do not totally cover the plant stalk with dirt when using the flat method. Half of it should be above the ground. The latter method will produce a denser growth. Ti plants like moist, well drained soil, with partial shade.

Good luck,

Dino Labiste

Dear Jon,
I am about to make my first bow. I live in Daytona, Florida and was wondering if I could buy a piece of really good bow wood (if so, where?). Or do I need to find a piece myself? If so, what wood is around my area and how do I find it.

Thanx for your time,
Michael

I have made some very decent board bows out of the maple and red oak available at the store called Home Depot.

The short story on making a bow from a board is: You pick a board where the grain runs parallel to the board and pick a board where the grain does not run off the back. You glue on a handle riser. Tight Bond II is fine for this. Then you use a rasp and do it like you would for a sapling. If anything, its easier and faster. Just picking out the board can take a bit of patience. Layout is a snap.

On red oak, if you choose that wood, take a good hard look in the grain and choose a board where the porous spring growth wood is minimal.

For really good bow wood, like osage orange, you can snoop around and find premium staves for sale. They cost quite a bit. They are a bit more complicated to work. You have to remove the sapwood from the back. Try Three Rivers Archery (www.threeriversarchery.com) or ask on the forum on www.primitivearcher.com if you want to find a staff.

Since I don't know the woods in your area, I can't help you there. Locust is good I have heard. I think you have that down your way. Oaks are good. So is maple.

Good luck.,
Jon Jeffer

Hi Dick;
After reading all that I could find on the subject and building what seemed to be a reasonable friction fire set I could not form an ember. Smoke yes, ember no. The cord always seemed to slip

at that time when you had to put in a big final effort. Lack of success despite being so close eventually caused me to give up. Then I read your article on "The Egyptian Bow". First try I got an ember, put it into the tinder bundle and begin to blow. Smoke, more smoke, more smoke, different colour of smoke and then suddenly poof there was fire in my hands and a big stupid grin on my face.

Question, how long does the smug grin last?

Thank you,
Jon Spencer

Hello Jon;
For flaming ever. I have been doing it since 1972 and it is still a thrill.

Dick Baugh

Hi Bill;
I like your idea. Does it hold up well? How thick of leather should I use for a 5 inch blade? How do I get the basic shape? Does the knife stay in well?

Mark Parsons

Greetings Mark;
Are you refering to the no stitch sheath on the primitiveways website? I got the idea from a friend who had a similar one, who got the idea from somebody else. Since then, I have seen the same idea on pistol holsters, so I think the idea had been around for a long time.

Have a look at the diagram at the bottom of the article for the basic shape. Make a paper sheath first, so you have all the measurements right before cutting into leather. Leather thickness is not as important as leather stiffness. I have make one out of birchbark, works well although a bit fragile. Once someone wrote that they were going to make one out of rawhide. The two sheaths seen in the picture are fairly stiff, about 1/8th inch thick leather. The knife stays secure as long as you have something to secure the handle. That is why the sheath handle is slightly shorter than the knife handle. I wear the sheath around my neck. The leather neck cord goes through the folded sheath and then over the knife handle. The top sheath in the photo, in my article, shows the knife assembled sheath with the cord holding the knife. The bottom sheath shows the unfolded sheath,

with the neck cord/handle holder looping around the handle.

If you are going to wear it at the belt, add some sort of handle securing strap that can be snapped or tied over the handle.

Hope this helps,
Bill Scherer

Hello Jon,
I harvested an oak tree yesterday and, unfortunately, the piece was 4" thick. I split it and it is now 3" thick.

Do you think it can still be made into a bow?

Thanks,
Chris Aloia

You can make a bow out of it. This just means that you need to take off more wood. If you have a good saw you might even get 2 bows out of it.

When you say "thick" you mean front to back, right?

What you need to do is get a staff that is about as tall as yourself, and about 2" wide. If the harvested tree is green/fresh, you will want to reduce the thicknessto say about 3/4" (a bit thicker at the handle) and then clamp the staff to something straight and flat to let it dry out.

I have a couple of red oak bows. The wood is strong. Limb thickness on a 71" long 2" wide flat bow was less than a half inch at the thinest part.

Good luck,
Jon Jeffer

It is 4"wide and 3" thick. I split it with a sledge hammer and 3 wedges very difficult and uneven. Luckily I have an adze which is perfect tool to tiller.

How much time do I have to do all this? While it is wet?

Thanks again,
Chris Aloia

If its got no twist in it, you could saw it in half to get 2 2" wide staves out of it. You'll want to use a saw because you won't be able split it that accurately.

I'd put glue or varnish on the ends right away, or rubber band plastic bags over them. That keeps the moisture from going out the ends faster than the rest of the staff and will prevent splitting as the wood dries. If they are in a shady place you have a little while to get them clamped down, but the more green the wood is the easier it will be to bend into shape.

You can use C-clamps or string to tie the staves down. Clamp or tie to a 2x4, a work bench, a pipe, or a bed frame. Whatever. A warm dry place will dry the wood faster, but count on several weeks to be sure.

You'll want to try and reduce it to something closer to its final thickness before clamping it down to dry. From my own experience, with oak I can tell you that 3/4 of an inch is probably plenty.

Jon Jeffer

I tilled it last night. I found that there are 3-4 knots in the stave, how bad is it? I hope I didn't waste all that time tillering. It is C-clamped down. I didn't quite make it to 3/4", maybe 1" to 1 1/2".

Thanks again,
Chris Aloia

Don't worry too much. The idea on knots is to just leave more wood around them, and have the limb bend less around the knot. It makes tillering a bit more challenging.

If the knots were hidden, branches that broke off and were grown over some growth rings back, they may not penetrate deeply enough to have any effect. If there are voids where the knot was, and the branch has rotted out and left a hole, some folks will fill with a mixture of sawdust and glue.

Otherwise, sometimes you can lay out the bow to avoid the knots, either by puting the knot in the handle, or tapering the limbs to get rid of them.

Jon Jeffer

(Question pertaining to how many hours for net making)

David, to answer your question I would need to know a couple of other details - what type of string is being used, and what is the guage of the net (size of the openings). The time taken is a function of how many knots need to be tied, and the number of times that a new piece has to be added in (how much string can be put on a netting needle at a time - i.e. the weight of the string. As an example, I made a net four feet by eleven feet with a distance between knots of three inches in about twenty hours out of heavy cotton string. For an experienced person, figure about 5 seconds per knot. To figure the number of knots in a 10' x 10' net, if the knots are two inches apart (good for catching medium sized fish) . . . . a quick calculation comes out to about 16 - 20 hours for your10' x 10' net for an experienced person who is very motivated and undistracted. Two or three times that for a novice. My other question, is a 10' x 10' net efficient for seining? It would seem that a longer narrower net would do better - maybe 5' x 20' or 30 feet.

Hope this helps,
Norm

Dino -
This might be too modern for you, but do you know what a man used to light his cigar / cigarette when out in the field? I have read references of a machero.

I have a living history program at the San Pasqual Battlefield near Escondido, CA. During the battle they could not fire their cannon as the slow match was not ready, so a Lt. fired the cannon using his machero. Time period 1846.

Any information would be appreciated.
Leroy Ross

Hello Leroy;
The machero (also referred to as "mechero vesca") was a fire making tool used during California's Spanish / Mexican era. It consisted of a serrated high carbon steel wheel that rotated over a

mounted flint stone. The sparks created by the wheel ignited the cord on the device causing it to smolder. The lighted cord was used for igniting fires or "firing" a gun or cannon, its original use.

This website has pictures of the mechero vesca:

http://www.livinghistory.co.uk/1500-1600/articles/xw_172.html

Sincerely,
Dino Labiste

Hello, William!
I just read your article on saunas in the Primitive Ways website. It was fun to read, especially since I am Finnish.

Let me introduce myself: I'm Tuukka Kumpulainen, a primitive skills-enthusiast who lives in Tampere, Finland. I am the vice-president of the Finnish Society of Primitive Skills, a small group of people who strive to keep prehistorical skills and knowledge alive here in northern Europe.

I know a lot of Minnesotans are of Finnish origin, Are you one of them?

There was an error in your informative article that I thought you'd like to know: The old Finnish proverb about the sauna being the poor man's pharmacy was spelled really wrong; no one here in Finland would understand what "saun on koha apteet" means. It should be: sauna on koyhan apteekki. There are double dots (umlaut) on top of both the O and the A in the "koyhan"-word, I don't know if American keyboards have those letters.

Yours, Tuukka Kumpulainen
Finland

Terve Tuukka;
Thank you for checking out our primitiveways website. I was hoping some native Finnish speakers would respond to the sauna article, especially on my attempt with the Finnish words. I will see if I can get the corrections made soon, and you are right about the umlauts and American keyboards.

The people I know who speak Finnish learned from their grandparents. My brother recently hosted a Finnish exchange student who said the local folks really don't speak Finnish very well.

The community I grew up in was settled in the early part of the century by Finnish immigrants. Most of the kids I went to school with where 2nd generation Finnish-Americans. My own origin is a mixture of German, French, Polish, Austrian, and Luxenborger. (We have been in this country for a long time) Two of my brothers are married to Finnish-American girls, so now my family is partly Finnish.

The community has tried to preserve some parts of its heritage. There is an Annual Finnish Festival held every June. The Sisu Heritage foundation is trying to preserve some of the immigrants old homesteads. Check out the website http://www.embarrass.org/

I am so glad to hear there are people like yourself in Finland trying to keep the old prehistoric skills alive. I find great joy in learning and practicing the old ways. Can you tell me what is the Finnish word for birch bark crafts? A friend of my father gave us a woven birch bark back pack that his parents had made. Since then I have seen a few other woven birch bark items that I am told are Finnish in origin. I am planning on trying to replicate some of them.

Nakermiin
(Hope I got the greetings right!)
Bill Scherer

Well, Bill, you didn't get the greeting right, it's näkemiin, again with an umlaut ;-) I guess the Finnish language has evolved on its own in the US . . . that's cool!

The Finnish word for birch bark crafts is tuohityöt (an umlaut in the last 0, I'm starting to realize how weird our language really is) . Tuohi means birch bark and työt means 'works' or 'crafts'.

Cheers,
Tuukka

Hello, I am wanting to learn how to use my turkey feathers on my arrows that I will build. I need to find directions that will take me from taking the right feathers off the wing and how to make them into a functioning feather. I shoot a long bow at 60 lbs. I like to use 5" feathers. If you know of a book or tape, I sure would appreciate it.

Sincerely,
Bob Bosman

Hi Bob;
The only book I have is the Traditional Bowyer's Bible. I don't recall it getting into this in detail. The feathers I have used were feathers that had fallen off the turkey.

I can share my experience in prepping these for primitive arrows. If you want more input I'd go to www.primitivearcher.com and post the question on their forum.

To prepare the feathers, I used scissors, sandpaper, and a rasp, and sharp kitchen knives and a cutting board.

I split feathers down the center using the knife on the cutting board. The outer quill is hard, and the inside is like styrofoam. Then I used the scissors to trim the quills down and the sand paper and rasp to abrade the remaining quill down. I have read articles on just stripping turkey feathers by pulling. I have never been able to do this to my satisfaction. It never leaves enough quill to help attach the fletch to the shaft.

I usually trim the quill as small as I can and still have something to attach to the shaft. It is important to thin and taper the leading edge of the quill to flatness. This will keep it from cutting your hand (if you don't use a rest).

For my purposes, my fletches are not uniform. They are fine for hunting distances but these are not target quality. I tend to try and get the maximum number of fletches out of my material. If you have more material to waste, you can probably get more uniform fletches. I cut the profile freehand by eye with sharp large scissors. I find this works surprisingly well. Other folks use forms - usually metal plates that sandwich the feather, and a hotwire cutter. You could probably use a cardboard "pattern" and just hold it on by hand and cut around it.

I hope this helps,
Jon Jeffer

(Question pertaining to the article entitled, "Four Hour Kayak")

From L. Alverio:

I have trouble finding willow in Puerto Rico.

1. What alternative material can or has been used instead of willow?

You can use any slender saplings. Look near creeks. Make sure you can bend at least some of them

into ovals for the ribs of the boat.

2. Can tie-wraps be used instead of cord?

Yes

3. Which of the Grip Clips models is the one used for the kayak?

General Purpose

Sincerely,
Bob Gillis

Hey Bill;
I'm writing because I'm doing a sweat lodge for my brother this weekend and wanted to know where I can get stones that won't explode. What is the name of the type of stone used. I would appreciate any information that you might have about this. Thank you for your help.

Jeff Bernstein

Hello Jeff;
The most important thing about the stones is "NO SUBMERGED ROCKS! The water contained inside the rocks will expand during the heating process causing them to explode. Collect your rocks where they have been high and dry for awhile. If you are using nice rounded, submerged rocks, let them dry out in the sun for a couple of weeks. My parents collected some sauna rocks from Lake Superior, and they work fine, after being dried out for a month.

The vesicular, basalt rocks that we have in the "Primitive Sauna" photos are the same rocks that we use for stone boiling our morning coffee. You might have to experiment a bit with your local rocks before you use them in a sweat. Put the rocks in a hot fire and then stand back. When the stones are really hot, you can get sparks off them by banging a shovel on the rocks. Toss them into some water (from a distance) and see which ones survive.

Let me know how it works out.
Bill Scherer

Hello Jon;
I harvested an oak tree yesterday, and unfortunately the piece was 4" thick. I have split it and it is now 3" thick. Do you think it can still be made into a bow?

Thanks,
Chris Aloia

You can make a bow out of it. This just meant that you need to take off more wood. If you have a good saw you might even get 2 bows out of it.

When you say "thick" you mean front to back, right?

What you need to do is get a staff that is about as tall as yourself, and about 2" wide. If the harvested tree is green/fresh, you will want to reduce the thickness to say about 3/4" (a bit thicker at the handle) and then clamp the staff to something straight and flat to let it dry out.

I have a couple of read oak bows. The wood is strong. Limb thickness on a 71" long 2" wide flat bow was less than a half inch at the thinest part.

Good luck,
Jon Jeffer

Hi Chuck,
My three young daughters love crafts and the outdoors. We are trying to think of local natural materials - - pretty easy to gather and prepare - - that we could string to make necklaces and other adornments.
1) Someone told me that madrone berries can be dried to a nice dark red and strung.

Hi Rhona, Great to hear from you.
I am not familiar with madrone berries but it sounds like they should work. Most any nut or seed once dry can be drilled to make beads. Bright colors and interesting textures are always preferred of course. A common bead used by California Indians were cedar berries. It is interesting how some indians hollowed them out. After gathering fresh cedar berries in the fall, they would find an anthill and place the berries next to the hole. The ants would take the berries into their nest to feed on the fruit inside the berries during the winter. When spring came they would take the dry hollow berries back out to the surface as they were now just trash, ready to be re-gathered by the person who had placed them there. Using insects as a tool! I love that story! If you ever visit Western

Canada another berry used was from the Wolf Willow. It is a conifer so I don't know why it is called a "willow". It produces small gray seeds that are gathered in the summer, that shrink into a wonderful star shape and are almost silver in color.

Another little known seed used for beads by some California Indians was from the California Manroot or Wild Cucumber (Marah fabaceus). The dried seed was used by the Chumash Indians both in its natural color and also dyed bright red.

2) We have thought of apple seeds, sea shells, eucalyptus nuts, and pine nuts.

I have seen apple seeds used, but you will have to be very careful drilling them. You may even be able to string them just using a needle when they are fresh. I'm not sure if they would split after they dried though. I believe I have seen eucalyptus seed pods used as an ornament but have no first hand experience with them.

Nuts from the Gray Pine (Pinus sabiniana) also called Digger Pine, Ghost Pine and Yellow Pine, were a commonly used and traded bead in California Native Culture. They are also easy to make. You simply abrade off the ends on sandstone or piece of concrete, then using a straightened paper clip (you can use a whittled down wooden stick), poke the nutmeat out the opposite end. Save the nutmeat to either eat as a snack while making the beads or as an oil to polish the beads when you are finished. I actually prefer the taste of gray pine nuts to Pinion pine although the shells are much tougher to open.

Sea shells were also a much used bead source by the California Indians. Olivella shells (Olivella biblicata) are the most numerous, used whole or broken and ground into tiny disk shapes or more often squares drilled with a central hole. These squares were often used to inlay other art or ceremonial objects held in place with asphaltum along the south coast or in the rest of California, with pine sap mixed with ground charcoal to make pitch. The white shells would really contrast with the black adhesives. Again, to make a basic easy to sting olivella shell bead is quite simple. Using the same stone or concrete used to abrade the pine nuts, gently sand the tip of the spiral to form a whole. Once the hole is started it will get big really fast so go slowly. Sometimes you will have to poke out the remains of the creature that called the shell home, but it usually crumbles and comes out easily. Blowing through the hole will usually get out anything that remains so a string will now thread through.

3) Is there a way to prepare chicken bones so that they are whiter or shinier or otherwise more attractive?

I have found that the best way to whiten bones is to let ants clean them and the sun bleach them. But if you want to quickly whiten bones, a mild chlorine solution works well. Check online sources for a mixture that would work best for you. To make bones shiny depends on a couple variables. A hard dry bone that has not started to degrade will take a polish by only sanding and

smoothing by a mechanical means. Softer bones cannot physically hold a smooth finish and would require an oil or liquid polish to keep it shiny. Stick with nut or seed oils (pine nuts!) rather than animal fats or oils. Vegetable oils do get stale but old animal oils really smell bad!

To smooth and polish hard materials is pretty much like working with wood. Use a rough stone or sandpaper for initial smoothing of rough areas, then move to progressively finer sandpaper or horsetail fern (Equisetum sp.) for next to final polishing. As an alternative to commercial sandpaper, I often use a cloth or piece of leather dampened then pressed into a little fine sand or even dust to polish with. For the last step I usually rub what I am polishing on the jeans I am wearing or a piece of buckskin or leather. Any leather will work as long as it has a nap to it. Another method for a final polish is to use a very smooth, slick small stone to actually burnish the surface of wood or bone. The slick surface of the stone will actually compress the microscopic fibers down into themselves and produce a shiny hard surface. Sometimes, this is the only step you need to perform. Here is one last trick when working with a finished bone bead or carving that will give it another level of depth, age and beauty. I will often use a hot flame or coal (a small propane torch when in my shop) to brown or scorch the surface of the bone. This will usually highlight carved areas of the bone by scorching and darkening the edges of a cut where there is less mass before it begins to darken the surrounding bone. Another advantage to using this technique is that the burned or scorched area has become harder and will take a high polish! Burned bone does smell bad to most people so be prepared.

We thought we could also incise them and rub the incisions with charcoal powder from our charcoal grill for contrast.

Incising is a traditional method of decorating, but not as easy as it looks. The real trick, if there is one, is that the surface has to be very smooth, shiny is best, or sealed. What happens when you rub in the color fill material (soot, pigment etc.), and the surface is not smooth, the color will seep into the entire surface of the naturally porous bone. I have some California Native friends who replicate traditional elkhorn purses and incise them. They usually use a very fine pen or x-acto blade to add the color to the incised area. Incising and engraving has obviously been done for thousands of years and many tricks and subtleties can be found with further study.

4) We know it is possible to buy some natural supplies. We know about nocbay.com, which sells powwow costume supplies, and about Moscow Hide and Fur, which may sell claws, teeth, etc. Possibly Michael's even has some stuff. Maybe even abalone, which we all like.

I have had good luck with many online suppliers. Shop around though, some suppliers can be quite a bit more expensive for the same items, If you are looking for something in particular, please let me know. I have several good suppliers that are hard to find on line. I have found some materials at Michael's; coconut shell beads, wooden beads, feathers, small narrow bamboo sections. Other places to look are thrift stores and flea markets and recycle old beaded curtains, macramé beads, 50's and 60' necklaces and such.

Abalone (Haliotis sp.) is a wonderful material to work with and very available in California. Caution must be used when working with abalone though. It contains several nasty toxins that can cause severe problems and long term complications. If the proper caution is used though, abalone can be worked with safely. The first thing you want to avoid is the dust created from cutting or polishing abalone. The best way to do this is to always work with the abalone wet or even better under water in a shallow pan. Abalone is not very hard and can be broken apart with a stone or hammer then shaped and polished on a sandstone. A pump drill works well with abalone but if you wish to drill it with a power tool make sure to keep it wet or under water.

Many other shells can and were used by the Native Californians including dentalium or tusk shells that were traded from British Columbia. The Chumash supplied much of the trade in olivella shells to the interior. A source for hard to find olivellas is http://www.theshellstore.com/craft.htm then page 6. Or along much of the California coast south of Santa Cruz.

5) Someone else recommended to me a Dremel drill for putting holes through stones, etc. I'm not sure, though, how I hold the stone still while I drill it. A vise? You can tell that we have enthusiasm but are clueless. Can you help us get started?
Thanks for any tips you might have!!
Rhona

A Dremel tool is handy for a lot of different projects. Depending of what material you are trying to make a hole in would determine if a Dremel were the best tool. Harder stones require diamond coated drill bits and a drill press to make holes and there can be alot of breakage. For shells, seeds, and soapstone a dremel or even a good pumpdrill would work fine.

Most stones that you may find will be to hard to drill through without commercial equipment. Some native stone is soft enough to work by hand. Alabaster and especially soapstone (steatite) were used extensively by California Native People and were easily shaped and perforated.

The California Native People used a couple of different techniques for drilling holes in beads. The most common method was to haft a stone bit onto a strait, arrow-size shaft and either use 2 hands to twirl the drill as if you were trying to make a fire. A similar technique using the same hafted bit is to hold the bead in one hand and roll the shaft of the drill back and forth along the top of your thigh while pressing the bead against the twirling bit. A pump drill, although not native, is a great marriage of tradition and technology.

As for holding the bead steady, which ever technique you choose to drill the hole, there are a few options for holding the bead. One ethnographic report stated that the Indians just placed the bead in a shallow depression of the surface of the drilling surface it would rest on. If this were a piece of sandstone with a little depression pecked into it, the bead would sit very secure. Another method is to make a simple vise. Start with a 6"-8" long section of a fairly sturdy wooden branch or dowel (old broomstick or rake handle) approximately 1/2" to 3/4" diameter, split lengthwise. Save a 3"-4"

long piece of the same branch or dowel. With the 2 halves held in their un-split positions, bind them together at the center loosely, but with a strong material, leather, a metal ring, etc. Next, with the saved branch piece, carve or saw it into a long wedge shape. This part can vary and should be fit with the bead you want to drill. It works by placing the bead to be drilled in the "jaws" of one end of the vise and then using the wedge slipped between the 2 halves and forced tightly into the opposite end, which will put pressure on the jaw / bead end. A simple vice as this can be adjusted to fit different diameter beads by sliding the center binding closer or further from the "jaw" end to accommodate different diameter beads. Small notches can be cut into the area of the vice where the bead will actually rest so it won't want to go shooting out as you force in the wedge to tighten it.

Misc.: Many different feathers were used by California Native People. Unfortunately, today most feathers are illegal to posses. Be aware of your local laws.

Chuck Kritzon

Chris Norden wrote:

Hi, my name is Chris and I live in Australia. I am 13 years old and am interested in bowyering. I have a few questions but firstly I would like to congratulate you and your associates on a great site. I found it while looking at how to make bows (longbows in particular). Here are my questions:

Does it matter if the bow is not perfectly straight? Will this affect the accuracy? I ask this because I live in Western Australia about 170 kms south of Perth (I don't know what that is in miles but it takes 2 hours travelling time when you follow the speed limits). In this area there is no straight trees. Not suitable species anyway. I have made one bow (first serios attempt) that has a draw back weight of 15 pds at 32".

This species is the best species my Dad has come across (he made bows as a hobby in the same area from when he was 8-16). Anyway, I have decided to make a stronger bow that is powerful enough to go hunting with. I have already cut down a stave that has plenty of power and is about 7' 6". This is not perfectly straight but seems reasonable. I also do a rough tillering that is not perfect. Will the slight uneven bend on both sides affect the accuracy much?

Thanks for your time and any info will be greatly appreciated.

Yours sincerely,
Chris Norden

Hi Chris,
A lot of natural wood is bent. Extreme bends and twists make tillering really challenging, and might be difficult for a first few projects. Some people love to make bows from these challenging staves.

In general a little bit of bend is not a problem. If the staff bends in one plane that is no problem at all. You can even use this natural 'reflex' in the staff to get a bow that shoots a bit faster and hits a bit harder.

To do this you would tiller on the convex side of the bend. The bow will loose some of this reflex while its being tillered and broken in, but it will still give you extra umpf. The trick here (like everywhere) is to go slowly.

Otherwise, for staves that ate a bit snakey, the rule of thumb is that they are okay as long as the string crosses the handle area of the bow.

Propeller twist in the grain can be a problem. A little bit is okay, and I have heard people say even extreme twist tillered right does not effect accuracy.

One other thing I wanted to just toss out - maybe to take up with your dad as a project: You can splice two shorter billets into one staff if you can't find a staff long enough. A 'V' splice or a 'Z' splice works nicely. Many glues work but epoxy is pretty much bomb proof.

Best of luck,
Jon Jeffer

To Mr Jeffer,
Sorry to bother you again but there are some things I need to clarify. Most of the instructions and articles about bows that I have read from the internet say that the curved side after splitting is going to be the back of the bow, and the flat side is going to be the belly of the bow. I want to make an English Longbow and while surfing the net yesterday I came across an example that had the back of the bow being the flat side and the belly of the bow being the curved side. Which way around is the best way (strongest/most powerful)? Also, the same bow had linen backing. I presume it was glued on. I'm thinking of using calico (material) to back the bow. What be a good, relatively cheap and common glue that I could use to stick on the calico backing? Any other pointers would also be greatly appreciated.

Thanks for your time,
Chris Norden

By the way: Your articles on fletching and how to make a bow from a sapling are by far the best I've read and I've probably read 15-20 articles on the same thing. Thanks again.

Hi Chris,

No worries.

You ask about flat and curved. What you are talking about technically is called a "crown". That means that the profile of the back or belly (if you cut throught the staff and viewed it in section would be concave.

On a sapling bow, the back will almost always have a crown. Rememer what is important for the back is strength under tension. For this, on a self bow, usually you want to make the back out of a single growth ring. If the staff is split out of a trunk, of a pretty big diameter tree, this could be pretty close to flat.

I have never made an English Long Bow. From reading, I know they are narrow, have a flat back and a crowned belly. Not every wood can take the strains in this design. The design that tends to accomodate less than perfect wood and still give you a pretty hard hitting bow will be long, wide limbed and have a belly and back as close to flat as you can get them.

For glueing on most backings, I use Tightbond II, which is a water resistant wood working glue. For rawhide backing, I use hide glue or unflavored gelatine mixed very thick. I use ace bandages to wrap the limbs while the backing dries.

Jon Jeffer

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QUESTIONS & ANSWERS

Primitive Skills and Plants

From: Susan Zakin
Subject: Reporter's query: tules vs. reeds

Susan, your question is based in a general confusion of the different types of marsh plants, which get lumped together as tules, or cattails or reeds. Tules are more accurately called bulrushes and are indeed sedges in the genus Scirpus. Cattails are a separate family all their own and reeds usually refers to large grasses such as phragmites, although an unrelated cattail-like plant is called Burreed. None of these names is very well fixed in the public mind. Rush chair seats for instance are made with cattail leaves. Sooo, the way you use these terms in your article depends on how `scientific' you are trying to be. I would use reeds to mean phragmites, and tule or bulrush to mean Scirpus spp. (including alkali bulrush - Scirpus robustus), and cattails to mean cattails.

Hope this has been helpful,
Norm

Thanks so much. That was actually very clear!
Susan

Hi Dino,
Loved your article on making the drum. I make figurative sculptures of Native Americans, and thanks to your excellent article, will be able to add a drum on occasion. I liked your parting comment about being alive again and singing. Its almost like giving birth and caring for another.

I do have a question for you. I would like to paint symbols on the deer hide. What type of paint do you use. I'd appreciate any suggestions you would be willing to share.

Thanks so much,
April Walton

Hello April;
Thank you for your nice comments on my "Sycamore Membranophone" article.

I painted the drumhead with the juice from olive berries. An olive tree was growing near a creek. When the berries ripened, they made an excellent paint source for creating designs on the deer rawhide. The color was a deep reddish brown. Also experiment with the juice from blackberries or any berry that has a dark color.

Colored minerals from the earth can be powdered and mixed with a binder, like egg yolk, rendered fat, lard, salmon roe, or even saliva. You must finely powder the earth pigments to the consistency of flour or you'll get lumps in your painting.

Also finely, powdered charcoal from an open pit fire will give you a nice black color. Collecting the soot from burning pine pitch will provide an even better source for black pigment.

Sincerely,
Dino Labiste

Howdy, howdy, howdy Norm! I just found your site on the internet and you've done a beautiful job (along with your co-workers). Gaia and Kodiak and I have moved to the B.C. Coast and plan to settle on Quadra Island. We are tentatively looking at hosting a skills gathering during the summer

of 2003.

I have a couple of questions for you. Joe Dabill made some very nice hand drill sets a few years ago from "coastal elderberry" with an alder board. I assume he means the red elderberry, Sambucus racemosa, and alder wood from the trunk or branch, rather than the root. Do you recall or have any thoughts on these materials? I have not yet tried the red elderberry, but the blue species I found to have too much pith and not enough side wall.

Do you have any information on what the Natives of Coastal B.C. used for hand drill fire sets? We have clematis and some cattail here. I have used big-leaf maple shoots, but found them effective only on a very soft board. They make for a hot combination with a sotol board, but that's far from local availability. I almost certainly have tried the maple shoots on an alder board (trunk), though I can't remember for 100% certainty. I doubt that I've tried the maple shoots on clematis vine. Of course, mullein grows here. So, there are materials available for hand drill sets here, but what were the natives using?

Keep in touch.
Chris Morasky

Chris, good to here from you. Sounds like life's an adventure.

As to fire stuff. Red elderberry that I've checked out has less side wall than Blue Elderberry, but that is totally variable depending on how shaded it is. Full sun on blue elderberry gives lots of side wall, but not usually straight. Too much shade and you get really long straight and useless pieces. Elderberry growing in partial shade or fairly deep valleys provides straight pieces with enough sidewall. I don't remember for sure what Joe Dabill was using. I would think alder root would work better than the wood. Willow seems to be like that too. I have some alder lumber that I'll have to try. My experience with Big-leaf Maple is that only the water sprouts (root suckers) are low enough density to be any good. The same with cottonwood and buckeye. As to what the natives used, my vague recollection is that they used cedar for everything, including hearth boards. Drills can also be cedar I think, although good elderberry, mulefat etc. should work well also. I think I have an ethnobotany of B.C. at work, I'll see what I can find and let you know.

Norm

Hi,
I am a senior at the University of Hartford in Connecticut. I am currently enrolled in a Native American Culture lecture and for a class project I have to build a kayak. This seems like the most

realistic model ["4 Hour Kayak" article in PrimitiveWays] I have found and would like more information. Where can I find "green willow shoots". . . .

Along almost any stream. Look for a shrub sized tree with small oval shaped leaves and green or light brown bark. The shoots will take a bend without breaking.

. . . . and how much do I need?

Fourteen 10 feet willows and fourteen 7 feet willows, but cut extra also.

Is there a substitute?

You can use any flexible branches or saplings that do not taper too radically.

Bob Gillis

Anything that you can pass my way would be greatly appreciated.

Thanks,
Stephen Santangelo
Research Asst.
Micro CT Lab
University of Connecticut Health Center
Farmington, Connecticut 06034

Hi Norm;
I went to a nearby pond yesterday and wrestled with the cattails. I managed to yank out 8 or 10 knobby rhizomes. I tried peeling them and boiling them for 30 minutes. At the end, they looked as toughly fibrous as they had at the beginning. The kids joined in with lighthearted bravery and we all chawed on them. "Hmm...tastes like hempen rope! " It was hard to liberate the starch with our teeth. The smallest rhizomes, say 3/8 inch in diameter, were crunchy and tasty, like a carrot. Quite good, actually. The white core of the new baby plants--boiled for 15 minutes--were perfectly acceptable, too. I'm much more interested in the starchy stuff, though, since that is what is scarce in the woods.

I think that next time I'll try to mash them up with a pestle or the like, and liberate the starch into a bowl. A kitchen crushing tool might be more effective than my teeth. I'm hoping that approach will have a higher food value to effort ratio. Do you have a preparation method that you recommend?

Also, do you resign yourself to wet shoes and socks, or do you have a harvesting trick to prevent that? It was 52 degrees, and I'm a wimp, so I wrapped my feet and legs in kitchen trash bags. My legs stayed dry, but both feet were squelchy.

I hope that you are doing well!
Rhona Mahony

Rhona, sounds like you're getting into this. Euell Gibbons (if you remember him) basically bashed the rhyzomes up and soaked the mash in a bucket of water. Once separated by running it through cheesecloth and letting the starch settle out, he used it like flour. I've prepared them by baking/roasting the runners under the coals of a fire (in the hot ash layer) - they taste like fibery sweet potatoes. The new shoots are even good raw, and taste like cucumber. The main base of the plant I haven't had much luck with, but there are so many rhyzomes I won't starve. Latter on, the flower tops can also be eaten. I have cooked the female flowers while still in their leaf sheath like corn on the cob. They taste like green beans. This is best with the wide leaf cattail species. I avoid the male flowers because I'm allergic to the pollen, but Dick collects the pollen and uses it like flour. As to collecting, it's a pretty mucky affair. The rhyzomes are best harvested in wet mud, so..... do your best.

Good to hear from you,
Norm

New to the tanning and of all the processes I have encountered yours seems to be the easiest. If you ever find out what to do with the hides after they are tanned let me know. I am dating a guy that comes from a long line of trappers and would like to use some of the pelts rather that selling them all. We have been averaging about 10 coons a weekend, but this weekend we got skunked, smelly animals, but their coats are beautiful and being I do not get much $ from them I would like to try and do something productive with the hides. Anyhow, if you can point me in the direction of some web pages I would greatly appreciate it.

Roberta Conway

Hello Roberta;
I'm at the stage now where I have enough furs and hides for my own uses. The last few hides I have tanned have been for other people. I have a fur hat (coyote), a river otter quiver, and some beaver that will be sewn into a sleeping blanket. Still haven't done anything with the fox pelts. I think my daughter will have the sharpest looking foxskin hat in her elementry school (and the only one). I

have two raccoon pelts that I should do something with as well. I like to save my pelt sewing projects for the winter,. That way I can do something primitive while being inside the house.

Check out the article, "What to Do with Your Roadkill Raccoon Skin? Make a Bag!", by my friend, Markus Klek, on the primitiveways website. I plan on something like that with one of my pelts. There are some patterns available from Crazy Crow traders and braintan.com. One pattern I have is the "free trappers hat", sorta like a Daniel Boone thing with a leather visor. I know one guy who said his daughters used muskrat pelts to play with instead of dolls.

Good luck and keep in touch.
Bill Scherer

Mr. Kidder: For a fictional book I'm currently researching, I'd like to know which central California tribes (Yosemite, Central Valley, Monterey-SF coast) used tule. If you can quickly tell me a few names of tribes, I'd greatly appreciate it.

Thank you,
Summer Brenner

Summer;
Tules were used by most, if not all central California tribes, depending on their availability. All the people in the central valley - Yokuts, Miwok, Patwin, Nisenan, Konkow, Maidu, Wintu and Nomlaki; the Pomo around Clear Lake, all the Bay area people, Ohlone (including the Monterey and Santa Cruz areas: Mutsun, Rumsien), Miwok, Salinan. The only tribes that would not have used tule were ones that didn't have access to them.

The were used for boats, roofs, bedding, mats, baskets, cradles, clothing, decoys and more, with each tribe having their own variations. Let me know if you need more specific info.

Norm Kidder

Dear Dino,
My son is making a tule boat for display at the Irvine Regional Park in Orange County, California for his Eagle Scout Service Project. We have located a source of reeds but are in need of a "step by step" instruction on how to build the boat. Your photos on the web site have been most helpful, but I know there are many more steps and "tricks" involved. We are hoping that you or Mr. Baugh can help us by directing us to a site or book that would provide some instruction. Thanks for your help!

Regards,
Allen C. Buchanan
Senior Vice President
Lee and Associates Commercial Real Estate Services

Hello Allen;
Let me recommend 3 books that might be of interest:
1. "Survival Arts of the Primitive Paiutes" by Margaret M. Wheat, ISBN 0-87417-048-6
There's a chapter that details the making of a Paiute boat of cattail and tule. The tule balsa, in this book, is a one person boat. Good photos.
2. "Tule Technology, Northern Paiute Uses of Marsh Resources in Western Nevada" by Catherine S. Fowler, Smithsonian Folklife Series, Number 6
There's a chapter entitled, The Tule Balsa Boat, with 3 subtitles: Constructing a Tule Balsa Boat, Tule Balsa Boats in Use, and Boats in Other Areas.
3. "Survival Skills of Native California" by Paul Campbell, ISBN 0-87905-921-4
There's a section called How California Indians Made Tule Balsas, pgs. 390-395

All three books are good reference materials for constructing a tule balsa. Keep in mind that every different Native California culture that constructed tule boats had different styles of design. The tule boat designs up north, south, and in the Great Basin may look slightly different in construction. If you are going to be true to the Gabrielino tule boat in your area, do your research. I don't have any information on their style of tule boats, but contacting the Gabrielino people in your area might provide some insight. Also, Campbell's book deals more with the California Native Americans down south, so his book may provide some information.
Universities in your area may also help. Contact the Anthropology Department or do research in the university libraries.

Or contact another member of our website group - Norm Kidder. Norm is the supervising naturalist at Sunol-Ohlone Regional Wilderness. His expertise is in the California Native American cultures. Norm and his wife, Jan (she's also a naturalist at Coyote Hills Regional Park), undertook a tule boat construction project a few years back and floated the boat from one regional park to another regional park in the bay. One of the tule boats is in the Coyote Hills Regional Park Visitor Center. You can contact Norm Kidder at atlatl1@aol.com

Hope this information helps,
Dino Labiste

Hello Allen,

I'm afraid I don't have a step-by-step set of instructions for you. Last year I met a man from the Santa Ynez Chumash reservation who said that he had made tule boats in the traditional way.

Two good books: "California Indian Watercraft" by Richard W. Cunningham, ISBN 0-945092-01-6 and "Survival Arts of the Primitive Paiutes" by Margaret M. Wheat, ISBN 0-87417-048-6. They are both good books.

Dick Baugh

Robert Bailey wrote:

In regards to your article on how to tan a fox hide, could I ask first, where the brains come from and how to properly prepare them for the tan, which seem to be a big secret in most of the articles I have read. I would like to try it myself, maybe even with a deer hide.

Thanks,
Robert

Hello Robert,
My usual source of tanning brains is a Asian supermarket about a mile from my house. They sell pig brains, as well as some other unusual parts of various animals. Some Mexican supermarkets sell beef brains. Any large supermarket will probably be able to supply beef or pork brains, although you might have to ask. When I was growing up on my dads farm, we used to bury the cow heads along with the entrails and other stuff we thought inedible. Try contacting some local farmers, maybe they can help.

Sometimes I get the hides from hunters, so I usually ask them for the animal brains as well. One note of caution here is deer in some parts of the country are testing positive for Chronic Wasting Disease. So far CWD has not proven to jump species, but lets be careful until more data is in. If you live in one of these areas you probably should use a pork brain, or not use brains at all. As a substitute for brains you can substitute egg yokes, soap flakes or lechatin. I once used beaten egg yokes, and they worked fine.

Prepping the brain is a very simple thing. Step one: the brain must be squished into a thick liquid. The easiest way is a blender, egg beaters will work, or you could mash it up with your fingers. Put a little water into the blender, toss in the brain and hit puree. Step two: cook the brain for about 15 minutes, sort of a low boil. Cooking the brain is not really necessary for tanning, but will lessen any chances of infection should you have any cuts on your hands. I have never had any infections,

but I know people who have. Of course I do not start any tanning if I have any cuts or sores on my hands. After the brain has cooled off enough where you can put your hands in without any pain, apply it to the hide. Too hot will cook the hide, too cold will not penetrate the hide as well.

There are a few variations on the brain prep. My latest experiments are to rinse out one of my smoking skirts, and add that sooty water to add to the brains. This has a few benefits, one is as a preservative to the brain. It also improves the smell (brains smell a bit funky). If you can, get an experienced tanner to show you the ropes. If you can get to one of the many primitive skills gathering, there is usually someone teaching brain tanning. There is much that can go wrong if you don't know what you are looking at. Check out the books and magazines section on the PrimitiveWays website, and pick up one of the books on the subject.

Good luck and keep in touch.
Bill Scherer

Chuck,
I have been having a problem of finding a container to render pitch with native materials. Short of getting into pottery (clay is available in Louisiana). Boiling stones and bark or watertight baskets do not work well.

Can you suggest a book on the subject?

Gerald

Hi Gerald!
Thanks for the question. Melting and working with pine sap and pitch has always been a problem for me too. Even at the many primitive skills classes I attended over the years, pitch was usually heated up in a tin can!

In recent years I have been using shells of various types. Scallop shells although not large enough to do a big batch of pitch, works really well. They can be acquired at restaurant supply stores and some nature shops. I have tried using abalone shells which are larger, but they cannot take the heat and will delaminate and crack.

I have also used large flat stones placed over a low fire or one that has been heated in coals for a while. Then by using a stick to keep maneuvering the pitch as it melts, you can melt quite a lot of pitch. You can also improve a flat stone by pecking a slight depression in the surface with another stone. It would not take to long to actually make a slightly concave stone to process pitch with. You would have to be careful not to heat the stone to quickly as there is always the chance of the

stone cracking or splitting.

To avoid any kind of thermal stress problem you can also shape a bowl out of soapstone (steatite) to heat pitch in. The soapstone can be heated repeatedly with out cracking or splitting. You can shape soapstone quickly using antler tools shaped as follows: grind or cut a fairly thick portion of an antler tine (approx. 1/2" to 3/4" diameter), at an angle to create a chisel shape. The tool can be used like this, but to make the tool really effective, file or grind with a sharp thin stone or modern saw to make tines out of the chisel shape like a stone sculptors chisel. This is really effective and allows you to shape the soapstone very quickly. This tool was used for shaping soapstone by the native peoples who inhabited the southeast region of the United States.

Another tip to making pitch, is to gather clean sap to start with. I always thought that you needed to used the clear sticky drips and blisters that form on pine trees, but you can also use the dry, hard patches of pitch that form on the branch where a pine cone has come off. It melts and can be used just as well as the clear sticky stuff. If you can find a place where logging is going on, you can climb through the piles of branches the loggers leave and gather buckets of this dry pitch. Many old timers have told me they prefer the dry patches of pitch over the sticky stuff. I like to gather sap this time of year as the patches tend to just snap off the branch and are less sticky to handle.

To actually mix the heated sap with ground charcoal, you don't even need to use a container. Just make a little mountain shape pile of the charcoal powder with a depression in the top so it looks like a volcano. Then you pour your melted sap into the depression then work the charcoal into it from the edges to the center. You can then just pick up the mixture and work it like taffy, pulling and stretching it until it is mixed. Keep plenty of charcoal dust on your fingers to keep it from sticking to you.

I hope this helps. Please get back in touch with me with any follow up questions.
Chuck Kritzon

Chuck,
Yes, your hints were quite helpful. Thank you.

I know the technique of pecking a stone, I am quite an accomplished knapper. Using the pecking and abrading method, I have made some stone grinding tools for grain and getting the meat from nuts and acorns. Having cooked some of the best steaks ever eaten on flat stone I also know of the dangers of heating stone.

Using shell was a new idea, I read about it in your web page. The problem lies in my type of survival techniques. Depending on the location of the particular outing, i.e.. Louisiana, the may be no shell, and the only stone, if very lucky will be soft sand stone or low grade iron ore.

Your gracious response has given me some ideas. My problem in the past was starting with pitch laden particles and trying to render it (as you would lard.) Starting with nearly pure pitch in the first place, perhaps any "platform" could be used. I will try soil patties (mud pies) not even qualifying for pottery. The soil used could be placed on a bit of a earth pedestal as to allow a deeper bed of coals under it. I suppose any soil with enough tensile strength to retain its shape and dry quickly in the fire would work. Perhaps support by green sticks within. (brain storming as I go here) maybe several green twigs 9 inches long or so and pencil thick set up in a squat tipi fashion would support semi-clay bearing soil well enough to create a tall depression for heating. Ideas worth experimenting with.

Thank you for your help. My goal is to be able to produce enough pitch to water proof a cooking basket. Using a hide container, or other animal part for liquid boiling is sometimes difficult to obtain on some outings. I am however allowing a change of rules. "If you make it using primitive techniques and supplies it can come." This will open up the opportunity for hide glue, small pottery, and considerable amounts of cordage, as well as some tools.

Your help has been good. Thanks for the ideas.
Do you know of any primitive skills gatherings anytime soon? And with in about 800 miles of NorthWest Louisiana? Having found these sources on the web has been a boon. I've been doing, learning, teaching and researching "survival techniques" since I was in my teens (nearly 30 years) finding the web has been great!

Gerald

Hello again Gerald,
I had another thought about a container for heating pitch. I have never tried it, but a turtle shell should hold together long enough to heat pitch. I don't think it could stand up to intense heat or repeated heating as it would delaminate, but with the steady heat of a bed of coals it should work. This is only a guess. I know you have turtles in your area so I thought I would pass on the idea. Plus snappers are pretty good eating!

Good luck and let me know how it works if you try out this technique.

Regards,
Chuck Kritzon
PrimitiveWays clan

Chuck;

I have had an opportunity to experiment with different methods of working pitch. I have worked in a simple, crude pottery and found it to work fine. This weekend, on an outing, I found a Three toed box turtle shell. All that had remained was the shell plates. It held together for several batches of pitch. After a while the fractures became porous to the pitch and it
eventually broke. But not until I had melted and cleaned a sandwich size, zip lock bag full of pine sap. The short of it is that it will work even with an old shell.

Gerald

(Inquiry on where to purchase ti leaves for receipes.)

I live in Southern California. Can you help?

Hello;
A local source of ti leaves in your area are florist shops. Ti leaves are also used for floral arrangements. Contact your local florist and find out if they sell the GREEN ti leaves. There are different hybrids of ti plants and the various colors are also used in floral arrangements. You want the green ti leaves that were traditionally used for cooking in Hawaii. Inform the florist that you will be using the leaves for cooking purposes. You don't want any chemicals sprayed onto the leaves that may get into your food. Most of the ti leaves from the florist are food safe, but just in case, inquire. Not all the florist carry this item, so call around until you find one that sell ti leaves. Also prices vary amongst the different florist. Find one that has the cheapest price.

Another alternative is to contact ti leaf distributors in Hawaii. Do a search on the internet.

If you are only going to use just a few ti leaves, it might be best to contact your local florist as oppose to buying in bulk from ti leaf distributors.

Sincerely,
Dino Labiste

Greetings!
I found your email address on-line. We have been trying to bend hickory with no success. We wondering if you may be able to provide hints of success.

We built a nifty little steam box that generates a constant temp. of 200 degrees F. We have lenghts

of hickory with the following dimensions: 6 foot long, 1.75 inches by 1.25 inches thick. We have tried steaming for both 2 hours and for 4 hours. Each time the stick broke.

Now, our wood is kiln dried but, we thought we might still be able to bend the wood.

1) Should we use green wood?
2) Should we soak the kiln dried wood and then attempt to steam and bend?
3) How long should we steam for? Most literature says 1 hour per inch of thickness. Is this squared inch of thickness? for our 6 foot and 1.75 X 1.25 inch thick....should we steam it for 2 or 4 hours?
4) Once bent, how long should we leave on the mold/frame?
5)Any other suggestions?

Thanks in advance for your assistance, suggestions, and expertise.

Hello Rodney, sorry to take so long, but the holidays kept me busy. First, if your steamer is giving temperatures of 200 degrees, it may not be hot enough. Since your wood is quite dry, I would take a sample and try boiling it for 20 or 30 minutes and trying that. Tim Baker, one of the authors of the Bowyers Bible had me do that with an Osage Orange stave that was dry. Mine was a bit thinner, but it bent in 20 minutes in boiling water. Otherwise it sounds like you've got the right ideas - soaking first especially. The thickness is relative to the time it takes the heat to penetrate, so refers to the thickest area. (1.25 inches in your case). Experiment with scraps until it works. As to how long to leave it in the mold, I wouldn't be in a hurry to take it out. It needs to cool and dry out - and that will depend on your climate. If you can wait a week, that wouldn't hurt. Moisture will soften the wood and let it rebound. If you have trouble with it returning to straight, you may want to sinew cover the inside curves and/or waterproof the stave.

Good luck,
Norm

(Question pertaining to tanning a fox tail)

Hello Paul;
The answer to every question starts with "That depends". I need a bit more information in order to answer your question. Tell me about the fox tail. Is it dried, fresh, salted, or still on the fox? Is it split open or still in a tube? Has the tail bone been removed? Is it a Grey, Red, cross, or maybe a Artic white fox? Have you done any tanning at all? For a first time tanner, a fox tail is a very delicate project. Do you want to learn the art of tanning, or do you just want a fox tail? I will be happy to help as much as possible.

Bill Scherer

From: "Pond Scum" <pondscum@maine.rr.com>

Sorry about the lack of info I sent you before, I didn't realize you needed all the details about it. It's still on the fox in the cold of my garage. It's (the fox) been there for 1 day (it's Sunday as I type this). It's a Red fox, good size, and I want just the tail. I would like to save the tail for my wife to put in her car on the mirror, or if my daughter wins out, she wants the tail for her room. I have never done any tanning before, as for learning the art of tanning, I'm letting this experence happen before I decide if I want to do more of it. Oh . . . why am I bothering you about one fox tail? I saw your webpage and I liked the way you explained the WHOLE process of tanning a fox, and decided to take a chance that you'd be willing to explain to me what I needed to know to keep the tail.

Thank you very much!

Paul

Hello Paul;
I would like to recommend that you try to tan the entire fox pelt, not just the tail. If you wish to have a tail to fly on the antenna, those are available commercially from www.moscowhideandfur.com. or Crazy Crow Traders for just a couple of dollars. A fox tail is the most delicate part of the pelt, one mistake could ruin the entire tail. I speak from the experience of ruining my first attempt. However, if you are going to tan only the tail, get it skinned and frozen immediately. Use a small slender blade, cut from the inside to the outside, on the bottom side of the tail. Keep it frozen until tanning time. Tanning should take place in a warm environment, so you may wish to wait until spring, or work inside a heated shed.

Remove all the membrane for the flesh side of the tail, be very gentle here. I like to use something abrasive like pumice or sandpaper. Then get an egg yoke and beat it. Apply the yoke to the flesh side, put it into a bag, and let it soak in for an hour or two. Take it out and begin to manipulate it until it dries out. Next ,you will have to come up with some sort of smoking scheme. I like to sew the tail into the seam of an old pair of jeans, fur on the outside, flesh on the inside. Start a small smoky fire, add punky wood, and suspend you smoking rig over the fire until the tail is smoked.

I hope this helps. Check out www.braintan.com. There is an very good article there about fox tannig written by George Michard.

Bill Scherer

Hello Norm!
I just sent you a letter and photos but forgot to ask you something. I've collected old crusty pitch from a driftwood log at a marsh and have tried to use it to glue points onto arrows and a pump drill, and as a soaproot brush handle. Whether I add nothing, powdered charcoal or powdered egg shell, the resulting hardened material (I don't let the pitch boil) is very brittle, which spells disaster when these tools are used. The soaproot handle is fine, however. I wonder:

1. Perhaps the pitch has been degraded by salt at the ocean.
2. I'm not adding the right amounts of the "temper" (shell, charcoal).
3. I'm not adding the right type of temper.
4. Maybe you have experience/knowledge that can assist my endeavor!

I've also collected gooey, tarry asphaultum from a nearby creek--natural exudate from upstream. It is of the consistency of molasses. Is there a way to prepare it so that it hardens for use as a glue? It certainly doesn't come off my hands, so I'd like it to not come off my arrows, etc. but be dry and reasonably hard and elastic. Any ideas?

Storm

Storm,
As to your questions on pitch:

1. Salt water degrading? Maybe, I don't have much experience with that.
2. Adding enough temper? I had the best results when I added enough temper (ground charcoal and ground deer dung) so that the warmed pitch was no longer sticky, then add just enough additional pitch to get it sticky again.
3. The right kind of temper? Stuff that's a bit stringy seems the best.
4. My experience? A bit limited, but I think Chuck Kritzon and some of the others at PrimitiveWays will have input, I forwarded your e-mail to all of them.

Asphaultum too gooey - - the only thing I can think to do is heating it slowly to drive off the lighter material. I've only used the commercial roofing tar myself as there isn't any natural stuff around here.

Norm

Hello Dick,
Quick question: How do you extract pine pitch from the tree. I've seen pitch running out of wounds on some trees, but this is not often. I would like to do some experimenting with pitch as a wet/damp material firestarter. Will pine pitch stay in liquid form if you store it in a plastic bag?

Thanks for any input!
Joe Musselwhite

Hello Joe,
I am sure that by now with your experience as an outdoor survival student and teacher that in the woods you keep your eyes open for things that "normal" people wouldn't know existed. Ah! There's a bow stave. I'll bet that sapling would make a good atlatl dart. That rock has a hollow which is perfect for a bow drill socket. The list goes on and on. What I'm saying is tune your looking in to pitch nodules on conifers. I have heard that the natives where I live (San Francisco Bay region) would bash the sides of pine and fir trees to induce the production of resin. Resinous pieces of bark would be pulled off to use as torches.

Pitch, or resin, consists of a solid, nonvolatile component (rosin as used on a fiddle bow) and a volatile component (turpentine). Tarheels from North Carolina were involved in the production of pine tar and turpentine from pine resin. I'm not sure, but I think the turpentine component will probably slowly evaporate through a plastic bag.

Regards,
Dick

Do you have any info on knotless netting stitches & patterns? Also any sources of waxed linen or other materials used? I'd really appreciate the info!

Thanks,
CC

Hello;
Here are some references for knotless netting stitches and patterns:

1) SPT Bulletin of Primitive Technology #17 - Spring 1999 - Fibers
"Looped String Bags" by Bonnie Montgomery, pages 19 - 22

(To order the magazine, access: http://www.primitive.org/backissues.htm).

2) "Androgynous Objects, String Bags and Gender in central New Guinea" by Maureeen A. MacKenzie,
ISBN 90-5702-270-2
(The indigenous women of central New Guinea are master craftswomen at weaving intricate bilums (knotless string bags). If you can follow the drawings and explanations in the book, it's worth getting. Buy the paperback book, it's a lot cheaper. I checked out the book from the Stanford University library to peruse it before I purchased the book. You can also order it through our website: http://www.primitiveways.com/pt-books.html).

3) "Creative Ropecraft" by Stuart Grainger, ISBN 1-57409-115-8
(Grainger has a section on various half hitches that can be incorporated into string bag patterns. You can also order this book from our website: http://www.primitiveways.com/pt-books2.html).

If you can't afford to buy any of the books mentioned above, your local library or the university/college libraries are good sources of information. If the books are available, the information is free.

As far as any sources of waxed linen or other materials used, access:
http://www.primitiveways.com/stores.html
Scroll down to "The Caning Shop". They have a website and do mail orders. The Caning Shop sells various colors and sizes of waxed linen and other type of strings and cordage.

Sincerely,
Dino Labiste

From: The Skinners

Hello, my name is Norman Skinner and I am kinda new to brain tanning. I was wondering if you stretch and dry your pelts before you brain them. I had always been told to do this and just wondered if it was nescessary. And is it possible to soften two or more pelts at the same time.

Thanks for any info you can give me.

Hello Norman;
I'm assuming you are interested in fur pelts, not leather, so I will address this reply as such. There is a lot of variations on how to tan fur pelts. Because I tan the pelts in stages (cleaning one day,

braining and stretching on another day, smoking on another, ect.), it just works out well for me to dry them between stages. Certainly you could brain the pelt right after cleaning. I always stretch the pelt after the brain has soaked in for a few hours. Don't try to stretch a pelt that is dried out, it must be in a moist and limber state.

I am a single tasking kinda guy, so I like to concentrate on one pelt at a time during the softening stage. A hide will have some parts that dry out before the rest of it. This way I am sure to discover any spots that must be worked harder. Try it for yourself and see what works. Other stages of the process (cleaning, smoking) are more suited for multiple pelts at a time.

Hope this helps,
Bill Scherer

From: The Skinners
Hi Bill;
Thanks for the info. I meant to email you right back but something stole a couple of my skins that I was working on. I didn't feel like doing much of anything afterwards. But I'm back on the ball now. The Braintan.com Store has patterns for fur hats if you're still looking.

If you don't mind, I have a couple more questions and then I'll get out of your hair for a while. First, how important do you feel it is to degrease a pelt before tanning. I've never degreased one and didn't know if it would help the finished product any or not. And also I tried using a PCV pipe for fleshing, but it didn't work too good for the face. Is there a trick to that or something. Also, what did you mean you mount it over a garden rake (I've always had trouble fleshing). I want to say that your web page really kind of inspired me to start tanning again. No matter what neighbors or family members might think.

Thanks alot,
Norman

Hello Norman;
I have been out of town for a few days, and just saw your email today. Never a bother to chat about one of my favorite subjects.

Everybody seems to have problems with critters eating their pelts. Another advantage to dried pelts is they can be locked up. I keep the "in progress" pelts in a utility closet. I will check out the pattern info on the Braintan.com Store as well. Thanks a lot.

As far as degreasing goes, I think it makes it easer to remove the membrane layer (inner most layer

of the hide) and helps with the penetration of the brains. I have never tried it without degreasing, but I will do some consulting of the literature.

I use a couple of different size PCV pipes. One of them has the end cut at an angle, so I can hook the critters nose on it. Even so, the face is a very difficult area to work. What you can't get out with the fleshing tool can be abraded out after the pelt has dried. I use the rake to hook under my fence, slide a 3 foot chunk of PCV over the rake handle, then a wooden brace to hold the rake handle up an angle, and then a second chunk of PCV. This second chuck is what I use for the actual beaming surface. The second chunk can be sized to match the work. Hope this makes sense.

I will be in touch,
Bill Scherer

Hi Norman,
Well, after talking to a few folks and reading some books, I can't seem to find a real good reason why pelts are degreased. I think it has to be removed in order for the brains to penetrate the skin. I also found out that some folks use dishwashing soap to remove the grease. The greasiest fur pelts I have done were racoon, but even the weasels and coyotes had some grease on them.

Good luck,
Bill Scherer

"The Skinners" wrote:

Hey, talk about timing, I was just about to email you. I've been talking to a fella at the hide out who rarely brains his coon hides. He says they're so greasy, he simply works them soft and lets the natural grease lubricate the hide. I don't think he really gets them all that soft, but he says it's good enough for hats and such. He said he thought degreasing was a waste of time. So, who really knows. I think if it helps in the fleshing it would be worth it.

I was also wondering how you attached your smoking skirt to the bottom of the pelt. Some people have started glueing them on. And do you cut it to the shape of the hide to get a better fit? And also how do you smoke the tail? I've just been sticking a stove pipe in the end of it.

Thanks,
Norm

P.S. I don't think that pattern from Braintan.com is what you're looking for. The pattern doesn't have a cape on the back or a face on it.

Hi Norman,
Got the hat pattern from Braintan.com last night. Its a Fess Parker Daniel Boone type thing. Gives the instruction on how to add the face, paws, and tail as options. Not quite what I was looking for, but its all good information.

I have wondered if a hide could be tanned with its own fat. See if you can get your friend to document this sometime. Maybe get it on the web.

I use a combination of sewing and stapling on the skirt. Don't cut the pelt to get a better fit, just follow along the pelt bottom as best I can. Make the adjustments to the cloth, not the pelt. The tail is fitted down the split in the skirt (where the zipper used to be). Most people don't bother smoking the tail, and some will smoke the tail separately. I have seen the tail smoked by holding it over a hole in a deerskin that was being smoked.

Bill Scherer

I have been looking for web sites containing information on pigweed which is mentioned many times in the Clan of the Cavebear series. I have not been able to find a whole lot of information. Could you point me in the right direction??

Thanks,
Amy

Hello Amy;
If my guess is correct, I believe the author of the "Clan of the Cave Bear" series was referring to a plant with the common name of amaranth (also known as pigweed or redroot). The scientific name is Amaranthus retroflexus.
Amaranth is a coarse erect annual, reaching 1 to 3 feet tall. Lower stems are often red or red-striped, with color continuing down the taproot. The oval-shape leaves are alternately arranged on the stems. Numerous small black, shiny seeds develop after the flowers mature.
Edibility: The leaves and tender stems can be eaten raw or lightly cooked. They are gathered in the spring. The seed can also be used for food. The seeds can be ground and used as flour (or even used whole). The seed consist of 15% protein as well as a host of vitamins and minerals. Seeds are gathered in late summer or autumn.
Medicinally: The leaves of this plant are a recognized astringent.
Amaranth is commonly found in cultivated lands, gardens, waste areas and disturbed soils.

Check out the following websites for more information on Amanrantus retroflexus:

http://www.ppws.vt.edu/~sforza/weeds/amare.html

http://www.fs.fed.us/database/feis/plants/forb/amaret/

Sincerely,
Dino Labiste

(Question pertaining to the article, "Primitive Quail Call")

What type of wood is used?

I used willow but any type will work.

How do you shape it?

With a knife. Although you could use a stone tool.

What is the reed made of?

A rubber band but grass will work.

Bob Gillis

Rodney C. Haring
MSW Candidate 2002
School of Social Work
State University at Buffalo

Mr. Labiste;
I have enjoyed your website . . . thought provoking and much to learn.

I have a question, while working a display project, that I would appreciate any insight or thoughts you might have . . . how was hide glue discovered, and what utensils/methods do you think were used primitively to manuafacture it? Thank you.

Respectfully,
Mark Peatrowsky

Hello Mark;
Thank you for visiting our website.

As far as how hide glue or any organic glue was discovered, archeologists can only speculate as to how it was discovered. It might have been through accident that glue was created. Maybe after boiling a deer leg, along with the hoofs, in a hole in the ground lined with a deer hide, a sticky residue was left in the container. The glue-like liquid then solidified into a hard substance. Through trial and error, boiling hoofs, sinew and rawhide created hide glue.

The ancient Egyptians were known to utilize hide glue for adhering their furniture.

How did they create hide glue? Here is one idea. First a container for boiling the hoofs, sinew and rawhide was needed. A hole in the ground, lined with an animal hide could have been utilized. The water in the animal hide could be boiled by continuously adding and replacing hot rocks until the water began to boil. This process would have to keep the water continuously boiling until the glue-like substance, called collagen, was extracted out of the hoofs, sinew and rawhide. Collagen is a protein constituent of all animal hides. More water had to be added as it turned to steam. Normally, using conventional pots and a stove, it would take a total of 12 hours to boil the animal parts. After the boiling process had extracted out the collagen, the sticky liquid was poured into a strainer (either a woven mat or wooden strainer perforated with holes) and any remaining water was squeezed out of the sticky solution. The glue was then allowed to gel in the sun on a flat, wooden tray or a slight depression in a log. After the glue had gelled and then solidified, it was broken into bits and stored in a leather bag for future use. When needed, the glue crystals were dissolved in water and then applied. The container with the water and liquefied glue crytals could also be heated by placing the container on hot ashes to warm up the glue. If allowed to sit for a long time, the water would evaporate and the glue would again solidify. Warming it up keeps the glue in its liquid state.

Another container that could have been utilized for boiling the hoofs, sinew and rawhide was a soapstone bowl. Soapstone makes an ideal primitive boiling pot because it absorbs heat very fast and is easily carved into a bowl.

The California Native Americans used fish glue and a combination of fish glue and plant pitch for their adhesives. The fish skin most used was from sturgeon or salmon. One of the plant pitches

utilized was from the various species of pine. Also asphaltum from the earth was used for adhesives. It was heated and used to haft obsidian and chert arrow points and knives.

I hope this information helps you answer your question.

Sincerely,
Dino Labiste

I'm working on a history of my family in Southern California, specifically in Los Angeles. In 1839 my Great-grandfathers Francisco Marquez and Isidro Reyes were given a Mexican land grant called Rancho Boca de Santa Monica. In the description of the rancho two plants are mentioned and used a landmarks. The first description is as follows: "Beginning at a bluff, a sharp hill which divides a cañada overgrown with *"tule"* near the sea at a place known as Topango Point."

The other description is as follows: . . . a path leads down to the cañada called de Iglesias, on a straight line with a small red bluff of the same cañnada, at which path a dead *"mangle"* was marked for a landmark.

Can you tell me what these plants looked like at that time? Do they still grow in the undeveloped areas here in Southern California? Your help with this matter will be very much appreciated.

Sincerely,
Ernest Marquez

Ernest, sounds like you have an interesting family history. Tules (also called Tulares) are a bullrush - Scirpus acutus or californicus. They are tall slender reeds up to 12 or even 15 feet tall, which grow in fresh water. Tules are still found around California, especially in flood control ditchs, and around ponds in golf courses. You might want to check in with local park rangers - Santa Monica Mountains maybe to locate some. They were a common material used by the Indians for house roofs, sleeping mats and boats (balsas). (I'm going to be cutting some tomorrow morning). The reference to a dead mangle, I believe, refers to an uprooted tree rather than to a particular species - a log jam or snag. If it was big enough to act as a marker it might have been cottonwood, alder, sycamore or oak. This would not be a permanent feature, although they often last for quite a while in the outside bend of a river. You might want to look the word up in a big, old dictionary to be sure.

Good luck,
Norm

Antje Cobbett wrote:

Dear Bill,
Thank you so much for your tanning page! We also "suffer" from a small back garden and it's really not easy to do the tanning here. I'm breeding satin angora rabbits and white English angoras and always have a backlog of orders for their pelts. In vain, I've tried to find somebody here in England, or indeed anywhere in Europe, to tan these furs professionally for me, but so far I haven't found anybody. So I'm the lone rabbit fur tanner of Europe!

At the moment I'm using alum and salt for tanning because the country seems to be swept clean of brains from pigs, calve and otherwise ... The other day I went to a local butcher and he at least could give me 2 whole pig heads which I boiled diligently in a very big pot and then I had to split the head with an axe and a mallet. Gosh, such hard work and what do you get? Tiny little pig brains! Oh, well, I will take your suggestion and find an Asian Supermarket, maybe in London, and see if they've got any. Can you believe that it is so difficult to buy brains??? Hm, rabbit brains I do have available, of course, but getting them out of the skull? Well, must give it a try.

I like the flower pot smoking idea. I also have to be careful with neighbours and space. My husband is just shaking his head over some of my contraptions in the garden, but endures it with stoic English upper lip. We live here in Kent, which is flint stone country. They are just everywhere lying around. So I've smashed a few on my patio to see if I can get a scraper for the furs. After a few attempts I found one that lies good in the hand and the other side is good for scraping and softening furs. Before flint stone I used pumice stone, but often ended up with parchment!

Somewhere I also got a long jeans skirt with buttons down the front, must find it again! Thanks for the tip, that is ideal! I've made a tipi thing out of bamboo and use it with a chain to hang a cauldron (can't find a real cauldron, so I use my stainless steel pot) over a fire place. I thought it looks rather cute, but husband and neighbours are just rolling their eyes up. So now I can drape my wet jeans skirt over the bamboo tipi and smoke furs, maybe even sausages? Lovely!

Thanks again for making the page!

Best wishes,
Antje

Hello Antje;
Thank you for visiting my webpage. If I ever start tanning rabbit pelts, it would be angora rabbits. I have a few thoughts that you might be able to use. With the lack of available brains (a problem for many of us), there are a few substitutes. I have never used any of these substitute methods, but I

know several people who have. The easiest one is slightly beaten eggs. An added benefit is they smell less than brains, and there is less chance of infection. Another "no brainer" is soy lecithin, available in health food stores. To quote my friend Markus, "I buy the lecithin in granule form at the health food store. Boil it up in hot water until all granules are dissolved. Then I throw it in the blender and make a very runny solution." Ken Wee in the SPT Bulletin says to dissolve 1/4 Cup lecithin, 1/2 cup shortening, and 16 cups of hot water. Let the solution cool off so that you can hold your hand in it without burning before applying to the pelt. If the pelt is fresh off the rabbit, the flint scraper should work fine. I have used obsidian scrapers, but mostly use a steel planner blade. If the hide is dry, I use pumice to remove the membrane. Just be gentle on thin hides like rabbits and canine.

Your smoking skirt doesn't have to be wet, only damp enough to keep the hot spots from burning. Don't want to steam your hide. I would not use the skirt over the bamboo, since the bamboo would be a real fire hazard. Try using the bamboo on the outside, sort of an exo-skeleton. All you need is a few twigs going across the inside of the skirt/pelt to channel the smoke into the pelt.

I visited Kent several years ago, and remember it a a beautiful place. Lots of chalk laying in the fields. We met a couple who were doing falconry at Leeds castle.

Let me know who it goes. One of these days I am going to try rabbit pelts too. For the moment I have deer and Beaver to work on.

Best wishes,
Bill Scherer

From: Antje Cobbett

Dear Bill,
How lovely to hear from you and thank you so much for the tips. I shall integrate them into my tanning efforts.

I like the idea of egg white, I've always wondered what to do with them as I don't make cakes and sweet stuff and now there is a way to use it up when I do mayonnaise! Great. But even more I like the soy lecithin which we can also buy in health food shops. The question is, how long do I have to leave them in egg white (and is it a solution with water or pure?) and how long for soy lecithin? I can hardly believe that this is tanning furs! But I love it! It would be so much easier and less smelly, of course!

So far, I've tried tanning with oak bark, battery acid and alum, all of which is very expensive and very difficult to get! So now there is new hope!

Thank you so much again!!!

Best wishes,
Antje

Hello Antje,
Last night I took out my copy of "Buckskin: The Ancient Art of Braintanning" by Tamara Wilder and Steven Edholm. They were my first teachers of braintanning leather, so I refer to them a lot. The section on alternatives say to use the egg yokes, not the egg whites. I don't think water is added, but since I have never tried this method I can't speak from experience. I have read of an instance where sulfuric acid was used, but that is a very toxic substance. I imagine the result would be a toxic pelt as well. Stick with the natural tanning agents. I have also heard of mayonnaise, soap, oils, tree bark, acorn paste being used. Check out braintan.com, they have information on all this kind of stuff.

On the question of how long to leave a fur pelt brained (or egged) the answer is: "that depends". The thickness of the skin and outside temperature are two big factors. After I apply a brain paste to the flesh side of a fur bearing pelt, it is stuck inside a plastic bag, and put in a shady spot. After an hour or two I will smell check it. If it is getting too smelly, better pull it out and start the softening. For a guess on rabbit pelts on a warm day, probably two hours, but check every half hour. I know the thicker pelts (raccoon) can be brained overnight. Hope this helps. Give me a shout when you can.

Always my best,
Bill

Hi Dino,
Thanks for getting back . . . in one of my books by a Mayan anthropologist, he mentions that cordage around 6,500 old from maguey was found in El Riego de Tehuacan, Mexico. But I am curious if anything earlier than that is known about.

You might like to know that I found out about Primitive Ways site by reading a newspaper from France!

It might be really interesting to your group (if they do not already know a lot about it) to realize that a considerable amount of cordage in Guatemala is made either made by leg spinning or with the hand held rope spinning device called the "rueda" or "carreta".

Thanks again,
Marilyn Anderson

I have been getting helpful suggestions. Many thanks to those who took the trouble to write me.

All this interest in subjects like "thigh or calf spinning" on the part of what seems to be a considerable group, I will convey to a Maya specialist in this area, JosÈ Balvino Camposeco, who is an anthropologist at the Subcentro de Artes y ArtesanÌas Populares in Guatemala City. He has done a little book (El Maguey Y Sus Usos En Guatemala) (It may be available in English, too.) on cordage in Guatemala obtainable through the Yax Te' Foundation Press. in Palos Verdes, CA. email: pelnan@yaxte.org

It is hard for me to express how thrilling it was when I lived in a Maya town in Guatemala, in the 70s, to watch the boys who did this as "artes manuales" in school. During recent trips to Guatemala, I have been told that spinning maguey and making the "knotless" netting (simple looping) bags is no longer done in public schools there. It may be done now in some of the Maya bilingual schools.

Marilyn Anderson

Hello,
I came across your article when looking for some information on drum making. Thank you for sharing your information with others! I have started to work on a few tree trunks and tried using a chain saw to open up the inside a bit so I could start using a chisel. It is a bit difficult and do just a little every day.

So I would like to plan and make a few drums as you have showed but would like to ask two questions:
1. How thick does the side of the tree trunk have to be to stay stable and not crack in the future?
2. Do you have any recommendations as to where to purchase some full pieces of rawhide (elk or buffalo)?

Thank you in advance,
Neta Aloni

Hello Neta;

> 1. How thick does the side of the tree trunk have to be to stay stable and not crack in the future?

If your tree trunk has been seasoned properly, it should not crack. I have read of wood carvers

using green wood and roughly shaping the object to cut down on the drying time. After the wood was roughed out, it was placed in a sealed plastic bag for a week or more to stabilize the wood, then it was taken out, worked on, and air dried in a shaded area. Of course, these carvers have been working on wood for many years and they were sensitive to all the tricks and short-cuts for curing wood. Another fast method for curing wood was to rough out the form and then grease the wood. It was air dried in the shade. This technique was used by bow makers for their bow and arrows. But letting it dry naturally for a few months (even to a year) is one of the better ways to insure the wood will not crack in the future. While drying, sealing the ends of the logs with Elmer's Carpenter's Wood Glue will also help to keep the ends from cracking. You can always give the wood a final lacquer or shellack finish to protect the wood (don't do this if your wood is still green. Let it dry completely before brushing on a finish).
How thick should the sides be? If the wood was properly cured, you can make the sides from 1/2" to a little less than 1" thick.

> 2. Do you have any recommendations as to where to purchase some full pieces of rawhide (elk or buffalo)?

Access our website (www.primitiveways.com) and find the category called "Resources". Then find the article entitled "Stores That Offer Raw Materials for Primitive Projects". Open the article and scroll down to Michael Foltmer. He sells deer, elk or buffalo rawhide. He is a reliable source and I would recommend him. He may be at an event in Arizona called Winter Count this week, so he may not be at his number. Call him to find out if he's around or try again next week. If you do contact him, mention you got his number from primitiveways.com and me. Primitiveways.com or I don't get any gratuities from him for mentioning his business to others, but it would be nice to know that we are referring him because of his excellent customer service and products.

Good luck on your drum project,
Dino Labiste

Hello.
John Goude gave me your email address. I'm looking into a story about food foraging for Forbes magazine. As you might guess, they're looking for something less on the survival side, and more like a fun class outing, followed by a cookout. That kind of thing. I found an outfit in Santa Cruz, CA that takes people foraging in tidal pools and then cooks up a big feast, and now I'm trying to find some other people/places around the country where this sort of thing is possible. Any advice/contacts/websites I should know about?

Thanks in advance for your help.
Dave

Greetings from Norm Kidder, Primitiveways:
You ask about food foraging classes around the country. I do about on or two a year myself - once in March, a one day learn 'em, pick 'em eat 'em sort of thing. and then we do a bit of foraging as part of our Rattlesnake Rendezvous on Memorial Day weekend along with a lot of other skills.

Good places to check in if you haven't already are John Kallas - Wild Food Adventures (Portland) wildfood@teleport.com, and Christopher Nyerges (Northern California) sos@self-reliance.net. Scooter Cheatam (Austin, TX) uwp@jumpnet.com , is putting together an encyclopedia of useable plants for Texas, and does Weed Feeds. David Holliday who works for BOSS (Boulder Outdoor Survival School) is an expert on the desert plant foods. (contact David Wescott at dwescot@aol.com) These guys are the best I know of, and the most likely to know others.

Happy hunting,
Norm

Do you know where I can get some antlers to make a knife handle? Any ideas on how much it would cost? I spoke with a taxidermist. He wanted $100 for a set. That's way too expensive for me. I'm looking in the range of $20. Can I find some at that price?

I read your article on how to insert an antler onto a knife tang. I have 3 knives that I'd like to make antler handles for, but don't have any antlers. I know alot of folks who have antlers, however, they're already mounted and don't want to part with them.

Thanks for any suggestions you have.

John Darwin

Hello John;

Access the homepage on our website: www.primitiveways.com

Look for the category called "Resources" on the left hand side of the homepage. In that category you will find the section entitled, Stores that Offer Raw Materials for Primitive Projects. Access that section and scroll down until you find Moscow Hides and Fur. Despite the name Moscow, this company is located in the United States. Check out their website (the URL address is in the information pertaining to Moscow Hides and Fur). They sell antler pieces that are reasonably priced.

Good luck on your project,
Dino Labiste

Mr. Baugh;
I have enjoyed your articles, and learned form them, on your website and in the "Primitive Technology". I have a question that I am trying to mentally bridge the gap with, perhaps you know the answer or have some ideas. I would appreciate it.

Aboriginals, early man, used hide glue . . . I've tried making this and knows it requires a long process of boiling, adding liquid, more boiling . . . till you end up with the goo. How do you think this may have been discovered? What primitive containers/methods would they have used? I have a project that I am working on demonstrating these things and am stuck on this . . . any ideas?

Thank you,
Respectfully,
Mark Peatrowsky

Hello Mike,
When was the last time you made soup from leftover animal parts? My guess is that soup came before glue. Maybe someone was starving and decided to boil up some dicarded feet, bones, hide, ect. to extract some nourishment from them. Maybe stone boiling or in a bark container held over a fire. They stuck a stick into the mess and found out that boiled meat stock gels when it cools off just like Jello. Pretty good glue can be made from un-flavored Knox's gelatin.

Hope this gives you some ideas.

Dick

Hello GENTS!

I found www.primitiveways.com/ and was happy to see that I am not the only guy in the world who is looking at his world and values a bit on the primitive side. My friends all think Im nuts lately, oh well, cant listen to them forever I guess.....

I am far away from your gatherings, (Mississippi) and would certainly love to see some hands on stuff.

But I have learned much on my own, just going slow and thinking about your surroundings, you can solve almost anything. (I design and maintain wildlife habitat specializing in watersheds. I contract to various govt and private habitat orgs).

I have decided to prepair for a 2002 winter pilgramage into the paleo world. Winter here isnt TOO harsh. I may decide to go elsewhere depending on habitat conditions. I want to do this for many reasons, one is that I must do this to feel and understand who I am and how I fit into things as I should. There are lessons here that can apply to a regular life, a whole system of values seems to be sitting here waiting to be explored and I want very much to feel this out and to see who the man is under the modern skin.

I have been far and wide in the southeast all my life as pro salt fisherman, pro trapper, pro hunter, I have done them all for a living and am only now beginning to realize many things about myself.

I can get all the pelts I need for clothes and bedding and other items and need to learn to tan them naturally. I also need to learn how to fire clay and how to find it in my region. I do know of one spot where indians gathered it, but I dont know how to use it. I have also purchased quite a bit of rock, good rock for points and knives and need to be instructed how to do these things.

Thats about all I need isnt it? :-)

Well some knowledge of local edibles would be real nice as well. Maybe something about making fire would be real good too.

I have to know this man ---- can you help me?

"Benny Marascalco" <yobenny@hotmail.com>

Hello Benny,

You need to join the Society of Primitive Technology (SPT). They send out a bulletin twice a year with tons of information. Steve Watts in Georgia is the presicent. The bulletin has lots and lots of names and addresses of kindred souls, organized by region. That would be the best way to connect with the people who could teach all thos things. I am sure that your hunting and fishing skills would be quite valuable to some of these people who know flint knapping, hide tanning, and other paleo skills.

SPT: call 208 359-2400. Well worth the effort and $.

Dick

Benny, greetings from the world of crazies in California. Sounds like the lust for real life has gotten you. Many of us dream about going abo/paleo but few of us do it. If you haven't already, check out some other websites - abotech.com, primitive.org, hollowtop.com, braintan.com, atlatl.com. these will lead you to lots of others. There are a number of gatherings in the Carolina/Georgia area. A good person to contact is Scott (Abo-Boy-Wonder) Jones in Georgia. He is a flintknapper, soapstone, gourd, river cane guru of sorts, and a fellow board member of the Society of Primitive Technology. E-mail him at scottj@arches.uga.edu (phone - 706-743-5144).

Good luck,
Norm

Dino;
I have some large pine logs in my backyard and am using them for various projects. I'd like to make a double headed drum with one of them. Would this be a decent wood for such a project? Also, when pulling the rawhide, should I allow a slight even sag to allow for the tightening of the skin once it dries? I really appreciate any comments you can make to me.

Thanks!
Ursa

Hello Ursa;

The pine logs would work fine.
When lacing your rawhide, leave enough slack as you go around your drumhead so that the hide is evenly centered on the opening of the log. Before the rawhide dries, begin tightening the lacing as you progress around the log. Don't wait for the rawhide to dry to continue the lacing. You need to complete your lacing before the drumhead dries. As you're tightening the lacing, you're stretching the wet rawhide taunt against the log. The purpose is to stretch out the hide as tight as possible. This will influence the sound of your drum. You'll never be able to stretch out the hide if your rawhide has completely dried first.

An added note: I mentioned to put a hole in the side of the log to enhance the sound of the drum in my website article. This is not really necessary if the drum sounds good to begin with. I've recently found that a two headed drum without a hole in the side of the log sounds just a good as one with a small hole in the side. Let your ears be the judge to determine whether to make a hole in the side of the drum.

Tip on lacing: Take a look at the coconut drum on the Homepage of PrimitiveWays.

Scroll down to the photo of the coconut drum. Instead of lacing your cordage through the rawhide holes in my two headed drum article, try securing the cordage on the drumhead similar to the photo of the coconut drum. Take a single cordage and weave it in and out through the holes in your rawhide. Secure the cordage with 2 overhand knots. Be sure that the knots end on the underside of the hide. Now, lace your lacing cordage through the cordage on the drumhead in the zig-zag pattern on the two headed drum article. The cordage that you initially wove through the drumhead and secured with 2 overhand knots will keep the holes in the wet rawhide from tearing. All the load will be taken up by the cordage on the drumhead and not on the rawhide holes.

Good luck on your project.

Sincerely,
Dino Labiste

Hi Dick,

Do you know of any effective natural insect repellants for on the body or otherwise?

Thanks,
Eric Waymann

I have used garlic (chew a clove) and also mugwort (Artemesia sp.), a relative of sagebrush (rub it on). Mosquitos don't seem to fancy me anyway.

Dick

Hi Dino,
Do you know of any effective insect repellants for use on the body or otherwise?

Thanks,
Eric Waymann

Hello Eric;
By "effective insect repellants", I'm assuming you're referring to natural plants. I can think of 4 plants off the top of my head:

1) California Bay Laurel - The dried leaves can be scattered in shelters to repel fleas, lice and other insects.
2) Eucalyptus - The leaves can be scattered in shelters to repel insects.
3) Yarrow - The fresh leaves may be rubbed onto the skin as a temporary but effective insect repellent.
4) Mugwort - Mugwort, as well as California Bay Laurel, leaves were placed in acorn granaries by the California Native Americans to deter insects.

Sincerely,
Dino

Bill;
Are the hides that you get, salted at all when you get them or do you salt them? I hear of a lot of people soaking them in salt. Is it neccesary when using the brain tanning method? If you have

answers, that would be helpful.

Thanks,
Jason Percell

Hello Jason;
Salt is not neccesary at all with brain tanning. If the hide has been salted, the salt should be flushed out before scraping and braining. The salt is added to the hide as a way to preserve it until the tanning process begins. There are other ways to preserve hides, freezing them for example or drying them. Fresh frozen works the best for me, but I use the drying method more because of limited freezer space. When using the drying method, I make sure to scape all the meat and fat off the hide first (fleshing), then let it dry. I think that during aboriginal times, salt was a precious commodity, and not used to preserve hides very much. Probably the hides were tanned as soon as the animal was butchered, or at least fleshed and dried.

Bill Scherer

(Question pertaining to willow bark fibers)

Brant, sorry to be so long in answering, but life is full. As to getting the fibers out of willow bark - usually I use willow as is, sometimes separating the outer bark and using the inner only. A quick way to get fiber is to strip off some bark, then work off fibers from the inside bark along one edge. I try to get them stripped off as long as possible, which takes some practice. I continue working off fibers while peeling back the outer bark. Another method is to dry the bark and resoak it, then de-laminate it into ribbons by working it loose (bending it back and forth). These thin strips can be further separated until fine enough to twist into a stiff cord. This time of year, it may be hard to get the bark to strip easily, look for trees growing in the water, as they will be wetter, and easier to strip). Keep practicing,

Norm

I just wrote to you and then discovered the primitive skills web site. I am very excited.

More questions:
Do you hold workshops for teachers? Day trip activities for kids? (Or overnight - we are great campers) How are they structured and what do they cost. (We are great campers and fundraisers, but we are not wealthy)

We also have thought about planting gourds this spring to use next year. I have not before taught 4th grade and most of the teachers in my school are pretty pencil and paper, so I'm a little ignorant in this stuff. It seems that guords were used by Ohlones in several ways. Is that true - what ways? If that is so, I think we're going to try planting them before school is out and see if we can have some to dry for our Ohlone study.

And don't forget about the tule grass.

I am very interested in
*teacher workshops
*class field trips
*haveing a visitor come to the class
*materials, info about hands on things we can do when we study Ohlone ways.
*stories from the Ohlones (I am also a storyteller)

If you can help me in any way, please respond. Thank you.

Bonnie Malouf

Greetings from Norm Kidder. You've got quite a few questions, but all of them answerable. First you need to know about the Coyote Hills Visitor Center in Fremont. They have exhibits on the Ohlone Indians, including a boat made from Tule reeds. They also have a shellmound (ancient village site) within the park and do weekend programs to visit it as well as weekday school field trips. Because you are from San Mateo County, there is a charge of $40/hour/naturalist for your class. Call Wanda Spitler, the secretary on Mondays, Tuesdays or Wednesday mornings and ask her for information and an application form. Applications for the fall are due by the first Monday in August. In October they host the Gathering of Ohlonean People for a one day event with songs, dances, stories and demonstrations, and they have occasional other events. My wife works there (as did I for 24 years). We are also offering a teacher training this summer on the Ohlones, with special emphasis on hands on activities. It is three days long and is listed under the Educators Academy. You can sign up for it through our central registration office at 510-636-1684. It's less than $100 I believe (I'm at home and don't have the flyer with me). The date is near the end of July - check the East Bay Parks website - ebparks.org - for specific details.

Tules do grow around the Bay Area, but mostly in places where you need permission to cut, such as drainage ditches and golf courses. There are tules growing at Coyote Hills if you want to see what they look like. You can tell them from the more common cattails which have flat leaves and a cigar shaped seed head because they have only a round flower stalk, no green leaves, and a tassel like seed head. If you want to see what a thatched tule house looks like, there is an exhibit at the county museum in Redwood City (in the old courrthouse). I put the thatching on over a frame that

was already there. There is also a tule house at Coyote Hills at the Shellmound, and there are models in the visitor center. I also have a tule house at Sunol Regional Wilderness where I work, but that is further to travel.

Stories from the Ohlone are scarce, but what exists have been translated and illustrated by an Ohlone woman named Linda Yamane or told by another Ohlone - Alex Ramirez. They are for sale at the Coyote Hills Visitor Center store.

As to in class visits, there are some Ohlone people who sometimes do that sort of thing, call Bev Ortiz at Coyote Hills - 510-795-9385 - to find out if any of her Interns (Ohlone people) are available.

Some phone numbers: East Bay Parks Reservations - 510-636-1684
Coyote Hills Regional Park - 510-795-9385
Sunol Regional Wilderness (Norm) 925-862-2600

E-mails: chvisit@ebparks.org (Coyote Hills)
svisit@ebparks.org (Sunol - Norm)

Websites: primitiveways.com
ebparks.org

Directions: Coyote Hills - take the Dumbarton Bridge to Fremont, take the first exit - Paseo Padre Parkway and turn left at the end of the ramp. follow to a left turn lane for Patterson Ranch Road (by a stand of Oak trees), turn left. Patterson Ranch Rd. ends in the Park. The Visitors Center is about a mile past the entrance Kiosk.

Sunol/Ohlone Regional Wilderness - take I 680 north from San Jose over the Sunol grade from Fremont. Take the Hwy 84/Calaveras Rd. exit and turn right at the end of the ramp. Follow Calaveras Rd. south for 4 miles to Geary Rd. Turn left and follwo Geary 1.6 miles into the park. The visitor center and my office are to the left after the Kiosk.

Good luck, hope to see you in a program,
Norm

Bonnie, I forgot to mention gourds in the earlier e-mail. they weren't used by the Ohlone until after the Spanish arrived, the Ohlone's only crop grown from imported seed was tobacco. Gourds grow best in very hot climates, I've only gotten a few to be useable in my yard in Fremont. There is a good place to buy them in Folsom - Zittel's Gourd Farm. they have a Gourd Festival each year. For more info on that - e-mail Chuck Kritzon at Petroglyphics.com (he's another of the PrimitiveWays.com guys).

Norm

Hello Norm,
My name is Brant Assmus. Recently I have been trying to make cordage. I have been trying to use the dry inner bark from birch trees. Whenever I try to seperate these fibers they seem to fall apart. Do you have any suggestions? Could you please tell me how to make cordage from willow bark. Thanks.

From: Brant

Brant, I've never heard of anyone using birch bark for cordage, but willow was (and is) used. First cut some willow branches. Small green ones have very thin bark, but try to scrape off the green outer bark. Thicker pieces can be used, but only the inner bark, the inner bark works best if dried first. After drying, resoak, then carefully separate into layers, then shred into fibers. These should then be twisted into cordage as with any other fiber. Willow inner bark cord is pretty stiff when dry, but loosens up when wet. For tips on making cordage, if you don't already know can be found on the primitiveways.com website - look for the making cordage by hand article.

Good luck,
Norm

Brad Watanabe wrote:

Hey Mr. Labiste,
I got my coconut and I just scraped out the inside today. I didn't really understand if I'm supposed to make a hole in the bottom of the drum, or if I'm just supposed to leave it. I also was wondering what I should use for the drum cover, because I don't think I can find shark skin.

Thank you,
Brad

Hello Brad;
Since you already scrapped out the inside of the coconut, I'll assume that you've already cut a hole in the coconut. The coconut has three, small eyes. These are the eyes in which the plant sprout will

germinate from. I hope that you've cut off that top portion of the coconut. That hole that you cut off will be the opening in which the drumhead membrane will be lashed to. Do not cut another hole on the bottom. Also your selection of your coconut should be more round in shape as oppose to the elongated shapes. The bottom of your coconut drum should have a slightly flat and rounded shape. If you have the elongated shape, it will not lay flat on the knee, when you play the coconut drum.

A Hawaiian fish, called Kala, was also used for the drumhead. The fish has a leathery, dark green skin. Check out the Chinese fish markets in downtown Honolulu. The markets are located on the corner of King Street and the Ala Wai canal. Ask the vendors if they have Kala. Or check out Tamashiro Market in the Kalihi district (look in your phone book for the address or call them up) to see if they have Kala. When you get the fish, lay the Kala flat on a cutting board and cut around the body of the fish. Near the gill area, gently peel off the skin. Try not to tear the skin. You want a whole Kala skin to come off for your drumhead. After peeling off the skin, lay it on the cutting board with the flesh side facing you. Take a butter knife, hold it at a 90 degree angle and scrape off any meat that is clinging to the fish skin (remember: try not to tear the skin). Get off as much of the meat as possible or the dry meat will eventually rot the skin. You only want to be left with just the Kala skin. If you haven't finish sanding and polishing your coconut yet, place the Kala skin in a ziplock bag and store it in the freezer. When you finish your cleaning, sanding and polishing of your coconut, then defrost the Kala skin in cold (not warm) water. When it becomes pliable, rinse it in soapy water, ring it out (remember: try not to tear the skin) and lash it to your coconut.

If you don't want to go through all of that process with the Kala skin, you can go with a non-Hawaiian method of using cow rawhide for the drumhead. Go to a store that sells pet food and buy one of those rawhide chew bones. These are hard, rawhide "bones" that people get for their dogs to play and chew on. Soak the rawhide chew bones in cold water until it softens completely (it may take awhile). When it's soft, unroll the rawhide bones and you should have a piece of rawhide for your drumhead.

Sincerely,
Dino Labiste

Mr. Baugh;
I've been studying primitive skills a number of years now for my own enjoyment. I've read your articles in "Earth Skills: A Book of Primitive Technology", and have been watching your web site. I just wanted to send an e-mail and express my appreciation for the research and knowledge you have passed along...it has really helped me and excited me to try something new.

Thank you.

Respectfully,
Mark Peatrowsky

Fremont, NE

Thank you for your very kind words.

Dick

Hi Dick,
I'm wondering if you have suggestions for the following more "quick need situations" where you have no ready made tools. How to make a watertight container for travel such as something similar to a canteen.

Mors Kochansky of Canada suggests carrying a large rubber balloon and a nylon bag. They take up very little space and weight and can carry a large volume of water. In the "bush" you might find bamboo which can be hollowed out as a water container. Other plants have hollow stems. AVOID WATER HEMLOCK!!! Your stomach can hold a lot. Drink until you are on the verge of puking, wait a while and drink some more until you have to urinate. Meanwhile, your urine should be perfectly clear. Some people are skilled at making watertight containers out of birch bark. You have to be in paper birch country for that.

and also some type of container for boiling water in (presumably with rocks).

I have heard of Native Americans boiling things in birch baskets held over a fire.

Also, any suggestions for how to tell the type of that won't explode?

The magic words are "vesicular basalt". This is an igneus rock with lots of holes in it. It's one thing for people to suggest not to use stones from a stream but, how to tell what you can actually use is another. Where we live, the San Francisco Peninsula, the archaeologists look for "fire cracked rock" as an indicator of old habitation sites. To me "fire cracked" implys that the rocks were not all ideal candidates for stone boiling. Experiment!

Thanks and cheers,
Eric Waymann

Hello Dino,
Your gourd canteens are truly a work of art. My question is, how do you clean out the gourd from such a small hole when constructing a canteen?

I've got a good selection of gourds and I make bowls and cups with them. I would like to try my hand at a canteen. Could you advise? Please.

What type of paint do you use on the gourds?

Thanks for any input!

Joe Musselwhite
Joe's Wilderness Survival Skills

Hello Joe;

> how do you clean out the gourd from such a small hole when constructing a canteen?

The traditional method I use for cleaning out the gourd from a small hole is an old Hawaiian technique:
1. After the hole is made, take a stick and swirl it around the inside of the gourd. This will loosen up any seeds and dried gourd membrane. Turn the gourd upside down and shake out any loose seeds and membrane. Some of the paper-like membrane will get stuck near the hole. With a tweezer, pull out any obstruction at the entrance. Repeat with the stick and extract as much as you can out of the gourd.
2. When you can't get out anymore contents from the inside of the gourd, the next step is to use pebbles to loosen up any clinging seeds and membrane. Collect pebbles that will easily fit into the hole. Your pebbles should also have facetted corners that will help to abrade the inside of the gourd. Don't use smooth stones. Drop your pebbles into the gourd and shake and swirl the inside of the gourd. NOTE: Do not roughly bang the pebbles inside the gourd. Doing so will create micro fractures in the gourd. How hard should you shake it? It's a matter of feel. Experience will tell you how hard to shake it. It also depends on how thick your gourd is.
Occasionally empty out the contents of everything inside the gourd and repeat the process until you start to get fine gourd dust.
3. After you are satisfied with your pebble progress, empty out everything and fill the gourd completely with water. Let it sit for 2 days, then empty out the gourd. Drop the pebbles back into the gourd and fill it 1/4 with water. Swish and swirl the contents, empty out everything and repeat over and over until the water is clear. NOTE: Be sure you have a good grip on the gourd when doing this. The weight of the water and the swirling motion may make it difficult to hold. If you drop it, the gourd will surely crack. The rule of "no banging of the pebbles from side to side" still

applies.
4. When you are satisfied with the results, empty out everything and set the gourd outside in the sun to COMPLETELY dry.
5. To use the gourd as a water container, you have to leach out the inside of the gourd (it has a very strong tannin taste). To do this, it's just a matter of adding a solution of baking soda and warm water to the gourd and letting it sit for a day. Empty and repeat this process until the bitter taste is gone. The Hawaiians used salt water from the ocean for the leaching process, then fresh water.
6. When not using your water gourd, be sure to COMPLETELY dry it out before storing. If there is any moisture in the gourd when you store it, the inside will develop mold. It's also good to coat the inside with safflower oil (you can use the brand called Saffola - found at your local supermarkets). Or you can use olive oil. Pour some oil into the gourd and swirl it around, then empty out the oil. Turn the gourd upside down to completely drain out the excess oil.

> What type of paint do you use on the gourds?

I don't use any paints on the gourd. The designs are burnt onto the outer surface using a wood burning tool (found at your local arts and crafts store or woodcraft store. Also check out The Caning Shop - www.caning.com). Since the gourds are porous, commercial paints may leach into the gourd. If you are going to paint your gourd, try using black, fine powdered charcoal from a campfire, mixed with pine pitch. It's more organic and less toxic. Let the paint mixture dry completely before using the gourd.

Sincerely,
Dino Labiste

(Question pertaining to the article, "Scout Pit")

In those pictures on this page it showed that you had the leaves with the branches and I thought that it would be very uncomfortable to have those branches for bedding. Also did you not have a blanket or did the leaves act as insulation? How do you make a grass mat? Is it like a woven mat? Sorry for all the questions I asked.

Your fellow outdoors man,
Nick

Hi Nick

Always good to know someone is reading the primitiveways website. I'm always happy to answer any e-mails concerning primitive stuff.

The bedding is all leaves, with my GI issue rain poncho on top of the leaves. The only branches are on top of the poncho, to keep the wind from blowing the poncho away. I have slept in leaves and hay, both are very comfortable. Did not use a blanket, although I did wear pants, shirt, sox and coat. A knit wool cap is a good idea too. If you got it, use it.

The mats I used were commercially made, the kind people use at the beach. These were not really necessary, my idea was to limit the amount of itchy leaves that would get inside my clothing. I've tried with and without mats, seems to be about the same. The only mat I've made was from tules (bulrushes). I will try to describe the tule mat weaving process, but it should really be a hands on demo. Lay down the tules in parallel like the rungs on a ladder, but no space between the rungs. Take another tule and wrap it around the tip of the bottom rung. Do the same in the middle of the rung, and then on the other tip. Twist each of the weavers, lay the next rung in, and repeat. Keep going until your mat is as long as it need to be. Kinda confusing, I will see if I can locate and better mat weaving instructions.

Getting in and out of the pit is not difficult, but it is not like crawling out of a sleeping bag. I suggest to bed, and keep a canteen within arms reach.

Good luck and sleep well,
Bill Scherer

Dear Norm,
Picked up a reference to your work on the Wild Edibles listserv, and wondered if you would like to be included in the Directory of Edible Wild Plant Educators. It is a national listing of people who are able to identify positively, at a minimum , the common backyard weeds which are edible and medicinal, and who are willing to help others identify them. The goal is to have someone within 50 miles of everyone in the US who they can turn to if they are having trouble figuring out what "weeds" they have in their backyard. Currently we have over 440 people from 45 states included in the listing.

If you would like to be in, and/or have associates who also belong in this list, please provide me with
Name
Address
phone number
e-mail
website
brief description of your background with edible wild plants and what you are currently doing with

them, such as teaching courses, available for consulting, doing weed walks, etc.

Thanks
Peter A. Gail, Ph.D. Director, Goosefoot Acres Center for Resourceful Living,
P.O. Box 18016, Cleveland OH 44118 (216) 932-2145, fax: (216) 932-2187,
e-mail: petergail@aol.com. Website: www.edibleweeds.com or
www.goosefootacres.com. Author, lecturer, photographer, publisher. Books and
articles on edible wild plants, the northern Ohio Amish and creative living.
Imprint: Goosefoot Acres Press. Classes on self-reliant skills.

Peter, greetings.
Thanks for the invitation. I just had an e-mail and in person talk with someone you directed to me - Samantha Allyn.

For your directory:
Norm Kidder, Supervising Naturalist
Sunol Regional Wilderness
PO Box 82, Sunol, CA 94586
(925) 862-2600
svisit@ebparks.org or atlatl1@aol.com
see website - primitiveways.com

I teach a variety of skills under the heading of Old Ways Workshops for the East Bay Regional Park District. I do at least one edible and useful plant program each spring (current one on 3/24/01). I include ethnobotany on many other programs, including basketry, survival skills and on our weekend in the stone-age Rattlesnake Rendezvous on Memorial Day weekend. I teach primitive cooking as well. I an often available at work (park south of Pleasanton, CA) to help people with identification and uses. I have a small library of books available. Check out the primitiveways.com website for schedules of Old Ways Workshops.

Hope this is useful,
Norm

Hi Norm,
Do you have knowledge of a school similar to yours in the SW area? I currently live in Tx, but could also attend a school located within a reasonable driving distance (i.e., NM, AZ, CO). I have searched the internet for such schools, but with no results. If you do not have any info, perhaps you may be able to offer suggestions for finding a school (contacts, etc.). Thank You for your assistance.

Warm Regards,
Wolf

Wolf, Have you checked out Tom Elpel's website which includes a listing of schools? He is at hollowtop.com. Cody Lundin teaches out of Prescott, Az, and there are others in Arizona and Colorado. Check his list, which is state by state. If you want more info on a particular school, you can check with Tom, or me.

Good luck,
Norm

Wolf, Norm again. There is also Joe Bigley's book - Aboman's guide to Primitive and wilderness Survival Schools (or something close to that). Tom Elpel may sell it through his site if you can't find it otherwise.

Norm

Hi Norm,
Peter Gail from my edibles newsgroup recommended I contact you. My name is Samantha and I live in Danville. I am looking for some classes or groups of people with whom to forage. I also would like to learn more about what grows when - where - in this area.

Are you also a mycologist? I would like to learn about the mushrooms here. Are there any morels?

Sincerely,
Samantha Matlock

Samantha, it was good to talk to you on Saturday. Again, the only edibles program I'm doing is on 3-24 at Sunol. some of the other Society of Primitive Technology members do foraging outings on occasion, notatbly Bill Scherer, Dino Labiste and Dick Baugh, they are all listed in the Friends of Primitive Technology schedule on the PrimitiveWays.com website. I'm not sure when they might be going informally, but you can e-mail them and ask. The Rattlesnake Rendezvous has an opportunity for foraging (May 25-27), and Dick Baugh's trip to Bridgeport also involves foraging. The best book on local edibles is called The Flavors of Home, put out by Heyday Books in Berkeley, it's available in many bookstores. It's specifically on the SF Bay area. You might also try

the Botanic Garden in Tilden Park. The head guy is Steve Edwards, who has some interest in Native American uses of plants, they might have something on their lecture schedule. Point Reyes Nat'l Park sponsors programs on California Indian subjects including food preparation occasionally. The group that does them is called MAPOM. If you call the Park, they can probably get you in touch with the schedule. You're other option is to come by Sunol when I'm there and drag me out of my office for help.

Good luck,
Norm

Mr. Baugh I am very excited that I found your web site! I am a 22 year old college student in Sacramento California. I grew up fascinated with primitive survival techniques, and the native american way of life. I recieved Larry Dean Olson's survival book when I was 7 and read it all the way through. I was hooked, always trying to make tools, weapons, etc. anything I could. I think in high school, society convinced me to be practical and logical or something and I abandoned my boyhood passions because I had to "think about my future." I have rediscovered my passion, though I don't have alot of physical experience in primitive ways, I think it is the only thing that really gets me going. Where should I start? Are their any groups around Sacramento with these interests. I thought I saw something about internships? Can you make a career of this? Also I have been trying for a while to make a bow drill fire, my big problem is cord slippage, I have been using rawhide shoelace twisted until round, I grips fine on the pull stroke but the push stroke slips some. Also how long do you drill on average before you get a spark? Any response would be greatly appreciated, I hope I didn't overwhelm you with questions, I am just excited that there are others out there who share my interests.

Thanks for your time,
Josh Eldridge

Josh's questions:
Careers in primitive technology: Contact Norm Kidder, supervising naturalist in the East Bay Regional Park District. He's on our web site.

Cord slippage on a bow drill: Do it the Egyptian way. Use an extra long cord. Either drill a hole through the spindle and thread the cord through the hole or else tie the cord to the middle of the spindle with a miller's knot. Then wind the cord up on the spindle. It CAN'T slip that way. Slippage is bad.

You should get smoke in a minute or less. I go real easy at first. I'm never in a hurry. After going easy fro a while and getting a wisp of smoke then go as fast as you can. Where you live get a

California incense cedar hearth board and a spindle of something harder like willow or mule fat.

Regards,
Dick

Josh,
Careers in primitive technology are a bit rare. Most folk, like Dick, do it as a hobby or side business. A few of us (myself, Steve Watts - the president of the Society of Primitive Technology) work for government entities that pay us for teaching primitive skills as part of our jobs. We also due a lot of beaurocratic stuff. Others are freelance skills teachers and craftsmen, such as Jim Riggs, Ron Macy, Joe Dabill, etc. They make a slim living with no benefits or retirement, but have some freedom. Some of us run schools of one sort or another that include primitive skills. Larry Dean Olson started Boulder Outdoor Survival School, which includes primitive stuff in a survival setting. Dave Wescott, who runs the Rabbitstick Rendezvous and publishes the Bulletin of primitive Technology, took over BOSS from Larry, and in turn sold it. Cody Lundin worked for BOSS, and now has his own school, the Aboriginal Living Skills School. Tom Elpel runs the Hollowtop Outdoor Primitive School (which may take in interns) . There are many others out there. Tom's website www.hollowtop.com has a list of schools all over the country. The one other school I've heard takes interns is the Teaching Drum school run by Tamarack Song. My recommendation would be to check out Tom Elpel, and BOSS (i think there is a link to BOSS at Hollowtops site). Boss does hire folk who have been trained to do the skills. Take a few BOSS courses if you can afford them, go the the Rabbtstick Rendezvous in Idaho in September (e-mail dwescot@aol.com). Take classes from anybody else you can find (check with Chuck Kritzon at petroglyphics.com). Join the Society of Primitive technology (a bargain at $25), and come on our Rattlesnake Rendezvous on Memorial Day weekend if you can.

Keep in touch,
Norm

Hi Norm,
I'm interested in becoming an outdoor guide and I'm looking to start my training by learning primative living (primitive fire building, prim. fishing, prim. hunting, shelter building, tools, etc). I'm wondering if you offer training (or know of a good source that does). Many of the wilderness training organizations only focus on wilderness survival but I feel like wilderness living is more suitable for what I'm looking for.

Thanks for your help,
Elliot

Elliot, greetings from cyberspace. What kinds of training are available to you depends on where you live. If you are near the San Francisco Bay area, then we offer some classes that would be useful to you. Check our website: Primitiveways.com. To find other schools around the country, Tom Elpel has a website that lists most of the schools at hollowtop.com. Joe Bigley also has a book out called Aboman's Guide to Wilderness Schools (or something like that). Joe's school is listed with Tom's site, and he also runs a chat room called the `cave' on the abotech.com website. Tom has taken on interns in the past and so do some others.

Good luck,
Norm

Hello, my name is Alan Skopinski. First I would like to say thanks for all the help you have given so many others, and many wonderful articles. I am currently studying ethnobotany and primitive living skills, more or less focusing on primitive living skills. To be honest, I was hoping that you take apprentices or interns.... I have learned a great deal in the past few years taking on interns, notably with Tom Elpel, and quite hopefully with Tamarack Song. If this is a possibility I would love to recieve more information. If not, thanks again and again... keep up the good work.

All that will be,
Alan

Alan, thanks for the e-mail. I work for a local government agency rather that for myself as do Tom and Tamarack. The only intern program we have is for college students, and I have to submit a description, and our Human Resources Dept. picks the person, so I don't know if I'll get one this year. I do work with young folks on an occassional basis who take jobs with the East Bay Regional Park district (my boss) as part time student aides and summer recreation leaders. For any of these. you'll have to contact the HR people at ebparks.org or call 510-635-0138.

Good luck,
Norm

Bill;
I live in a area of Utah that allows me access to many fox and raccoon. My family has been into raising chickens for many years and that seems to be a great attraction for these pesky critters. For the past 10-12 years, we have used all different types of trapping methods and have become skilled

in the art of capturing coons, foxes, and skunks. We have been simply donating the corpses to mother nature. My question is, is there a market for these skins? It seems so wasteful to just throw them away. I look forward to your feed back.

Regards,
Chad Brady

Chad;
I grew up on a farm, so I am well aware of the farmers need for pedator control. There is indeed a commercial market for raw furs. However the condition of the furs is critical. Fur is only in "prime" condition for a few months, sometime weeks, of each year. Unless the animal is trapped during that time, and properly skinned and cleaned, a comercial dealer will not want it. I will contact my brother in Minnesota, he is a trapper and can give us more information. There is a Utah Trappers Association, contact them for information.

There are other uses for animal carcasses than just pelts. I have eaten raccoon, quite tasty. The teeth can be used for jewerly. My friend uses fox leg bones to make flutes and whistles. Let's see what other uses we can come up with for the critters. I will contact you as soon as I have additional information

Bill Scherer

Hi, my name is Alan . I just wanted to tell you that your article on the atlatl was great, and much appreciated. I hear that you teach children primitive skills... do you have a school? To be honest, I was hoping that you take on apprentices. If this is so, I would love to get some more information. I am currently studying botany and ethnbotany, some mycology, primitive living skills (poor title), and some anthropology. The reason I wish to delve into an apprentice setup is because I plan on putting together some studies of my own, mostly relating to ethnobotany and primitive skills, but including ethnobotany and primitive skills teachers. I wish I could tell you more but I am still writing this, and I imagine you know how it feels.

Reguardless of outcome, your article was a pleasure and I hope you keep it up. By the way, I found that cherry wood works well for a didj 5ft and under, 1 1/2in mouth piece fanning out to a 3in bell at the bottom. Any longer and the reverberation goes to white noise. Maybe you have had a similar problem. Any ideas?

All that will be,
Alan

Hello Alan,
I am strictly an amateur at teaching young people. I do volunteer work in the schools here on the San Francisco Peninsula. You should really join the Society for Primitive Technology. That is the best group for networking primitive skills. In the San Francisco Bay area we have FPT, the Friends of Primitive Technology, a pretty active group.

The most successful didj's I have made have been from small eucalyptus logs. After they have dried I quarter them with a bandsaw, cut out the interior with a router and glue the staves back together. I use a piece of innertube rubber to hold it tigether while the glue dries. Then seal the inside with low viscosity epoxy.

I'm off tomorrow morning to the Winter Count primitive skills rendezvous in Arizona.

Keep in touch,
Dick

I just found your website and have enjoyed it. My interest in Native American culture started as a young boy growing up near the Senecas in southwestern New York state, and continued as I pursued a career as a forester after graduating from the New York State College of Forestry. Until I retired, my work was mostly in Georgia and the southeast. Since my retirement I have been active in the Georgia Native Plant Society having served on its Board and as President. I am interested in the subject of knotless netting and have made some "sprang" hammocks. Can you help me with some references?

Cordially,
Jim Smith

Hello Jim;
Here are some references for knotless netting:

1) SPT Bulletin of Primitive Technology #17 - Spring 1999 - Fibers
"Looped String Bags" by Bonnie Montgomery, pages 19 - 22

2) "Androgynous Objects, String Bags and Gender in central New Guinea" by Maureeen A. MacKenzie,
ISBN 90-5702-270-2

3) "Creative Ropecraft" by Stuart Grainger, ISBN 1-57409-115-8

Hope this helps,
Dino Labiste

Hello,
I am a varsity scout leader for a group of 8 boys. I have been looking for a project that would both teach and inspire the boys....your 4 hour kayak just may do the trick. There are just a few questions I have regarding the supplies I will need.

I live in the Pacific Northest (Medford, Oregon) and wonder where I would find the willow needed to build the kayak. As you might tell, I know nothing about plants and trees but am willing to learn!

See : http://www.gripclips.com/primitiveways/plants3.html/pages/Willow.htm

Secondly, is there a season to obtain this willow.

No.

and do yo need to soak,

No, but you should finish the boat before the willow dries out as it will get stiff and be hard to bend.

then dry before covering?

No, since it is the shape of the frame that gives it strength.

I like the 4 hour kayak because it is inexpensive and fun. Should you have other unique items to

build I would be very interested.

Take a look at our http://www.primitiveways.com/ Site. Lots of fun to be made.

Bob Gillis

Let me know what you think.

Sincerely,
Rob

Bob,
Saw the piece on reed flutes at primitiveways.com. Was wondering how can you keep the holes you drill in the flute from splitting.

If the reed is seasoned there is no need to reinforce the holes. I used a knife to cut the holes. If you use a drill bit make sure it is sharp and drill the holes slow. You can also burn the holes with a large nail that hold in a vise grip and heat red hot with fire or propane torch.

The picture seems to show some type of reinforcement added around the circumference of each hole, what is this material?

You are seeing the edge of the holes (since the holes were knife cut).

Bob Gillis

Thanks in advance for your reply,
Lance Stewart

Primitiveways;
I represent the National Paleolithic Society, Inc. We are about to embark on a national membership drive via the web. I can't tell you how much I enjoyed my visit to your site. I would realy like to speak to you about reprinting some of your stuff. Would you please send me a phone number at which you can be reached or give me a call on our toll free line at (888) 828-6188. You can check

us out at http://www.natlpaleo.org. There isn't much in the way of content out there yet, but there is enough information to at least give you an idea what we are about. I think our "articles" link will be of particular interest to you.

Hope to hear from you soon,
Ken Jensen

---

hi norm!
i met you a couple years ago when i visited coyote hills state park when i was working as a naturalist (still am). you and your wife were facilitating a program for 3rd graders--fire by friction and a visit to the Midden. i'm looking for on-line and hard-copy info regarding obsidian knapping. i've made a few points with pieces i've found in the local creeks up here in Loma Mar (inland from Pescadero, next to La Honda), but i end up "wasting" a lot more rock than i want to. i'm especially interested in learning how to first strike the obsidian in order to split off a great piece to work with (rather than the hit-it-with-a-hammer-and-see-what-i-end-up-with method). so far i've only worked smaller pieces of obsidian with deer antler point via the pressure-flaking method, but now i've found a few large pieces (maybe a third of a loaf of bread in size) and don't know where to start. any suggestions?

i also wonder about cordage-making techniques. i've been experimenting with different materials: bracken and sword fern inner-stem fibers are wondrously elastic and relatively uniform in width; wild cucumber outer skin fibers are decent; and recently i made 32 feet of iris cordage. Here's my quandry--i took that 32 feet of cordage and, after folding that length in half, i proceeded to twist those "two" lengths into rope yet again. basically i z-plied the iris twice onto itself--does this make sense? i'll eventually send a photo. the problem--as i proceeded to do this, my second round of plying worked against the original ply, causing it to begin to unwind. i worked hard to re-wind the original ply as i went along and everything was okay at the end, but too much work considering that there must be a better way! thank you!

storm

Storm, thanks for the note. My failing memory tells me you are one of the staff from the school camp along with Osprey, the Husk, et al.? As to the knapping question, there are books and articles out there, but I'll refer you to Dick Baugh for the best info on this subject. There is a group that meets Tuesday nights in the San Jose Area to knap - Dick can connect you to them as well as suggest the best books, etc.

As to the cordage question - did you twist and ply the same direction on the second round as on the first? To make it work right, when you double back the cordage you reverse direction, so if you z

twisted and s plied, you would s twist and z ply on the second round, then if you do a third round you go back to the z twist, s ply and so on, reversing each time.

Hope this is what you need.

Good luck,
Norm

Fire Making	New E-Mail Questions	Projectiles and Tools	Miscellaneous

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E-MAIL Q U E S T I O N S

Fire Making	Primitive Skills and Plants	New E-Mail Questions	Miscellaneous

QUESTIONS & ANSWERS

Projectiles and Tools

Would you please give me some ideas about what to make darts out of? I live in eastern Washington. Something around here is bound to be useful for darts.

Thanks,
David McAninch

Hi David,
My dad was born in Sprague, near Spokane. I was born in Mount Vernon, north of Seattle. For dart material, I would look in canyons and heavily wooded areas, places where saplings have to grow straight up a long distance in order to get sunlight. Anything which is long, skinny and reasonably straight (no kinks) will work. Growing location is probably as important as species.

The Australian Aborigines sometimes had to splice two or three pieces together in order to get something long enough. Use a lap joint with an angle of 5 degrees (1 in 10) or less. Glue it and bind it with sinew or string and add more glue to the binding.

Regards,
Dick Baugh

Norm,
I have an Osage stave I am shaping for a selfbow. Both ends bend slightly. One left of grain and one right of grain. Can I use localized steaming to bring these ends back in line with the riser of the bow or should I steam the entire stave? Also, how long should I let the bow dry before I resume forming the limbs?

Thanks,
Jim Sparks

Jim,
From my somewhat limited experience at bowmaking, I'd say you can try localized bending. When taking a class with Tim Baker, I bent recurve into the ends of a yew stave by boiling just the end for about 20 minutes, then bending. I'd clamp it in place until pretty dry, which depends on your conditions and the thickness of the wood. (the answer to all stone-age tech questions is: it all depends). If the wood was dry to start with, I'd let it dry for a week or so to be safe, assuming dry conditions where you live.

Good luck,
Norm

Norm,
Thanks for your input. I gave it a try over the weekend and it worked just fine. Looked like I might get a little twist from the localized heating but it all worked itself out when it cooled down. The Osage responded nicely and bent to shape alot easier than I expected. Again, thanks for your time.

Jim Sparks

Hello, I came across your site while searching for info on this rock that my father has, which I have enclosed a photo of. He found it years ago and had someone take it to Carnegie Museum in Pittsburgh, and tells me that they did want it but were not willing to pay anything for it. I am

writing to ask you if you could possibly point me in the right direction in my search. I have no idea what I am doing, just trying to help my Dad who will be 80 years old this year.

Thanks,
rickgloria92@aol.com

Hello;
It's difficult to determine what type of stone tool you have by just looking at one angle. It's best to have side (both sides), top, bottom views to get a better idea of what the object is. Dimensions, where it was found, location and measurement of abrasions on the tool, difference in coloring (location) and basically any history on the tool would also help to identify the object.

Looking at your one photo, the stone appears to be a type of igneous rock, either basalt or andesite. The tool could either be an adze, axe, or chisel. By the shape of the tool, my guess would be that it's a type of axe called a celt.
If it is a celt, then it would be considered an ungrooved axe. This type of axe has a somewhat pointed and diminishing poll. The poll was wedged in a hole or slot made for the axe in a billet of wood shaped into a handle. Sometimes there is a distinct difference in coloring and wear on a stone axe which indicates what part of it was set in a socket.
If it could be an adze blade, look at the shape of the blade from the side. Generally speaking, blades flat on one side and tending to a chisel edge were rather certainly adze blades.
Judging by battered polls, some stone axes were also used to split wood. If a blade is to be considered a complete chisel by itself, it must be capable of withstanding pounding.

Hope this information helps,
Dino Labiste

Hello;
I am a student at Wheatland High School. I am trying to make a bow for shop class, but I do not have the plans to cut out the handle. If you could e-mail me photo plans to make a handle I would really appreciate it.

Thank you,
Jeff Magill

Hi Jeff;

On a sapling bow, I just leave the handle area thick from front to back, and narrow it slightly.

If you decide to make a board bow, what I do is I glue up a handle. A board bow is not a bad first project There are a couple of good articles on line that are worth reading.

Here is one site with some nice pictures and you can see what a tillering stick looks like.
http://www.angelfire.com/ma/nnsbhome/bow.html

And this is George Tsoukalas's webpage.
http://users.rcn.com/gtsouk/archer.html

And his Board Bow article -
http://users.rcn.com/gtsouk/boards.html

George knows a lot about building bows, and I have been the beneficiary of his (and other people's) advice quite often via the forums on www.primitivearcher.com That is also a spot worth visiting on the web.

If you decide to go with a board bow, the grain orientation is imporant. On a natural staff or sapling the outer growth ring of the tree forms the bow's back. This guarantees that wood fibers are parallel and uninterrupted on the length of the bow's back. This is important for strengh under tension.

On a board staff the grain needs to run parallel and should not run off the board - at least on the side that will be the bow's back - its not a consideration for the belly. If you are looking through stacks of boards, it may take some searching to find one that is good. Everything else is the same as building a bow from a sapling.

I have been building nice bows from the maple boards from Home Depot and it's a wood I have been recommending.

Good luck,
Jon Jeffer

Hi Dick;
An internet search of "bow limb design" lead me to your fascinating web page. I am looking for information on guidelines for designing bow limbs. In particular, I am interested on the methodology used to determine the dimensions of the limb cross-section.

I understand that the cross-sectional dimensions of a particular point on a bow limb must be

designed such so that it deflects in accordance with the designed external moment. My issue is that I would like to understand how that cross-section is determined for a rectangular limb cross-section. For example, one can use the bending stress equation to design the cross-section, where stress = My/I, and if a rectangular cross-section is used the equation is reduced to:
sigma = (6M) / (wd^2), where w = section width, and d = section depth, M = the external moment.

Seems that there are an infinite combination for w and d that would satisfy the allowable stress conditions. How then are 'w' and 'd' determined for a bow limb of rectangular cross-section?

Any suggestions for references or resources would be appreciated.

Thanks,
Kyle Druey

Hello Kyle,
Good question. How do you select width and thickness to achieve a given stiffness for a particular position on the limb? I believe that is the question. Two important rules:
a. All woods are the same. They consist of cellulose molecules aligned more or less parallel and glued together with lignin to form hollow tubes. The main difference between hard and soft woods is the ratio of cellulose to air. Almost all woods will stretch about 1% before they yield or break.
b. Woods are all different. You don't use the same dimensions for a bow made with osage orange that you would use for pine.

Assume you want to make a bow which is 5' 6" long, has a fistmele of 6" and pulls 40 pounds at 28 inches. Bow limb design is a compromise between making the limbs very wide and not very thick or making them narrower and thicker. For the same draw weight, wider and thinner yields bow limbs which have more mass but have less internal stress so they will be more reliable and have less string-follow. Limbs with greater mass should cause light-weight arrows to have less velocity. Making the limbs narrower and thicker reduces the mass at the cost of higher stress and consequent string-follow and lower reliability.

How important is minimizing the mass of the limbs? Not very, in my opinion. A bow with a stretchless string is an amazingly efficient mechanism for transfer of energy stored in the relatively heavy bow limbs to kinetic energy of an arrow. This all happens because just before the arrow leaves the string the velocity of the limbs is very small.

Select a limb thickness which experience and past history have shown to work and then select the width to give the desired draw weight with the particular wood being used. The limb thicknes shouldn't depend too much on the type of wood. My friend, Tim Baker, made a bow out of pine, a relatively soft wood, which shot quite well. He did this by making the limbs normal thickness but

very wide.

If you are interested, I have copies of "Archery, the Technical Side", edited by C.N. Hickman around 1950. It is full of articles on limb design, arrow trajectory, and other aspects of archery. It is interesting to me to see what kind of engineering and scientific analysis was done before the coming of computers. This is available for $15.00 + $5.00 = $20.00.

Regards,
Dick

Jon;
In your article you said you backed the small bow with Hemp or what was it. I would like to know how you did it.

Thanks,
Chuck

Jute Backing:
I had a very short bow (56") and I was a little afraid of the back blowing. I had some raw jute fiber that John Fakan had given me.

I cleaned the bow's back. I think I used dish soap and water. The idea is to remove any grease (probably from you hands while making the bow. I have heard that some people recommend fels naptha soap. I have also heard about using a weak lye. My own opinion is that for my own purposes, this may be over kill. I tend to try to use what's handy. After letting it dry, I roughed up the back with course sand paper.

I took small bundles of the fiber (similar amounts), teased them out more or less straight by hand, and put them between the pages of a magazine to keep them separate.

I waited patiently for my wife to leave the house - and then set up in the kitchen!

I got some Knox gelatine - unflavored! - and mixed it strong. I can't remember exactly. It might had been 2 or even 4 packets to a couple of cups of water. Knox Gelatine is basically very clean hide glue that is FDA approved for human consumption. But it is still hide glue.

With a paint brush I painted the glue onto the back of the bow. Then I dipped the bundles of fiber into the glue and squeegeed the extra glue off with my fingers. Keep a bowl of warm water handly

to dip your fingers in so you don't glue yourself together. You just put these swatches of fiber down evenly and more or less symmetrically starting in the middle by the handle and working your way to the outside.

I was probably a bit too liberal with the glue, because I got some unnerving cracking sounds pulling the bow initially. So make sure you squeeze the glue out of the fibers.

I let it dry for a number of days. Then I took a file (Nicholson 4 in 1) and filed the overhanging fuzz off the edges of the bow. I varnished it with a polyurethane finish to protect the back from moisture. It took a while for this to dry out completely and if I did it again I think I would let the glue cure out over a couple of weeks at least before finishing.

The look was kind of interesting. Not exactly aesthetic but probably good camouflage.

I played with fiber and some laminated wood backings last year. Now my thinking is more towards self bows again - for simplicity sake. Right now I have 4 bow making projects that I have been fiddling with in dribs and drabs and am starting to build up some gumption to attack again.

Jon Jeffer

Message text written by "Brian & Llewena":

Loved the simplicity of the hoko knife. Will definitely try and make one. Photos great. Plenty of willow where I live in Australia.

Brian

Hello Brian & Llewwna,

Yes, when I saw the photo of the Hoko knife in a book my parents gave me I knew it was a keeper. The willow we use for binding is Salix exigua, common name is sandbar willow. It is the only native willow which can be tied in a knot. If you can't tie your willow in a knot you might try just using the bark. I'm sure there's some sort of plant where you live which can be used to tie things.

Some day I want to make a good "tula" or Australian Aboriginal adze/chisel. That's just a stone flake mounted on the end of a fairly heavy stick. Fastened with spinifex resin.

Regards,

Dick

Hey,
I've been making arrows for about a year now, and have gone through all the steps you have in getting improved fletching quality. I just wanted to say your website is very helpful in making my decisions on new arrows (how long should the feathers stay, how to tie the sinew etc). I use the prime feathers that fall from seagulls at the local beach, but I think that they are working fine.

Anyways, nice site.
Kris

Hi;
Thanks for the feedback on the article. You are actually the first letter I have had in response to it. I'm glad you enjoyed the site (PrimitiveWays actually maintains it.). A really good site for traditional and primitive archery, bow building, arrow making, and bow hunting - if you don't know about it already, is the forum at www.primitivearcher.com

There are guys there who probably know more about bowyering than I will ever know.

Best regards,
Jon Jeffer

Message text written by "UCB Libraries Public PC":

I've learned a little about Japanese swords and a lot about crystallography in the past two years. Your crystallography was brilliantly clear and correct. I'm impressed.

Now, about Japanese swords and differential tempering. Swordmakers actually leave a thin layer of clay on the edge of
the blade to break up steam bubbles when the sword is quenched in water, making the cooling quicker than for bare metal by increasing the contact surface.

The other thing worth mentioning is that the blade is straight before it's quenched. That expansion you mentioned happens
more along the edge, and forces a curve into the blade. Additional heat treating is done by pressing the dull edge to hot copper, and this is done until an even curvature is achieved (a very precise measure of the temper, I imagine.)

Now, as to why this makes the blade stronger: The alloy at the edge, being brittle, breaks under tension. All brittle materials, like concrete, have this problem. If you stretch your steel reinforcement as before the concrete hardens, you have pre-stressed concrete, which is under compression. This curve in a katana serves the same purpose, as a helmet or sword edge or (hopefully) bone will have to overcome this compression in order to bring the alloy's stress-state into tension and crack the blade. Tempered glass works on a similar principle.

Tempering the back of your knives should not only serve to stop any cracks that would otherwise shatter the blade, but should shrink this metal, pre-compressing the cutting edge.

Thanks for all your information.

Joel Hollingsworth

Thanks for your comments. You have obviously gone into this in greater depth than I. I spoke recently with a young man who has had experience in knife making and I asked him how to achieve a hamon line. I had been unsuccessful in getting a hamon tempering line with the 1095 steel I use. He said one must use a steel with less carbon, 1050 or 1065 for example, cover the back with clay (I use furnace cement) and then water quench. When I tried that with 1095 I got cracks in the cutting edge and no hamon line. The blade didn't break so I mounted it anyway. I wouldn't sell it, but it sure stays sharp.

More later,
Dick

Thank you for the article on making bows from saplings. I read it last week and since then I have made 2 bows. One for me made from beech and one for my son made from ash. It was great fun and it is something I intend to keep doing for a long time to come..

Thanks again
Paul Jeffreys

Hi Paul,
Thank you for the feedback. It's always nice to hear that people are reading the articles and finding them useful.

How did your bows come out in terms of dimensions, draw weight, and draw length? And most important how do they shoot?

Best Regards,
Jon Jeffer

Hi Jon;
Well the bow is about (when strung) four and a half foot in length with a one and a half inch grip draw length. I have not checked yet as I have not made any arrows (my next project), but to see if it threw a arrow I shot a piece of dowel from it and even without fletchings or an arrowhead, it seemed to travel quite well and at a reasonable force. I don't know how to measure draw weight this is the first bow I have ever made. My knowledge is still in its infancy, but I am learning with the help of others such as yourself.

Thanks again,
Paul

Paul, that is a really nice looking stick. The reflex tips looks really nice and the handle looks like it has a bit of set back too. Congradulations.

The length over all - 4 and a half feet may be a tad on the short side for an unbacked bow depending on what the weight is and the draw length you want to shoot it at. Basically the longer a bow is the less the limbs have to bend to give you a given draw length. One rule of thumb I have read about is to have the draw length about twice as long as the arrows.

Some Native American bows were shot with a fairly short draw length. Some guys on the primitivearcher.com forum talk about draw lengths as short as 24".

Best regards,
Jon Jeffer

Bad news. My bow snapped. It seemed to give at a point where there seemed to be no defect, but it seems I was wrong . Oh well, we learn from our mistakes. I tried to cordage back the bow to see if it would save it , but it didn't work . It just gave up the ghost. Next time, I hope it will be better.

Paul

Hi Paul,
There are different reasons a bow can fail. Did it fail on the back or the belly? If the belly is collapsing (compression failure) then backing the bow won't help. If you have a wood that is weak in tension, like cherry, then a backing can be the way to go.

I recall that your bow was a little bit shorter than optimal too. 52" right? The things you can do to help with the material stress is make the bow wide limbed (2" for most of the length) and long (minimum 65" or as long as you are tall).

If you think of a bow bending the stresses are tension on the back and compression on the belly. Having wider limbs distributes those stresses over a wider surface area. With a longer bow, any part of the limb has to flex less to give you any given draw length. Getting an even tiller helps to distribute the stresses evenly ove the limb as well.

Good luck with your next (longer wider) stick.
Jon Jeffer

Bamboo clay thrower, fascinating. Just when you thought you had seen it all, something like this comes out of nowhere to humble you. What do you think the accurate range would be? Thanks for sharing.

Sincerely,
Philip Silva
Owner/Bowyer

Hi Phil:
Thanks for the response to the article - glad you enjoyed it. In the program where I first saw this, it appeared the villagers were firing at targets about fifty to one hundred feet away. Like anything, I'm sure a lifetime of practice makes this a much more effective weapon. I don't personally have to deal with marauding hippos, but I might try one sometime against the deer that continually feed on our garden!

Take care,
Ken Peek

Ken;
The American Indians boys would let mud dry on a stick and use it to whip at birds and small game. I've read they used a springy stick to whip arrows also. Do love real primitive weapons. Did you read the article in the latest Primitive Archer about the last hunter-gatherer group in Africa. They used long bows. Nice chatting with you.

Sincerely,
Philip Silva

Message text written by Sam Kramer:

Hello,
I make knives from old cross cut saws. I had read somewhere to quench them when they lose magnetism - is this too hot?

The experts tell me that you don't want to heat the steel too hot or leave it hot too long before you quench and harden. Reasons are that too hot and too long cause grain growth and brittleness. You should ask yourself which is the most reliable method for you to heat your steel to the correct temperature. If the Curie temperature (where ferromagnetism is lost) works for you that's what counts.

I was reading your instructions and you say to quench at red which would be easier to accomplish. I temper by heating the back on a hot plate and quench at a little past straw color. I like them a little softer than 62. I like the prospect of putting them in the oven for consistency. Do you need to quench them when you take them out or just let them cool?

I would guess that it doesn't matter.

When I temper on the hot plate, is that creating a softer area toward the back of the blade?

I would think that if the oxide color were darker on the back then it would be softer. If the oxide color is uniform on the blade then hardness is uniform throughout the blade.

I'm trying to get my results a little more consistent and I think tempering in the oven will help.

Thanks,
Sam

Good luck,
Dick

I found your website about a year ago and have used a lot of the information given. I recently made a composite long bow with a pull of approx. 75 pounds. I'm trying to figure out how to make a bow string using primitive methods that can repeatedly support this stress. I hunt with self made bows and arrows and try to make my trips as "primitive" as possible. Any information would be much appreciated.

Thank you.

Hello;
I'm impressed! The thought of a 75 pound bow makes my shoulder ache. If I was given the challenge of making a natural, native fiber string, my first choice of material would be dogbane (Apocynum cannabinum). It seems to grow all over North America. Read Tim Baker's article on bow strings in the *Traditional Bowyer's Bible*, Vol 2.

Good hunting,

Sincerely,
Bob Gillis

Another good choice of material for your bow string is sinew. Specifically sinew from the backstrap area of a hoofed animal. Sinew, when properly made into a cordage of consistent diameter, will withstand a lot of stress. The only disadvantage is that it becomes useless when it gets wet unless it was coated with some type of waterproofing substance. I've heard that some sinew cordage for bow strings were coated with liquefied pine pitch to give it a waterproof coating. I haven't done it before, so I can't really say how effective the pine pitch coating is.

Additional comments by Dino Labiste

Hi Ken;
First, thanks for your 'primitive' page, I find it very useful for feeling safer in the bush, knowing some more tools if things go wrong. Anyway, back to the stone-thrower. When I was 10 or so I 'invented' the exact same tool (using ash or willow - sorbus or salix), using it to pitch stones probably 200 metres or so. I used to pitch pebbles at the tops of the power pylons near my home, and delight in the clatter of the stones falling through the steel members. I used a stick about 1.2 metres long. I've also heard of the tool being used to flush game out of gullies, canyons, etc.

Nigel Cowburn

Nigel;
Thanks for the note on your discoveries. I suspect this invention has occurred in many parts of the world at one time or another. Glad you liked the article.

Ken Peek

(Comments pertaining to the article, "Bamboo Clay Thrower")

For about $12.00 you can get a similar device in plastic for tossing tennis balls to your dog. It also enables you to pick up and throw the ball, loaded with dog slobber, without touching it with your hand.

Dick Baugh

Saki Yoshisada wrote:
I myself have never used a bamboo for an arrow, but I am willing to give it a try. I was wondering if any of you have advice as to how long the arrows should be? I have 3 1/2 foot bamboo sticks that you get at Pier One that's already fire harden (thank God) and would like to know how I should trim them.

Thanks for your help,
Saki

P.S. I live in Conroe, TX. Do you ever have any workshops close to this area?

Hello Saki;

> I was wondering if any of you have advice as to how long the arrows should be?

The length of an arrow depends on each individual. Every person has a different arm length. To determine the arrow length for yourself, place one end of the bamboo against the middle of your chest (in the sternum area). Fully extend both of your arms in front of you, coming together at the fingertips. The other side of the bamboo will be in between the fingertips of your middle fingers. The point at the end of your middle finger fingertips will determine the length of the arrow. Add an additional 1 inch to the end for notching the arrowhead.

> PS I live in Conroe, TX. Do you ever have any workshops close to this area?

Unfortunately, we do not have workshops in Texas. You'll have to visit beautiful California.

Have fun on your project,
Dino Labiste

Nancy Oakland wrote:

My grandson is in the 8th grade and he has to make a workable object from out of the past. Can you tell me how long ago people used the atlatl? We live in Florida, so if it is old enough for him to use, what kind of material would you suggest he use that can be found here. He can not use anything that is man made, for example rope or string.

Thank you in advance for your consideration.

Nancy

Nancy;
Spear throwers were used in the Solutrean era in Europe (18,000 to15,000 years ago). In North America the weapon is at least 5,000 years old.

There should be plenty of natural sticks in Florida that could be used for an atlatl. Also, use fibers from native plants and/or pine pitch for fastening them together.

Good luck,
Dick

Good afternoon. I am currently making an atlatl and need to start thinking more about the darts. What do you suggest making them out of? I have only seen them made of archery arrows. If this is a good product, how do you connect the arrows? I would probably use my cedar shafts that I shoot out of my self bow.

Thank you for your help.
Ryan

Hello Ryan,

There are lots of things you can make GOOD atlatl from. Aluminum arrow material is indestructible, but it "ain't natural". Atlatl Bob of BPS Engineering makes his out of two pieces of 2216 size shaft with a total length of 161 cm (63.4 inches). These are fairly stiff hunting arrow shafts. According to Bob, the buckling force is 24 newtons (5.4 pounds).

I have also made darts out of 3/8 inch dowels from the hardware store. They come in 3 foot lengths, so you will need to splice two pieces. I would recommend using a lap joint, similar to that used by the Aborigines of the central desert of Australia.

Make a diagonal cut in the two pieces you want to join. The joint should be about 2 to 3 inches long. Glue the joint and wrap it with string. Pull the string tight! Let it dry. Make sure you have the same angle on both pieces and align them before the glue dries.

Japanese arrow bamboo or rivercane from the south eastern states are excellent also if you can

obtain them. Look in gullies, canyons and areas with a lot of overhead forest canopy where things have to grow tall and skinny to get to the light. It will depend on what neck of the woods you live in. Make them at least 5 feet long.

Please note that the stiffness of the shaft is very important. See the article on tuning atlatl dart shafts in the PrimitiveWays web site. The stiffness of the shaft can also can be tested with a bathroom scale. Place the point on the scale and push down on the back end. The force that is needed to buckle the shaft is a reliable indicator of the stiffness. Tom Mills says that a 7 foot should buckle with 5 to 7 pounds. The 63.4 inch aluminum shafts buckle with 5.4 pounds. You should strive for that kind of stiffness.

Dick

Hello, I just wanted to thank you for your quick response and also for your help. I have been bouncing around on the internet and asking whoever will answer for help. You have by far been the most help. I used an atlatl a couple of years ago and had a great time but never could get what I wanted when making one. The one I used was not traditional, it used a string with a regular nock on the dart so I have had some trouble making a spur correctly. I finally saw one at fields museum when I went to visit my parents and hope that this one will work. Do you have a publication at primitive ways? I have enjoyed reading your online information. Do you know of anyone in the southern part of Missouri? I actually live in Springfield and would like to have someone to talk with on these items. I am a tradtional bowhunter and seem to get more primitive every year. Thank you for your time and help.

Ryan

Hello Ryan,

You need to join the Society of Primitive Technology (SPT). They put out an excellent bulletin twice a year and are a gret source of personal contacts. I do a lot of publishing in the SPT bulletin. Call Dave Wescott, (208) 359- 2400 for SPT information. Thee are some great knappers in Missouri. Call Larry Kinsella (618) 397-1377 for personal contacts in your area.

Best wishes,
Dick

Dino;
Just read your article on the branch atlatl. How accurate can it be in the right hands.

"In the right hands", the atlatl can be an effective hunting weapon. Bands of Paleo-Indians of North America hunted wooly mammoth with these weapons. The effectiveness of the atlatl can be seen in the variations of the weapon worldwide. Even, today, certain states allow atlatl hunting, using atlatls made of modern materials. Instead of Folsom or Clovis stone tips, the modern atlatl darts have razor sharp steel broadheads. The primitive atlatl was easy to make, but required a bit of skill to master its use. When the bow and arrow was developed, the bow system required certain skills to make, but the learning curve to shoot a bow was easier than mastering the skill to use an atlatl.

How long do you make the darts (that looks like an arrow in the picture).

It was difficult to show the full length of the atlatl dart and take the picture at the same time. The main shaft of the dart was 5 feet long, made of river cane and fletched with wild turkey feathers. Like the fletching on an arrow, the feathers on the dart helped to stabilize the dart as it flexed at the beginning of flight. The darts made by the Ohlone Indians in my area used willow shafts, phragmites or elderberry. The main shaft was usually made of a flexible material.

I know Native Americans in the Ohio valley used them, but it seems to me that the dart would have to be 3 feet or so to be effective in the woods.

The darts used on the east coast were shorter in length than the darts used on the west coast. The reason could have been due to the environment. The east coast had more of a forested habitat. The open terrain of the west coast allowed for a longer dart and less obstruction of trees. The indigenous cultures on the west coast did also use short darts.

Also did darts have fire hardened tips for small game?

The tips usually consisted of a foreshaft that was made of hardwood (oak, chamise, wild lilac) and hafted with bone or stone tips, like obsidian, chert or in other areas, flint. The foreshaft was also made of a hardwood with just a sharpend tip that was fire hardened (barbed or unbarbed). There were also foreshafts that had a bulbous, blunt tip for stunning small game.

Thanks much for your time, I find this stuff absolutely fascinating.

Sincerely,
Philip Silva
Owner/Bowyer

Thanks for visiting our website,
Dino

Hello,
I had just read your article on bowery at http://www.primitiveways.com/sapling_bow.html, and wanted to thank you for the excellent information. It's good that someone is interested in sharing information freely, and not just advertise for their book. I do appreciate the work you put into sharing.

I am also curious if you could tell me what special preperation yew and ash would require for bowmaking. Thanks in advance.

James Fox

Hi James,
I am glad you enjoyed the article. There is actually a lot of good free information on making bows and arrows on the net. My favorite is the forum at www.primitivearcher.com

A number of very accomplished bowyers post there regularly and share their experience, and a number of them have very good how-to articles posted to their own websites.

Also the Traditional Bowyer's Bible Vol. I-III are great.

As far as yew and ash go, I have never made a bow from either one. As far as I know ash requires no special treatment. That means that with the ash you should be able to let the unviolated outer growth ring on the staff, stick, or sapling be the back of the bow.

With Yew and also Osage Orange, both premium bow woods, what I have "read" is that you must remove the sapwood - the outer living wood of the tree, and make the back of the bow out of an inner ring of heartwood.

I like to build out of what is around where I am or what is handy and easy to get. This also keeps

me from spending a fortune on premium staves of top quality bow wood.

Good luck with your projects,
Jon Jeffer

Message text written by Ron Ireland:

Dick,
I'm a social studies teacher, Montana history, building my first atlatl for student demonstration later this year. My atlatl is ready, but I'm struggling with locating dart shafts of the appropiate length. I'm also not certain of the best diameter for a dart. What advice would you give me?

Hello Ron,
You have several options:
1. Buy aluminum darts from Bob Perkins in Manhattan, MT. His company, BPS Engineering, has a web site.
2. Find some red osier dogwood growing tall, thin and straight and make the darts from that.
3. Use 3 foot X 3/8 inch dowels. You will have to splice them together to get a length of about 4 1/2 feet.. Bevel the two ends, glue'm and bind them with string. That's the way Australian Aborigines splice spear shafts.
4. Use a table saw to cut square shafts of some hardwood. Start with 7/16 inch square and plane them round.
5. Skinny bamboo garden stakes.

In all cases, you would like to have the tip somewhat heavier and add feathers to the back end. Some day we should put more details on the web site.

Good luck,
Dick

Hi, I am 11 years old and I would like to know how to make a primitive bow.

Thanks,
Michael Gams

Hello Michael,
The easiest way to make a bow is to get two straight sticks which are about 3 feet long and very similar in size (one inch diameter at the fat end and 1/2 inch at the top end. Let them dry and then tie the two fat ends together. The joint will be the handle and the skinny ends will be the tips. It doesn't have to be perfect! Use plenty of string to tie them together and pull the string as tight as you can. The wood is stronger when it is dry. Try willow, wild plum, shoots from an apple tree, branches from a cedar tree.

I hope this helps,
Dick

Ryan Meschke wrote:

I have been wanting to try to make a knife with an antler handle for a while now. Your article has brought the desire to do so back. I only have one problem. Where can I get a blade to affix to the antler? Thank you for any help or direction.

Ryan

Hello Ryan;
Check out this website for purchasing high carbon knife blades:

http://www.ragweedforge.com/BladeCatalog.html#blades

A word of caution when affixing your blade to the antler handle. Be sure to adequately tape the blade to keep from cutting yourself on the sharp edge and knife point. Good luck on your antler handle knife.

Sincerely,
Dino Labiste

A fellow on the leather wall made a cable backing from jute and it worked well so I tried it. I backed a 60 lb. Cherokee style bow with 6 strands of jute and it went from 40 to almost 50 pounds Just wondering if you had any idea of the stretch of other material such as hemp, cotton etc. I would like to pursue this because it seem to be a simple effective way to get more power out of a self bow. Thanks and God bless.

Sincerely,
Philip Silva
Owner/Bowyer

Hello Philip,
There are lots of ways of doing bow backings. I believe you back some of your bows with either linen or hemp. They are examples of materials which have similar properties (breaking strength and elastic modulus) to wood because they, like wood, are composed primarily of cellulose fibers. A 1/16 inch backing of linen or hemp should behave just like an additional 1/16 inch layer of wood with the following improvement: The fibers in the backing are all very well aligned whereas it is very difficult to align the wood fibers so they are parallel to the back. Consequently the bow backed with a layer of linen or hemp fibers should have less tendency to rupture catastrophically than the bow backed with an additional strip of wood.

Another way to back a bow is to put on a thick layer of some material which does not have as high an elastic modulus and also shrinks after you put it on. Enter sinew. This material has the possibility of adding reflex to the bow limbs.

One can also put a backing on which is not initially under tension and do something to increase the tension. The cordage backed bow.

The reason for describing these different backing methods is to emphasize the fact that both the tensile strength AND the elastic modulus must be considered when designing a bow backing. The following data is from an 1979 copy of Material Engineering.

Material --------Tensile Strength ----------
Elongation

pounds/square inch Gramms/denier
"stretchyness"

Nylon 109-125,000 6.8-8.6
19-24%
Dacron 106-123,000 6-7
9-11%
Kevlar 400,000 21.5
3-4%

Cotton 1.5-6

6-9%
Hemp 5-7
1-3%
Silk 3.5-4.5
20-25%
Linen (similar to hemp) (my guess)
Jute (much weaker than hemp and not much stretch)(my guess)

Fiber
glass 300-500,000 3.9-4.7
2.5-3.5%

Elastic modulus, measured in pounds per square inch is a measure of the "stiffness" of the material, the pressure needed to compress or stretch a material a given amount. Grams/denier is similar to tensile strength but in units which are convenient to measure on fibers.

Nylon is similar to sinew in that it is very "stretchy" so you need to put a thick layer on the back to make a significant increase in the draw weight.

You not only get more power but I think you increase reliability. Jute would probably be my last choice for a bow backing because it isn't that strong.

I hope this answers your question.

Dick

Hi,
I have been looking for some information on making hand thrown spears (not atlatl or thrusting spears). Do you know of any websites/places/books I can find info on this? eg. the length/weight and thickness for hunting with (if you had a stone blade on the end), etc stuff like that.

Thanks,
Paul

Hi, sorry to take so long. I haven't ever run into a description of a hand thrown spear from the stone age. This could mean they didn't exist, or only that I've never run into them. I'll forward your request on to a few other folks to see if they have any info.

Good luck,
Norm Kidder

Hi, I was just looking at your website.

I'm in a Primitive Technology Class at Uconn, and I'm trying to think of something interesting to make for a class project in which we have to make a primitive tool through primitive methods. Any Ideas on something that would be rather unique?

Thanks,
Tom Walsh

Hello Tom,
Do you have sources for fiber, knappable stone, abrasive sandstone, wood, bone, antler etc? Do you know how to use a large stone flake to cut through a stick quickly? Basic stone age woodworking.

If you have access to stone flakes you could make a Hoko knife. See the Primitiveways web site for details. Use rawhide from a doggy chew to bind it. This is the sort of tool which can then be used to make other tools.

An antler wedge is a very useful tool. It is a labor intensive project if you only use stone age tools (sandstone abrader).

You could cooperate with someone and make an atlatl and dart.

For glue use plain un-flavored Knox's gelatine and a small amount of water.

I hope these ideas help. Please feel free to ask more questions.

Dick

Hello Lee,
Thanks for your inquiry about Beavertooth knives. The knives depicted in the web site are all long gone but I still make them. My objectives are to make a knife which:
1. has excellent edge holding properties when cutting wood

2. is light weight and consequently easy to carry
3. is reasonably easy to sharpen (done by using steel which is only .05 inches thick)
4. reasonably cost (done by using either 1095 plain carbon steel or crosscut saw blade steel (L6) and doing my own heat treating)
5. teaches me something about heat treating

One of the consequences of using 1095 or L6 is rust if you aren't careful.

One of the consequences of using .05 inch 1095 steel is that it shouldn't be used to chop through a baseball bat.

The L6 knives are more expensive than the .05 1095 knives because the L6 is thicker and takes more time to shape.

My idea of a great survival knife is a Swedish Mora knife with a laminated steel blade. THEY are close to indestructable. With abuse the blade will bend but can be straghtened out again.

I don't do much differential tempering anymore.

I think the blades come out with a Rockwell C value of about 62 or higher. The table that came with the steel says the as-quenched hardness is Rc66 and 400 degree tempering gives Rc62. I put the blades in my wife's oven at 375 for 20 minutes so they're pretty hard.

Still interested?

Dick

I have been for a while attempting to construct an atlatl. I believe that the atlatl itself is resonably well made, but I am unsure exactly how to go about making the arrows. I have tried using long (aprox. 5 foot) lengths of bamboo, four foot lengths of dried maple about 1 cm in diameter and once I tried using hobby arrows. The other two arrows had been tipped with a relatively simple tip of a lawn dart. Part of the problem is I cannot find a clear set of guidlines for the construction of such a device and I was wondering if you could recommend a source for such instructions.

Thx
Andrew

Andrew, it sounds like your atlatl darts are too short. Most folk I know of use darts from 6 to 8 feet long. For practice, I use 6 foot lenghts of bamboo, sold as tomato stakes at the garden store (look for the straightest and thinnest ones). They should be no bigger than 5/8 inch in diameter at the fat end. I cut the fat end at an angle to make a point, and then either tie on two feathers to the thin end for fletching, or use duck tape (see article on this at www.primitiveways.com). I'll forward this on to Dick Baugh, who has done a lot of research on this subject.

Good luck,
Norm

I have been for a while attempting to construct an atlatl. I believe that the atlatl itself is resonably well made, but I am unsure exactly how to go about making the arrows. I have tried using long (aprox. 5 foot) lengths of bamboo, four foot lengths of dried maple about 1 cm in diameter and once I tried using hobby arrows. The other two arrows had been tipped with a relatively simple tip of a lawn dart. Part of the problem is I cannot find a clear set of guidlines for the construction of such a device and I was wondering if you could recommend a source for such instructions.

The importance of flexibility in atlatl darts can not be over-emphsized. Selecting the proper stiffness of the shaft is even more important than proper spin in arrows shot from a bow. If a projectile is too stiff than the back end will kick down. If the projectile is too flexible the back end will flip up. Stiffness can best be tested by throwing the dart WITHOUT feathers. A strong, muscular thrower will need a stiffer dart than someone who doesn't throw as hard. Anologously, arrows shot from a powerful bow need to be stiffer than those shot from a lighter bow. A dart can be made stiffer by trimming the length. It can be made less stiff by lengthening or making it slimmer in the middle. EXPERIMENT!

Hope this helps,
Dick

Brian - thanks for the note. The Knap-in is a very informal affair held at Coyote Hills Regional Park in Fremont. It is mainly a gathering of central California knappers who demonstrate their craft. Ken Peek is organizing it this year, as I am busy with my son's wedding. You can call Ken at home in the evening at (510) 537-1215. As to activities for kids, ken is very patient about showing them the basics. Depending on who is there, there may also be atlatl throwing, fire making and other activities. The schedule for the rest of the fall is non-existent this year. I've been too busy with things at work to call people and set anything up. We'll have an organizational meeting in

January to set up the 2002 schedule, and it will be posted after that, so keep tuned. If anything does get scheduled, it will be posted first on primitiveways.com.

Norm

Hi Dick;
Tom Walsh here. I had e-mailed you about a project for a Primitve Technology Class I'm in. My friend and I have decided to make a spear and atlatl. Any suggestions for making this. I.e. wood to use, points to use etc.

I greatly appreciate your help,
Tom Walsh

If you are in an urban environment I would recommend the following:
Make your dart out of a 3/8 inch dowel from the lumber yard. Splice 2 pieces together, total length = 5 feet. You can cut both pieces at an angle and fasten them with glue and string. Another option is to find a thin brass tube that fits snugly. The brass tube would make the dart collapsible for travel. Put feathers on the back end like an arrow and put a stone or
metal point on which has some weight. Total dart weight should be around 3 to 4 ounces See my article on dart tuning in the PrimitiveWays web site.

For an atlatl anything will work. Make it about 1 1/2 to 2 feet long, not too heavy and give it a good firm hand grip.

If you want to be more primitive, then good luck.

Good hunting, feel free to ask more.
Dick

Ben Martin wrote:

What is the most primitive stone tool and what is the major tool of early man; used as a hammer, ax, and knife?

Please e-mail answer at thomasch@lrc.edu
You would be doing a struggling college student a big favor!!! Thank you in advance!!!!

Hello Ben;
The first evidence of toolmaking was found at Africa's Olduvai Gorge by paleoanthropologist Mary Leakey. The ancient tools were utilized in the Late Miocene period, about 2.5 million and 1.6 million years ago. During this period, Homo Habilis inhabited the dry woodlands and savannahs of eastern and southern Africa. Homo Habilis possibly picked up rocks to crack marrow bones. Maybe they started to scrape flesh from bones with small, sharp flakes that had fractured naturally from rocks. Besides smashing marrow, the stone tools at Olduvai Gorge were also possibly used to dig for roots and poke insects from tree bark.

Eventually, early humans started shaping stone implements.

Sincerely,
Dino Labiste

Message text written by Richard Fetterly:

Dear Richard,
I read your nice article on atlatl flexability. Do you know why a spur was used rather than a socket? It seems to me
that a socket would be more universal.

Remember, the people who hunted with atlatls were pre-literate and pre-scientific but not stupid. The stupid genes died out pretty quickly. They were also pre-steel woodworking tool. I am sure that the design of many of the things they made was influenced by the limitations of stone tool woodworking. That may have influenced them to use a spur instead of a socket. from an optimal design point of view the spur must engage the back end of the dart as the atlatl moves from horizontal (0 degrees) to a little past vertical (~100 degrees). This says that you probably want the spur to be pointed at half way between 0 and 100 degrees = 50 degrees. I think it would be hard to carve a socket into the atlatl which would effectively be at 50 degrees but really easy to set a spur at that angle.

Do you buy the "balance" theory of the atlatl weights presented by RBS?

Please refresh my memory. Who is RBS? Could you mean BPS instead? My theory on atlatl weights is that they were only used with very light weight darts. I have done extensive computer modeling on the effects of the size and the position of an atlatl weight. The conclusion I arrived at was that they don't affect the velocity very much one way or another for a light dart. In trying a

light dart with and without a weighted atlatl all I can say is it "feels" better with the weight. Computer modeling tells me that it doesn't slow it down much. If you ask some one to pick up any rock they want to to throw at a rabbit they will choose a rock of a certain weight (mass) because it "feels" right. If you are throwing a light dart then you add an additional weight to the atlatl so it "feels" right. This last statement is not original with me. I saw an article in the Atlatl bulletin which claimed the same thing. No, I don't think the weight was intended as a counterbalance.

Hope this clears things up.

Dick

I am looking for a reference that would mention the use of atlatls by Apache Indians. I am doing this for a school project. Any help you could give me would be appreciated.

Matt Salley

Hello Matt,
I'm sorry but I can't give you anything specific to Apache use of the atlatl. According to the archaeologists, bows and arrows were a fairly new hunting weapon in North America, arriving on the scene a few thousand years ago. Presumably everyone throughout North America used atlatls before then.

Good hunting and feel free to ask more questions.

Dick

Hi Dick!
Well, I went out looking for garage sales to find used files. The very first one I went to had a whole batch of nice files and large rasps for fifty cents each. I bought 19 of them. I followed your instructions to make a stone-carving gouge chisel out of a large half-round rasp.

I used wood coals in a fire pit to get the file red hot, then I buried the whole pile of coals with the file inside it in about four inches of sand. I let it cool over night. The next day, I used sawed the rasp into two pieces, each about six inches long. Then I used a small grindstone in a power drill to grind the flat side of the rasp into a concave shape to create a gouge on one end. Then I ground

down the round side on the back side of the gouge to give the gouge a bevel. I reheated the thing in wood coals to cherry red and plunged it into a quart of motor oil to cool it. (I left the tip of one end out of the oil bath to keep it soft.) Quite a thrill there. It sang to me in the tongs and the oil bath caught fire. <smile> I was prepared for all that, don't worry. I polished the chisel and tempered it in the oven. I polished it again and sharpened it on an oil stone.

I have been banging away on it for two weeks now to carve hardened dragon stone (a secret mixture of Portland cement, lime, paper fiber, house paint, and acrylic hardener). It has stayed sharp. Amazing. The soft tip is slowly taking on a nice mushroom shape as I pound on it with a soft iron hammer. Good, it makes it easy to control the carving. I am quite pleased with the chisel. I plan to make a series of gouges and a couple of scrapers in the future.

Robert DeFord

Hello Robert,
It is extremely gratifying to know that someone actually read the article on knife making and used the information to make their own tools. You made my day.

Dick

Philip G. Schroeder wrote:

Hi Dino,
Thanx for the information on your web site. Sure beats calling all my friends to ask their secrets! I have a question though. Because of the curve of the antler base, I'm assuming you have to cut the tang on the knife quite a bit shorter than most knife blades come with. Is there a formula to make sure that I don't go too short on the tang? The piece of antler (base) that I want to use is not as curved as yours, but it will only take about 2 inches of tang in a straight line. I'm afraid of heating the tang to bend it as this will reduce the temper(?). The blade I want to use is almost 5" long. Is 2" too short of a tang for that length of blade?

Thanx for any help you can give me.
Phil

Hello Phil;
A 2" tang might be too short for a 5" blade. If you're going to be utilizing the knife for rigorous

uses, it might be best to have a longer tang. I would go with a 3" tang for your 5" blade. My suggestion is to find a straighter antler that will accommodate a longer tang.

Sincerely,
Dino Labiste

I wonder if you can help me. I remember as a kid been shown how to make an arrow about 2 foot long which was propelled by a string wound round the shaft near the flights, it seems very similar to the stick launched spear you discuss on your web site.

I wonder if you know what I am describing, and if you could refresh my memory as to how to make one.

1) Were the flights mounted at an angle to create spin?
2) Was the string wound around the shaft in front or behind the flights?
3) Is there a notch in the shaft to keep the string in place before the arrow takes off?

Maybe there is a web site you know of which describes this kind of arrow you could direct me to.

I thank you in advance for any help you can offer me.

Yours,
Gavin

Hello Gavin,
The original article I know was in a delightful but sometimes wrong book "The Crossbow" by Sir Ralph Payne-Gallwey, Bt.. It was written early in the 20th century. This was followed up by 2 excellent articles in the Fall, 1992 issue (#4) of the Bulletin of Primitive Technology by Paul Comstock and Tim Baker. Baker quoting Payne-Gallwey:

1. Make a pencil mark around the arrow 16 inches from the head.
2. Take a piece of hard strong string, 1/16 " in diameter and 28 " long. Tie a double knot at 1/2" from one end of the string.
3. Hold the head of the arrow towards you in your left hand, and hitch the knot firmly around the pencil mark.
4. Next, and still holding the head of the arrow towards you in the left hand, twist the loose end of the string around the first joint of the first finger of the right hand, until the inside edge of this finger is 3" from the point of the arrow along its shaft. Keep the string tightly stretched form the

finger to the knot. The knot will not slip if the string is kept taut.
5. Now grip the arrow close to its had between the thumb and second and third fingers of the right hand (the first finger keeping the string tight); and turn it from you in the direction of its intended flight.
6. Hold the arrow at arms length in front of you, then draw it back and with a powerful jerk of the arm, cast it forward and high as if throwing a stone, its line of flight being at an angle of about 45 degrees to the ground.

1) Were the flights mounted at an angle to create spin?
Sir Ralph Payne-Gallwey's article shows no flights (in the USA we just call them feathers) on the throwing arrows. Instead they were tapered so the center of mass was moved forward. The arrows were made from hazel shoots, 31 " long, 3/16" at the back end, 1/4" at the center and 5/16" at the front. Weight = 1/2 oz.

2) Was the string wound around the shaft in front or behind the flights?
Read above.

3) Is there a notch in the shaft to keep the string in place before the arrow takes off?
No. Just the "half hitch" and the fact that the shaft was tapered.

My dad taught me how to make "shake darts" or "shingle darts". They were made from old cedar shingles. The thin end of the shingle was about 1 1/2" wide and the shaft part was about 1/2" wide They had a notch at the balance point. They were propelled with a "whip" consisting of a stick abut 1 1/2' long with a 1' length of string on the end. A loop on the end of the string engaged the notch and the whole thing was given an underhand toss. They would go a long way.

The Indians of the Great Plains made similar tosses with what they called a "traveling arrow". This was used to launch arrows into a pondful of ducks from a concealed location.

Dan Beard's "The American Boy's Handy Book" first published in 1882, describes the "Whip bow" as shooting a conventional arrow with a small notch in it at the balance point. The whip was flexible.

Regards,
Dick

I am doing some research and I saw your page on spear throwers. I wandered if you could tell me when they were first used in Europe.

Thank you for your help

Best wishes,
Kate Solomon

According to Andre Leroi-Gourham's "The Hunters of Prehistory", the spear thrower showed up perhaps during the Solutrean period (18,000 years ago) and definitely in the Magdalenian (15,000 to 9,000 years ago).

Dick

Hello Dick;
I am a sculptor experimenting with a new material. I call it Dragon Stone. It is a "secret" mixture of my own creation based on Portland cement with acrylic polymer additives and paper fiber. Anyway, I model it while in its wet stage and carve it when in its "green" stage or even when fully hardened. I plan to make a series of large fantasy sculptures for a privet park I am calling The Dragon Farm. My first real work beyond the experiments to develop the mixture is an elaborate bird bath. I am in the final carving and polishing stage of the bird bath at the moment.

I have worked with clay in the past, so all this is new for me. So, I bought a set of stone carving chisels and small rasps to work on the Dragon Stone. It is going great, but I keep needing a gouge or scraper of a different shape than I have. Since the darn things cost $15 to $20 each, I want to make my own. I remember my father used to make his own wood turning chisels and a knife or two out of old files, auto leaf springs, etc. and I found myself wondering how he did it. (He doesn't quite remember the details and says he got the info on how to do it from a co-worker who did it as a hobby.) So I turned to the Internet. Your web site gave me just the information I am looking for, down to how to use the house oven for tempering like my dad did. I will start on my own chisels and scrapers this
weekend.

Thanks for being there,
Robert DeFord

My name is Renee. I received your name from a friend. I recently lost my cherished knife I have had for many years. My friend said that you have a comprehensive article published on knives used for primitive skills. I am very interested in reading it. Could I possible receive a copy by e-mail or the citation for it?

Sorry. I have plenty of opinions but nothing written. The knives I like are: the ones I make (high carbon steel, very hard and sharp but subject to rusting, $60 to $80), Swedish laminated steel "Mora" knives ($20 to $30, the best knife bargain you can every find) and a very small (2 3/4 inch folded) Gerber lockblade which is my constant companion.

Also, can you recommend a place where I could purchase 1 or 2 good knives for primitive skills; a knife with a drop blade, full tang, tapered?

You can buy Mora knives from BOSSGEAR, the part of the Boulder Outdoor Survival School which sells stuff. They have a web site and are good guys.

Places I encountered sell 'buck' or 'hunting' knives. I teach Ethnobotany and I use my knife to process plants mainly . . . make digging sticks, make fire starting implements, processing pine cones and other things for food.

For that, my choice would be a Mora knife.

Dick

Thank you!
Renee S.

Hi, Dino
On your excellent site, I saw many good photos of ancient tech being used in modern times. I am looking
for a photo of an Inuit mouth drill, where the drill is held in place with the mouth. "The "stick" is held in the mouth at one end and into an antler notch at the other. A leather thong is wrapped around the stick and attached to the antler at either end. The drill bit is at the bottom (pointy end). The drill bit is placed over the area to carve a hole. While the mouth is used to keep the drill upright, the hunter's two hands move the antler. This action moves the leather thong, which turns the drill. (only info I have). I am helping to develop a College/university transfer course, First Nations Studies 200, that will be delivered as distance education over the Web. I am based on Vancouver Island at North Island College and one of the units is on the Inuit. I am not near enough to any settlements to get this photo or the knowledge first hand and though I have tried several Inuit sites, I'm still short the photo. Can you help me?

Karin Clark

Hello Karin;
I found 2 books that contain photos of an Inuit using a mouth drill. If you can get a hold of these books, they both contain an excellent photo of what you are looking for:

1) Reader's Digest, "America's Fascinating Indian Heritage",
Editor: James A. Maxwell,
ISBN 0-89577-372-4,
Photo on Page 381

2) "The Native Americans The Indigenous People of North America",
Editorial Consultant: Colin F. Taylor,
Technical Consultant: William C. Sturtevant
ISBN 0-8317-6393-0
Photo on page 216

I hope this helps you.

Sincerely,
Dino Labiste

I have spent the last several weeks looking for information on the treatment of wood for spear shafts to no avail. there seems to be no information on how to bend and dry the tree branch that you are using to make an adequate spear shft let alone what trees are most suited to this. I would be very grateful if perhaps you could give me some hints on constructing a spear shaft.

Also after reading your web page I have become very interested in making fire with a bow and also the atlatl and maybee I will pursue both of these fields.

Thanks again for any help

Look around! See what is growing long, skinny and reasonably straight. Us that. It is best to look in canyons, heavilly forested areas and other places where saplings have to grow tall to get any sunlight. Part of the pleasure of primitive technology is going out and looking for stuff. Cut the sapling green and heat it over a fire to make it flexible and straighten it by hand. After you do this 1000 times you will become a real expert. It is best to straighten at least 3 shafts and then tie them

together while they dry. You may have to straighten them again after they dry. Don't take the bark off until they dry. Some woods straighten and stay straight. Other, such as willow, don't always stay straight.

It is VERY important to make atlatl dart shafts flexible. Otherwise they don't go straight.

Good luck,
Dick

I was amazed at how you could make things like that. I live in VA and I was wondering what I would use to make an hoko knife here.

Your fan.

Hello in Virginia;
Use your imagination! There is no one way to do this. What kind of rock did the indegenous people of Virginia use? Start basking the local rocks until you find one with a sharp edge. Take a flintknapping class from Erett Callahan. Find out what trees and shrubs have tough, supple branches. Get your hands on stuff. I am not that familiar with the flora and geology of Virginia but I do know how important it is to have a "feel" for local materials and that is best learned by hands-on methods.

JOIN THE SOCIETY FOR PRIMITIVE TECHNOLOGY!!!! Their bulletins are a gold mine. Call (208) 359-2400

Dick

Hey Dick,
How's it going? I was wondering if you can explain how to make a digging stick and how to fire harden it? If you fire something do you fire harden if all over?

I can see the importance of a digging stick, especially one that is fire hardened because we have some nice onion type plants growing in the woods right now and just trying to use a regular stick, dead wood mind you, proved unsuccsessful because it kept snapping in the soil. Perhaps there is something I don't know about using the stick properly that would allow me to lever out the plant with out breaking the stick and thus allow me to use a dead piece with out having to go to the

trouble of making a fire to harden a stick when I'm just looking for something to eat at the moment. Is there anything to this thought and a way of doing it with out breaking dead sticks?

Thanks, Eric

Hello Eric,
Yes, digging sticks are very important tools for wild food foragers. Many believe that the idea of "fire hardening" is a myth. If you were making a digging stick 10,000 years ago you wouldn't have a nice sharp steel tool for shaping the wood. The easiest way to put a point on a stick is to put the stick in the fire, char the part you want to remove and then scrape the char off with a rough or sharp rock. We have frequently used the same method for making "burn bowls". Put a glowing coal on top of the piece of wood you want to hollow out and blow through a hollow plant stem directly at the junction between coal and wood. When you make a burn bowl you should frequently scrape away the char. Otherwise you may burn a crack all the way through.

Back to digging sticks. Use the hardest, toughest wood available, about 1 1/2 inches in diameter at the fat end. Is it obvious that the point should be at the fat end? The Aztec used something called a "foot plow" which had a branch coming out about 10 inches above the sharp point of the digging stick. Consequently they coud put their foot on this and get some extra force.

Dick

Hi, I think your web page is the best on the web. How about making arrows the primitive way?

Thank you
ED PROKOP

Ed, thanks for the kind word, I've forwarded it on to the other primitives in our group. As to the request for an article on arrow making, I'll see if I can stir up something. Are you familiar with the Society of Primitive Technology? Their Bullitin is full of info on a variety of topics including primitive archery. We have a link to their website from primitiveways.com, or you can go directly to it at www.hollowtop.com/spt_html/spt.html. If you're in the San Francisco Bay area, let us know, we have a lot of stuff going on.

Norm

Brad Cheif wrote:

I have been thinking of how to make an atlatl, tools I would need and all that, then I read your article about using a tree branch. Needless to say this has blown my mind.

Thanks for such a great idea. I will try it. Thanks to you, I have found many good things on your site. My only regret is your group is in California, and I am in Florida, where it seems there is little information about primitive living.

Glad to hear you found our website informative and useful. Keep in touch on how your atlatl turns out.

Sincerely,
Dino Labiste

Message text written by IFTIKHAR AHMAD:

I read about how to make your own knife. Very interested. I like to know if I make a knife from file without heating up. Just grind up I still have to need heat treatment and temper my knife. #2 Can I heat up in forg file and Abel to make a knife. And what is prassocer for that. I thanks full if answer back.

Hello Iftikhar Amad;
I am always happy to answer questions because it means someone looked at our web site. I would not recommend making a knife from a file by just grinding because the steel in a file is very, very hard. If you grind with great pressure so that the file gets hot then you make the steel soft. That is bad. If you grind with gentle pressure so the steel does not get hot then it will take much time and you will wear away the grinding wheel. That's bad too.

I suggest that you anneal (soften) the file by heating it uniformly to medium red heat and then let it cool slowly in ashes. After it is cool you should be able to shape the steel easily with a grinder or file. After you have the desired shape you must heat treat it. I described the heat treatment in my article "The Shade Tree Knife Mechanic" on our web site. Remember, You must have a big enough fire to heat the entire blade uniformly.

Best of luck and please feel free to ask other questions.

Dick

(Question pertaining to atlatl and dart)

Greetings - If you got my name from the primitiveways website, check it again for pictures and info on atlatls. (If not, check the www.primitiveways.com site) there is also some info at hollowtop.com. If these aren't enough for you, e-mail me a snail mail address or fax number and i'll send you a handout on a simple design. Basically, you can use any piece of wood about 18 to 22 inches long with a handle at one end and a hook in the other. The hook fits into the back of the spear, which can be made from a 6 foot bamboo tomatoe stake from the garden shop, see the article in primitiveways.com on jiffy fletching with duct tape.

Good luck,
Norm Kidder

Hello Dick,
My name is Wade Willis and I own a rafting and kayaking compay in Alaska. I too love primitive wisdom and have been fortunate to meet elders in Alaska that still retain a vast amount of knowledge. I was reading your report on sinew and thought I would let you know that I have been taught that all sinew is not the same. For instance, Bowhead whales sinew was highly prized by the Yupik and other groups because it does not shrink and expand with moisture. It was the favored sinew in the days of war bows here in Alaska. Many a trade was made for it!

Thanks for the great articles and I look forward to learning more from you.

Wade

Hello Wade,
It's always good to find out that at least one person read that article. I like to generalize. I could also add that on land animals only the heel tendons and back tendons have useful fibers. Once I was given a great big bag of bison tendons. We're rich! To my chagrin, I found that when it dried, it was like plastic and shattered instead of shredded when I pounded it.

Dick

Atlatl stone found in southeast michigan:
About fifteen years ago we built our new home on ten acres of old growth land in oakland county, michigan (about 30 miles north of detroit). this land has never been farmed because the fence line runs on the border of my property to the north. the trees that are on the property are mostly oak and hickory and are about 75 to 100 feet tall. there are also two natural ponds on this very hilly property, it is also very stoney. while surveying the ten acres my son then fifteen found a very strange stone. at the time I believed it to be an ax head for a child. it is a beautiful polished stone with a hole drilled through the center (the hole would be the same as that of a modern day steel ax). the reason that i thought it was a childs ax head is because the hole is only about 1/2 inch in diamiter. the stone is approx 3" high x 5 1/2 " long, by 3/4" thick and narrows to a blunt tip on each end, and it looks to be flint. it is highly polished on one side and somewhat pitted on the other side, the same as that of a stone that has been left to weather for many years. about two years ago I showed it to a friend whose son is an archeologist. he told me that i have an atlatl stone and that it is about 4 to 5 thousand years old. some of the edges are chipped but it is in very good condition. I began to investigate the history of this ancient weapon and found that it was used by indians mainly in the western part of the united states. I also learned that these stones were highly prized by the warriors and were often buried with them. I have not been able to find a lot of history on early native indians in the great lakes area. there is a lot of history here abut indians; such as chiefs pontiac and sashabaw who were chippawa. but that is only within the past 200 years and that is where it ends, I don't have much else to go on, I would appreciate learning more about these aboriginal americans. i am somewhat of a history buff and an illustrator, I enjoy drawing indians and civil war charactors. I have been told by some people that my art is very good and i should sell it. I am also married to a wonderful woman who is part chippawa. I look forward to hearing from you.

p.s. I enjoyed viewing your photo gallery.

Greetings. Sounds like you have a "banner stone". There's lots of speculation over their exact function. Bob Perkins (Atlatl Bob) has a theory. You might want to check out his website - www.atlatl.com. To get in touch with folks in your area who know about stone tools, try finding some flint knapping links. I think there are some on a website - www.abotech.com. They also have a chat room where you could ask for more information. The Society of Primitive Technology also has a website, you can access it most easily at www.hollowtop.com. There have been several articles on atlatls in the Bulletin of Primitive Technology. There is also the World Atlatl Association but I don't know of a website for them, but the Secretary is Leni Clubb in Ocatillo, California, she might be in the phone directory. Another source of info for your area would be to contact Dave Wescott, who is the main contact for the Soc. of Primitve Tech. at dwescot@aol.com, he might be able to give you some names from the membership list. (he won't

be home until late February at the earliest as he is running a primitve skills gathering in Arizona). That's all I can think of for now.

Norm

Hi,
I'm doing a project on archery and I need to find some information on how to make a bow. Can you help me?

THANX
Scott

You don't want much. The best books on the subject are "The Traditional Bowyer's Bible", 3 volumes, ISBN #1-55821-311-2.

Dick

Dear Dick Baugh,
I just joined S.P.T. I would like to meet you. I live in Oakland. I have been interested in primitive technology since I was 4. My first project was an atlatl. I showed it at show & tell. I recently wrote a monograph about yew in Northwest coast material culture.Can you buy deer sinew at the Caning Shop?

I don't know about the Caning Shop but there are always adverts for sinew in the SPT bulletin. Asian meat markets sell beef tendon, but it is in rather short pieces.

write me back,
perry wong

P.S.
At the Caning Shop they're selling beaver insicors for $1.60. Set it in antler to make a nice carving tool.

Hello Perry,
Good to hear from you. Now that you are in the S.P.T. you should also join FPT, the Friends of Primitive Technology. We have an activity almost every month here in the San Francisco Bay area. I'll forward this on to Norm Kidder who keeps the FPT mailing list and agenda.

Regards,
Dick

Dear Mr. Kidder,
I happened upon several pictures on the PrimitiveWays website, and several of them indirectly suggested (you blowing darts at lizards, for example) that perhaps you might be someone I could contact with a few questions about the creation of primitive blowguns.

Our anthropology department has a spring and a fall "get-together" each year. In the fall, it's a pig roast, with the primitive projectile competition involving atlatls. However, in the spring, the weapon of choice is the blowgun. In the past, winners have employed a variety of materials (last year's winner, me, used steel tubing, with sharpened galvanized nails fletched with pieces of 3" x 5" cards and duct tape - hardly aboriginal), all of them modern. However, with my vastly accelerating interest in primitive skills and technologies, I am considering producing an "authentic" blowgun for this year's competition.

So, here're my questions. These relate to both the collection of materials for the blowgun, and the construction thereof. They are, specifically:
- What is the average length, and the average diameter, of the cane used in your blowguns?
- If you use rivercane with nodes, or bamboo, how do you remove those nodes, and to what extent do you hollow the "tube" (I assume that a smooth bore is the requirement for decent projectile velocity)?
- When you create your darts, what type of fletching do you use? I suspect that simple feathers or something of a similar variety are inadequate for capturing one's breath for the purpose of propulsion?

I appreciate any assistance you can offer, and the time you spent reading this. My knowledge in this area is slowly increasing, as a result of a number of very helpful sources (I do *love* the "Bulletin of Primitive Technology"), including those online and linked at the Primitive Ways site. But, of course, I am constantly finding that my desires to reproduce ancient technologies lag behind my skills to do so. I am currently perfecting my atlatl construction techniques, and will soon embark upon bow-making. However, there seems to be a dearth of sources on aboriginal blowguns available to the "novice." Thanks again!

Sincerely yours,
Thad Bissett

Thad, greetings from California. I do indeed have a blowgun of Cherokee type. I bought it already made from Bo Brown in Arkansas. It is rivercane about six feet long and an inch in outside diameter. Bo gave a class in making them at the Winter Count gathering in Arizona last February. The two basic steps are straightening and opening the bore. The first was accomplished carefully over the coals of a fire. The second step with a red hot piece of rebar. A possible aboriginal alternative to rebar might be to drop a coal into the hollow end, then use a blowpipe to burn through. A second possible method would be to straighten and dry the cane, then split it, clean it and reglue it. This appears to be the method used on hardwood blowguns from South America (split the wood, dig out a straight channel, then reglue). Some of these are closer to10 feet long. With cane, you do need to clean the inside to remove the nodule material. This can be done by gluing sandpaper to a dowel and using it to ream out the cane. Or, take a tin can lid, punch many holes through it and attach it around a dowel with the sharp points out. Or, put sand into the cane and run a stick in and out of it.

As to the darts, the originals that Bo made are fletched with thistle down, tied in a spiral wrap. You have to find one of the southern abos or Cherokee Indians to teach this to you. What I do is take cotton balls and tie them to a bamboo teriyaki skewer, both available at a local supermarket. With these, I can stick the skewers into my garage door so they are hard to pull out.

Good luck, and try not to put anybody's eye out !
Norm

PS - for more experienced details, you can contact Scott "Abo Boy Wonder" Jones at scott@uga.edu or mediaprehistoria@yahoo.com. Also try the chat room at abotech.com.

Thanks for everything, Mr. Kidder! I believe that I'll try the straightening/boring method, and see how that works out. I suspect that it may work pretty well, if I can just get a fire set up somewhere "legal" (living within the city limits, in an apartment, I doubt I can just go out and start a fire in the back yard, although the neighbors' reactions would be interesting, to say the least).

I have heard of the splitting and hollowing method, but I think I may hold off on that type for a while. I have some suspicions as to whether or not I could sufficiently air-proof it once I got it hollowed out. I hear that wax is an oft-used solution, though.

As to the darts, it sounds like the skewers and cotton balls will work pretty well. The nails we were using with the (ahem) modern blowguns could be sunk pretty deep into the targets, but are, of course, nowhere near primitive, except in function. I may try some small-diameter cane branches I

have lying around. They've dried up, are hard, and are about 1/4" in diameter, if that. The thistle-down fletching sounds incredibly complex, and I think I may have seen it done once, but had no idea what I was watching...

In any case, thank you for you help! I'll let you know how this whole thing turns out. Hopefully, I'll have some time to experiment this weekend.

I am in boy scouts and at camp one year they had an atlatl there and we got to use it. I was fascinated with it and have been trying to make one similar to it after visiting your web site. I wondered if you have any instuctions to make an atlatl.. Please send them to me. I would be most gracious. Thank you

Sincerley,
Brentus Perea

Hello Brentus,
The atlatl is the easy part: a stick from 1 to 2 1/2 feet long, light weight, with a good hand grip and a rounded spur on the far end that sticks out at about 45 degrees. The hard part is the dart. If it is too stiff it won't fly right. 3/8 inch dowel works well. Splice 2 pieces together so the length is about 5 feet.

The Aborigines of Australia splice the two parts of their spears with a lap joint, glue it and bind it with sinew or strong string.

Put some arrow shaped feathers and a hollow socket to engage the atatl spur on the back end,

Good luck,
Dick

I was looking around the web for some info on atlatls and I happened to stumble on to your site. I read it over and found a link to your email address at the bottom. I was wondering if you could send me some plans so that I might construct my own atlatl, similar to the ones I see on your sight.

Thanks,
Ben

I do have a couple places Ben could go with more information about atlatls. One is http://www.atlatl.com home to BPS engineering and Atlatl Bob. Some good info on history and atlatl mechanics. The other is WAM, the World Atlatl Magazine <http://wam@atlatl.net/>http://wam@atlatl.net/ , an ezine with several informative articles also put out by BPS. The SPT journal has a lot of info, but I do not know where in the issues they are at.

Chuck Kritzon

I don't know personally how well this works, but here goes. You can make a flint knapping billet by sawing off a piece of dowel or broom handle as long as you want your billet to be. Then go to the hardware store and buy a copper pipe cap (the solder-on type) that's just a rat's hair smaller than the dowel. Slightly sand the dowel 'til the cap is just a LITTLE bigger than the inside of the cap. Pound the cap down onto the dowel 'til it's tight. I suppose you could use some type of glue, also. I've been told by a coupla knappers that this works fairly well, but is totally different to knap with than antler. Not very primitive, but if it works, it works.

Dear Primitiveways,
My name is Jesse Polsley. I'm 14, and I like to study survival, and I want to become very good at making my own weapons, and be able to hunt, and kill wild game with them, I would like to someday live off the land, and I would like to learn how to learn how to make my own weapons, and I was wondering if you kinda tell me how? I would greatly appreciate it if you could help me. My e-mail is woodsmen39@hotmail.com

Thanks!
Jesse P.

Hi Jesse,
Lesson number 1: Be patient!

Lesson number 2: Find other people nearby who also want to learn. You learn a lot more when you have someone to share knowledge with.

Lesson number 3: Join the Primitive Technology Society and read their bulletins cover to cover.

Lesson number 4: Don't give up. My Dad and I tried lighting a fire with a bow drill when I was 8 years old. We failed. I finally succeeded when I was 35 years old.

Lesson number 5: Read some good books. I recommend books written by Larry Dean Olsen, Bart and Robin Blankenship, John and Geri McPherson and Mors Kochansky.

Dick

Hello Stephen,
It's always gratifying to know that someone looked at our web site. Here are answers to some of your questions:

I have come across references to arrows with only two fletchings (including your neat duct-tape item). In your opinion, is there a significant difference in accuracy compared to a conventional three-fletched arrow?

The natives of the south eastern United States made arrows with a two feather fletch. I think that part of the reason that it was successful was because it had a strong spiral. A neat design. Rip off 1/2 of one side of two feathers. Strip off 1/2 of the quill where you pulled off the plume. Bind the two with sinew on opposite sides of the shaft, top and bottom.

Does the accuracy suffer? I don't know. I'm not a hunter, but if I were I'd take no chances and use a 3-fletch.

For use on a bare primitive bow should the nock run parallel to the plane of the fletching, or at right angles to the fletching? (ie: is it best for the fletch to hit your hand or the bow as you shoot it?)

I don't know.

I have access to hunting areas which are covered with very thick vegetation. I find that the bushes catch on my bowstring and tear at my fletchings (and block the flight of my arrows!). What is the shortest practical bow and drawlength you have come across? (I want to use the bow for deer or pigs at ranges of up to, say, thirty yards).

The natives of California hunted with fairly short sinew backed bows 48 inches (1.22 meters). The draw length was maybe 24 inches (.611 meters) Draw weight was about 50 lb. The deer that they hunted were rather small, but they also hunted elk and bear. I and a friend of mine have made small bows like this and they shoot OK, but not quite as enegetic as a larger bow.

Have you got any interesting thoughts on hunting in thick scrub? I think that traps are probably the best option. The game is there, but boy can it be hard to get at.

As I said before, I'm not a hunter.

I have spent hours playing with the concept of a simple trap for big animals that will hold them alive. I would really like to have a design for a simple foot trap that could hold a large wild boar without injuring it beyond repair. (I also could catch livestock or a dog in one place I go). Any ideas?

The quarterly magazine, "Wilderness Way" had an article on primitive leg-hold traps. I loaned the magazine to a friend, but should get it back in a week or so.

I know virtually nothing about the internet. If I subscribe to a group like Primitive Skills does it require internet browser access to receive their mailings ? Does it cost money other than email connection time?

I don't think any money is needed.

Would you mind receiving further emails from me?

I'm very happy to correspond with you.

If you or any of your associates would be interested in hearing about how I made my primitive archery gear, I would be happy to share the information.

I am a bow maker myself so please tell me more. Check out "the trading post"> dick baugh>bowscraper. I have received a lot of satisfaction in developing this tool which is used by

many bow makers in the USA. Please send us all you can on your bow making experiences.

Regards,
Dick

Jon Jeffer,
How do you suggest splitting the freshly cut sapling? I once tried an elm tree, and I used a draw knife to split it. I held the sapling vertically and pounded the draw knife down. I couldn't believe how hard it was to split the thing!! Later I read in a book "Inside Wood" that elm fibers are very intertwined and it is especially hard to split. I also once tried splitting a larch tree that was left standing after a fire. This was also incredibly hard. I guess it was fire hardened or something. How do you split the sapling?

Jon Reisman

Hi Jon,
I have had that experience too with Birch. Someone on the forum list (www.primitivearcher.com) told me afterwards that the fibers are interwoven or something like that. Elm is supposed to be like that too.

My piece of birch was a log about 7 inches across, and I had at that thing with wedges and a maul, and finally ended up using a hand saw to cut through the wood fibers that were going cross wise across the split.

The easy answer, I think, is a band saw. I don't have one. I have a table saw, and I have had mixed experiences using that to trim staves. It definately does not like it when the wood gets out of alignment with the blade and I have a healthy respect for power tools.

I think it is really dependent on the wood though. I have had other woods split relatively easily, just using a big knife and a baton. Hazel was easy. So was Maple.

I have not been able to split a sapling like that and get two useable staves though. That had been beyond me. Usually it ends up being more like trimming off the belly half of the staff. I think most people like hatchets for this. I find that I have more control over a big knife, and I have used kitchen knives and an old Bowie knife for this.

For what its worth, elm is supposed to be a very good white wood for bows.

Jon Jeffer

My Dad is making a bow from Yew wood that has dried a year. My question is how to make a bow string out of sinew and how do you back sinew on your bow.

Thanks,
Monte in Olympia

Hi Monte,
Those are questions with complicated answers. I would strongly suggest that you buy the 3 volume "Traditional Bowyer's Bible". It is a gold mine of bow making information. If you are going to sinew a yew bow you would like to do it right the first time.

Good hunting,
Dick

(Question pertaining to atlatl darts)

Darts are a more complicated matter. The ethnographic record shows darts rangeing from 2 to 10 ounces. I recommend about 3 ounces. Length: 4 1/2 feet for long distance, 6 1/2 feet for accuracy. The dart MUST flex for a decent trajectory. Small feathers on the back should be used. Heavy end in front.

Dart Materials: Arundo donax (a bamboo-like reed native to the Mediterranean) is plentiful near Santa Barbara. Cut a piece about 1/2 inch dia at the base. Use heat to straighten it.
Also, you can use a 3/8 inch hardwood dowel from the lumber yard. Select dowels which have a straight grain. You will probably have to splice two together.

Message text written by IFTIKHAR AHMAD:

Hello,
This is Iftikhar Ahmad. I went to the store to buy steel to make a knife. I found 4041 alloy steel. Is it good steel to make a knife.

Thank you.

Hello,
4041 is, I believe, a stainless alloy steel. I would not recommend it for two reasons. Stainless steels are difficult to heat treat (you must use a very high temperature and the temperature must be very carefully controlled) and only the most expensive stainless steel will stay sharp longer than plain carbon steel.

I would suggest that you buy a new file or obtain a worn out file of the proper size, heat it red hot and let it cool slowly to soften it, shape the blade and then heat treat it. File steel is fairly easy to heat treat.

Regards,
Dick

Growing up in Kentucky, some 50 something years ago, I made arrowheads from steel bottle caps by flattening the metal and shaping to a broad arrowhead shape. I used goldenrod stems for the arrow shafts, reinforcing the notch with a wrapping of plant fiber. I used chicken feathers for fletching, bound on by plant fiber and glued with model cement. I used a hickory bow, carved from a tobacco stick, strung only when used. I learned the hard way about an arm shield and used the tongue of an old leather boot with holes about the edges to lace on. I read an article about fabrication of arrowheads from metal. In an emergency a "tin can" could be pressed into service. I enjoy your approach and entrust this will aid your store of knowledge.

Bill Tyler

Dear Bill Tyler;
Thanks for your practical description of how to make a working bow and arrow out of what's at hand.

Bob Gillis

Howdy,
My name is Rick Son and I live in Visalia, CA. Found this website searching how to make a knife sheath. Eee-haaaw! Man, am I enjoying this site. I am going to try my hand at this sheath pattern

you were so gracious in letting others see. I would also like to join your group if that is at all possible? I have been interested in these type of skills for a long time. I have a friend here in Visalia we call the modern day mountainman. As about this time of year he goes and spends time in the great lonesome. Last year, I watched him make a canoe style bullboat. We then took it to the lake and tested it out and it floated great. So off to the Yellowstone River. He went to follow the Lewis and Clark route. Got caught in the rapids though and lost the boat, but that is a whole nother story! Well, do you think I can use rawhide to make that sheath? If you have any info on your group I would like some.

Thank you,
Rick L. Son

Hello Rick,
Glad you enjoyed the site. Our local group, The Friends of Primitive Technology is very inclusive, all you have to do is show up. The easiest way would be to show up at one of the events we have scheduled, see if you like it. In two weeks (May 24, 25, & 26), we are having our Rattlesnake Rendezvous, which is done through the East Bay Regional Parks. It is a stone age weekend camping trip, no metal, and as primitive as we can make it in these times.

The international organization is the Society of Primitive Technology, see the links on the site. The SPT is a real treasure trove of information, membership dues are quite reasonable.

I don't see why rawhide wouldn't work for a knife sheath. Give it a try and let me know.

Bill Scherer

Fire Making	Primitive Skills and Plants	New E-Mail Questions	Miscellaneous

PrimitiveWays Home Page

The $5 Friction Fire Starter Kit

by Dick Baugh and Bob Gillis

This **Friction Fire Starter Kit** includes a cedar hearth board, a mule fat spindle, some tinder and instructions. **It is guaranteed to start a fire!** We have noticed that beginners often have a hard time starting a friction fire. If they do not succeed they give up perhaps never to try again. The two main problems are lack of the right materials and the strength and skill to supply enough friction. This Friction Fire Starter Kit will put into your hands the right materials to succeed in making a fire by friction. After you have succeeded using our materials and a drill our hope is that you will have the confidence to go out locate native materials near you and start a fire by friction using a bow drill or hand spindle. The ability to make fire by friction with your own hands is not only they most basic survival skill it is an act that links you to our ancestors in a way that will deeply move

you.

Using the Friction Fire Kit is simple. First shred your tinder well.

Place a piece of leaf or paper under your hearth board. Insert the spindle in a drill, turn it on and apply gentle pressure.

After you get smoke remove the spindle.

If the char still smokes you have a coal.

Pick up the paper with your coal on it and gently place the coal into the center of your tinder. Blow gently on the coal until your get a flame.

Then add some small sticks to your flame and you have fire!!

The Friction Fire Starter Kit $5.00. plus $1.00 for shipping and handling. In California add $.40 for sales tax.

It is Guaranteed to start a fire! If it does not start a fire for you simply return it and we will send your money back.

Send your check to:

Dick Baugh
490 Gary CT
Palo Alto, CA 94306

The purpose of this kit is to introduce you to the fascinating world of fire by friction. Once you have succeeded in starting a fire with the starter kit plus an electric drill I hope you will be inspired to find your own materials and make either a hand drill or bow drill set.

Contents:
Hearthboard: red cedar (Thuja plicata) shingle material
Spindle: mule fat (Baccharus vimnea)
Tinder: shredded redwood (Sequoia sempervirens) bark
Ember catcher: cardboard

In addition you will need an electric drill with a 3/8 inch chuck and more tinder material.

Note: If you are only interested in creating a smoldering ember then step 1. and the steps involved in transferring a smoldering ember to the tinder bundle and blowing until you get a flame can be skipped.

1. Prepare a tinder bundle. This is a tennis ball-sized wad of fibrous plant material which looks somewhat like a bird nest. Coarse fibers should be on the bottom and finer fibers on the top. In general , any fine fibrous dry plant material will work. In addition to shredded redwood bark I have used dry thin stemmed grass, inner bark from a dead cottonwood tree, jute string fibers, milkweed and shredded cattail leaves.

2. Chuck the spindle in an electric drill. Use the highest speed setting.

3. Set the hearthboard on a dry, level surface with the little cardboard ember catcher underneath the hole and notch.

4. Place your foot on the hearthboard to prevent it from moving.

5. Insert the business end of the spindle into one of the holes and start spinning. Use very light downward pressure. After abut 20 seconds a little wisp of smoke should start rising. Increase the pressure a little bit more and more smoke should be generated. Along with the smoke finely powdered charred wood (char) should come out of the notch and start to form a small pile. When the pile of char is about 1/2 inch (1.2 cm) in diameter and smoking stop drilling and set the drill aside. The little pile of char should be smoldering.

N.B. One cause of failure is too much downward pressure with the electric drill. Excessive force will wear the wood away too quickly it will not reach the ignition temperature (700 to 800 degrees F). When this happens the char will be coarse and gritty instead of very fine.

At this time make all of your movements very carefully in order to not disturb the smoldering char pile. Now you don't need to be in a hurry. GENTLY remove the hearthboard from the ember catcher. Any char which adheres to the notch should be dislodged with a dry twig and deposited on the smoldering char.

6. Transfer the smoldering char to the top of the tinder bundle and fold the tinder bundle so it surrounds the smoldering ember. Immediately start blowing on the tinder bundle with long steady breath, inhaling quickly. In order to avoid inhaling the smoke hold the tinder bundle high and keep the wind at your back. Keep blowing until the tinder bundle bursts into flame. Congratulations!

N.B. There are several common causes of failure to obtain a flame from the tinder bundle. You must always manipulate the tinder bundle so that there is tinder (fuel) in contact with the smoldering char. It is helpful if you initially have very find fibers in contact with the char. Be sure you have a big enough tinder pile. Don't let the tinder get too "fluffy. Remember, in order to create a fire you need the gang of three: heat, oxygen and fuel. Damp tinder can be dried on a rainy day by enclosing it in a bandanna and holding it inside your shirt for several hours. Patience!

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com or "Bob Gillis" at shelter@best.com
E-mail questions answered about fire-by-friction.

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Useful and Edible Plants of California / Mule fat (Baccharis salicifolia)

- Grows in summer-dry streambeds and arroyos.
- Stalk used as a spindle for fire making. The larger branches made good hearthboards.

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Useful and Edible Plants of California / Mule's ears (Wyethia glabra)

- Grows on dry hillsides and open meadows.
- The broad leaves were used to wrap food for open pit ovens.
- Used medicinally by Native Americans.

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Useful and Edible Plants of California / Mugwort (Artemisia sp.)

- It favors moist places, such as stream banks, dried streambeds, shady slopes and open chaparral.
- Aromatic smell, similar to sagebrush.
- Leaves served to repel moths from wool clothing.
- Dried leaves were good for coal extenders in a fire tinder bundle.

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Useful and Edible Plants of California / Mint (Mentha sp.)

- Characteristic square stems and mint aroma.
- Drank as a wild tea.

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Useful and Edible Plants of California / Miner's lettuce (Montia perfoliata)

- California native plant.
- Grows in moist shade.
- The whole plant is edible (has a pleasant taste).

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Useful and Edible Plants of California / Milk thistle (Silybum marianum)

- Grows in disturbed places, pastures and fields.
- The young leaves, stalk and roots can be soaked overnight in salted water and then cooked and eaten.
- Strip leaves in half lengthwise and eat from the inside out (careful of the prickly outer edges).

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Useful and Edible Plants of California / Mallow (Malva parviflora)

- Grows in disturbed roadsides and fields.
- Cooked leaves are so rich in Vitamin A that it could actually be unhealthy to eat a large helping every day.
- The cheeseweed seeds are pleasant tasting enough for nibbling.

Useful and Edible Plants of California / Coast live oak (Quercus agrifolia)

- Found in the inland foothills.
- The acorns were ground into flour and leached to make mush or bread.

Useful and Edible Plants of California / Horsetail (Equisetum sp.)

- Grows along lake shores, streambeds and other wet areas.
- Plant contains silica, an abrasive compound that makes dry horsetail an excellent, fine sandpaper.

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Useful and Edible Plants of California / Horehound (Marrubium vulgare)

- Found along roads and in waste ground.
- Has square stems.
- Horehound syrup was used for coughs and sore throats (gather from mid-November through winter and spring).

Useful and Edible Plants of California / California hazel (Corylus californica)

- Common to moist environments (slopes, in canyons, bushy slopes and woods, both dense and open).
  It may or may not follow streams if it grows in shaded forests (found particularly on the edge of redwood forests).
- Nuts have as rich a flavor as walnuts (gather in July and August).

- The straight stems were made into arrow shafts and the smaller stems were woven into baskets.

Useful and Edible Plants of California / Giant reed (Arundo donax)

- Grows in dense, clusters in wet canyons.
- Looks like bamboo, but has thin, hollow walls.
- The jointed segments can be used as small containers.

Useful and Edible Plants of California / Fennel (Foeniculum vulgare)

- Introduced from the Mediterranean.
- Plant has a licorice or anise smell and a pithy core in the flower stalk.
- The chopped, fresh leaves were used for seasoning (loses its flavor if dried).

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Useful and Edible Plants of California / Douglas iris (Iris douglasiana)

- Found in open forests and along the coast.
- Outer, silky fibers of the leaves were made into cordage.

Useful and Edible Plants of California / Dogbane (Apocynum canabinum)

- Grows in damp places and along streambeds (below 5,000 feet altitude).
- Excellent cordage material for fishing nets, ropes, string or weaving rough cloth.
- Also called Indian Hemp.

Useful and Edible Plants of California / Blue Witch (Solanum solonaceae)

- Common to moist soil.
- All parts of the plant are toxic.

Useful and Edible Plants of California (2)

DISCLAIMER: ***A website is insufficient to convey the knowledge a person needs to safely and responsibly use wild plants. Before eating or using any plant, seek hands-on field training with a qualified professional in the proper indentification and use of wild plants. Gather only what you need or use. You should leave more than enough for the plant to easily reproduce and grow. Also know that gathering in State and National Parks and wildlife preserves may be detrimental and/or illegal. Be sure to get permission from the landowner of private property before gathering wild plants.***

Blue_Witch

Dogbane

Douglas iris

Fennel

Fennel

Fennel

Fennel

Giant reed

Hazel

Horehound

Horsetail

Horsetail

Coast live oak

Mallow

Milk thistle

Milk thistle

Miner"s lettuce

Miner"s lettuce

Mint

Mint

Mugwort

Mugwort

Mule"s ears

Mule's ears

Mulefat

Mulefat

Mullein

Mullein

Mullein

Mystery plant

Narrowleaf plantain

Narrowleaf plantain

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com or "Bob Gillis" at shelter@best.com

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Useful and Edible Plants of California / Mullein (Verbascum sp.)

- Found in disturbed areas.
- Flower stalk used as a spindle for fire making.
- Seeds used as a paralytic fish poison (contains a considerable amount of rotenone).

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Useful and Edible Plants of California / Mystery plant (help identify the plant & its uses)

Useful and Edible Plants of California / Narrowleaf plantain (Platago lanceolata)

- Found near stream banks (likes well-watered areas).
- A leaf poultice was used for insect bites and cuts.
- The raw, mature seed heads are tastey.

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Photo Gallery 12

Troughed metate and rectangular mano used for grinding maize (corn) at Winter Count.

Norm Kidder's "Basic Willow Baskets" class at Sunol-Ohlone Regional Wilderness.

Netted tule basket for carrying fish.

Photo Gallery 11

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

View "Friends of Primitive Technology" past activities

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Winter Count in Maricopa, Arizona

February 15 - 22, 2003

Cost: $245 (includes camping, instructions and 2 meals a day)

Backtracks, LLC
PO Box 905
Rexburg, ID 83440
208-359-2400 Voice/FAX
E-mail Dave Wescot: dwescot@aol.com
Website: www.backtracks.net

Winter Count is a contemporary primitive skills gathering that offers a real hands-on learning experience that will get you started on a variety of primitive skills and keep you going. This conference is designed for you to meet a diverse group of nationally known instructors, authors, practitioners and performers. There are 20 to 30 classes each day that range from introductory to advanced, kids camp, evening campfires (drumming and dancing), friendly primitive weapons competitions and more.
Backtracks also offers another primitive skills gathering in the summer called the Rabbitstick Rendezvous. The event is held from September 14 to 20, 2003 in Rexburg, Idaho.

Photos from Winter Count 2001






Opening presentations

Ken Wee

Opening presentations

Annie

Opening presentations

Bart Blankenship

Opening presentations

Cathy

Hawk

Albert Abril

Paul Campbell

Digger's brain tanned hides

atlatl competition

Dino's coconut shell drum class

The babes of Wintercount

Cody Lundin

Egyptian fire by friction device

John Olsen's Egyptian fire by friction device

Egyptian fire by friction device in action

Dick Baugh's fire saw

We have an ember

Vince Pinto's fire plow

Fire plow in action

Hand drill fire

Looking at the primitive goods

Hawk and Alice Tulloch's cordage demo

Patrick's Navajo loom

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Winter Count 2001 / Opening Presentations

Dave Wescot, Albert Abril and Hawk addressing the Wintercount crowd.

Winter Count 2001 / Opening Presentations

The PrimitiveWays clan presenting their classes - Dick Baugh.

Winter Count 2001 / Opening Presentations

The PrimitiveWays clan presenting their classes - Chuck Kritzon.

Winter Count 2001 / Opening Presentations

The PrimitiveWays clan presenting their classes - Dino Labiste.

Winter Count 2001 / Hawk

Hawk (instructor) showing his beaded belt.

Winter Count 2001 / Paul Campbell

Paul (instructor) armed with his rabbitsticks. To his left is a large agave carrying net.
Paul has written an excellent book entitled, "Survival Skills of Native California" (Order this book).

Winter Count 2001 / Ken Wee

Ken Wee (instructor) - bowman extraordinaire.

Winter Count 2001 / Annie

Annie (instructor) showing her hand crafted silver jewelry.

Winter Count 2001 / Bart Blankenship

Bart (instructor) tanning a hide. Above him is a large cast net made of natural plant fibers.
The fibers were twisted with a drop spindle.

Winter Count 2001 / Cathy Farneman

Cathy (instructor) modeling her buckskin dress. In the baskets to her left are her herbal medicines.

Winter Count 2001 / Albert Abril

Albert (instructor) teaching a fiber cordage class.

Winter Count 2001 / Digger's Brain Tanned Hides

Digger (instructor) displaying his excellent brain tanned hides.

Winter Count 2001 / Atlatl Competition

The young lads showing their atlatl prowess.

Winter Count 2001 / Dino's Coconut Shell Drum Class

Dino and his students in his coconut shell drum class.

Winter Count 2001 / The Babes of Winter Count

The next generation.

Winter Count 2001 / Cody Lundin

The gentleman in the purple tee-shirt on the left, in his trademark shorts, tee-shirt and bare feet is Cody (instructor).
Cody appeared on the TV show, "20/20". He talked about how to survive and stay alive in the snow.

Winter Count 2001 / Egyptian Fire by Friction Device

John Olsen showed everyone an Egyptian fire by friction device which consisted of a hearthboard, spindle, buckskin thong and a wooden mouth piece.

Winter Count 2001 / John Olsen's Egyptian Fire by Friction Device

John (instructor) showing the spindle section of his Egyptian fire by friction device.
The buckskin thong was threaded through a hole in the spindle and one end of the thong
was wrapped around the spindle.

Winter Count 2001 / The Egyptian Fire by Friction Device in Action

With the mouth piece held in his mouth, the spindle socketed in the mouth piece, John began pulling the thongs side to side to spin the spindle. He got smoke and then an ember.

Winter Count 2001/ Dick Baugh's Fire Saw

Dick stood on the hearthboard as his two assistants sawed away.

Winter Count 2001 / We Have an Ember

Success with the fire saw.

Winter Count 2001 / Vince Pinto's Fire Plow

Vince (instructor) coaching a pyro enthusiast.

Winter Count 2001 / Fire Plow in Action

The fire plow was the same fire by friction method used by Tom Hanks in the movie, "Cast Away".

Winter Count 2001 / Hand Drill Fire

Where there's smoke, there's bound to be fire.

Winter Count 2001 / Looking at the Primitive Goods

A display of beaver pelt, elk antlers and felted clothing.

Winter Count 2001 / Hawk and Alice Tulloch's Cordage Demo

Hawk (instructor) and Alice (instructor) teaching a fiber cordage class.

Winter Count 2001 / Patrick Farneman's Navajo loom

Patrick (instructor) demonstrating the fine art of weaving.

Photo Gallery 13

Dream catcher made by Dino Labiste.

Turtle water gourd container made by Norm Kidder.

Antler arrow straightener

"FOREST OF ANCIENTS" - home of the Great Basin Bristlecone Pine *(Pinus longaeva)*

Some of these trees are more than 4,000 years of age. Bristlecone Pines have survived in spite of, and perhaps because of, their harsh environment at White Mountains, California. These trees do not live in isolation, but are interconnected to other living and non-living things and to each other.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

View "Friends of Primitive Technology" past activities

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Photo Gallery 14

Salmon cooking over hot coals.

Acorn processing demonstration at the Maidu Interpretive Center in Roseville, California.

Julia Parker (Coast Miwok/Kashia Pomo) demonstrating coiled basketry at the Maidu Interpretive Center in Roseville, California. Julia is a basketweaver and cultural demonstrator.

California indigenous necklace made of Washington clam shell beads and red abalone pendants.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

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Photo Gallery 15

Skulls from the Skulls Exhibit at the California Academy of Sciences.

Chopping down a California Bay Laurel *(Umbellularia californica)* for bow staves. A grooved basalt axe was used to cut down the tree.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

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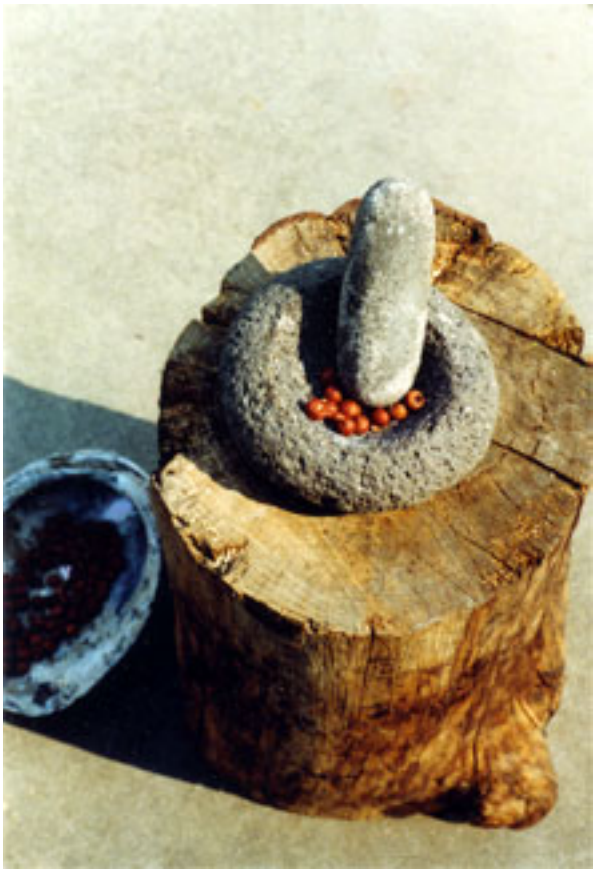
Photo Gallery 16

Wooden spoons made from Big leaf maple (with abalone shell inlay) and Manzanita by KAHIKO Artwork & Replicas.

Creating yellow earth pigment in the Friends of Primitive Technology pigment workshop taught by Chuck Kritzon and Ken Peek.



Preparing manzanita berries in a basalt mortar to make manzanita cider.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

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Photo Gallery 17

Carvings made by Bob Gillis:
Top left - Woodpecker spoon carved from maple
Top right - Close up of spoon handle

Bottom - Wooden comb

Fishing license holder attached to a pine nut / Washington clam shell bead necklace.


Gathering sedge rhizomes with a digging stick. The rhizomes were then washed at the water's edge.
Notice the fire hardened tip of the mountain mahogany digging stick.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 18

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

View "Friends of Primitive Technology" past activities

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Photo Gallery 18

Bamboo basket

Items made by Dino Labiste (KAHIKO Artwork & Replicas):

1st photo - Charm stones
2nd photo - Netting shuttles
3rd photo - Cocoon rattle
4th photo - Necklace made of abalone shells, Washington clam shell beads, pine nuts, & juniper seeds

"Ghost beads" from Juniper berries (*Juniperus osteosperma*).

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 19

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

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Photo Gallery 19

Material technology


© Dino Labiste 2003


© Dino Labiste 2003


© Dino Labiste 2003

Fleshing a pelt with stone and bone tools.

Soaproot brushes made from the soaproot plant.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 20

PHOTO GALLERY I

PHOTO GALLERY III

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Photo Gallery 20

Dino and Bill scraping a buffalo hide.

A pump drill made by Shannon in the KAHIKO Workshops.

Poke pole fishing for eels.

Photo Gallery 11

Photo Gallery 12

Photo Gallery 13

Photo Gallery 14

Photo Gallery 15

Photo Gallery 16

Photo Gallery 17

Photo Gallery 18

Photo Gallery 19

PHOTO GALLERY I

PHOTO GALLERY III

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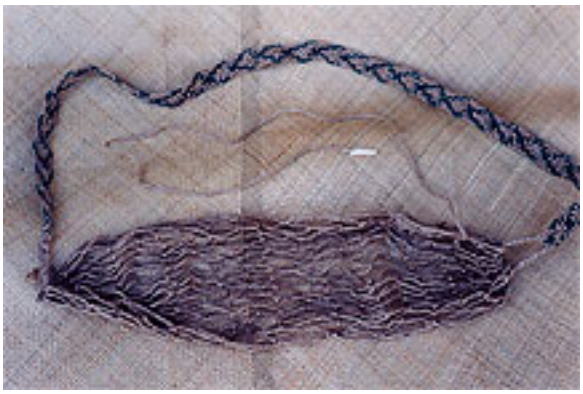
KAHIKO WORKSHOPS IV

"Try to rediscover everything: Know truth by your own direct experience."

Carrying Net



The gathering and hunting grounds were often a long distance from the homes of hunter/gatherers. When the load got heavy and became too great to carry in their arms, carrying nets were devised to hold as much as the harvester or hunter could carry. Items were carried in the small hammock of large mesh. The net was attached to a carrying strap, which was suspended from the head or shoulders. The carrying net was no trouble to carry empty, yet convenient if one needed to transport something.

The making of the mesh net will be started on the first day. You'll learn to use a shuttle and gauge to construct the netting knot. On the second day, we'll continue the net and also begin creating the carrying strap.

Fee: $45

Coconut Shell Drum

In the traditional Hawaiian hula, music and dance were performed for religious purposes to honor gods, ruling chiefs and their family history. The hula involved dances accompanied by mele (music, song, prayers and poetical chants) and a variety of sound-producing instruments, some of which were musical. Others were used to beat time for hula dancers. One of the musical instruments used by the drummer/chanter was the coconut shell drum.

We will make a rhythm drum out of a coconut shell and lash it to a goat skin rawhide. The drum beater will be made from coconut fibers.

Fee: $60

Tule Sun Visor

Tule or bulrushes were used by local groups throughout the world. It's length, pliability and cell structure made the plant suitable for making baskets, clothing, mats, watercrafts, paper, toys, duck decoys and sun visors.

The class will deal with constructing a sun visor from tule. When hiking or working in the field on a hot day, a sun visor will protect your eyes from the glare of the sun. The wide brim will also shade your face and keep you cool.

Fee: $20

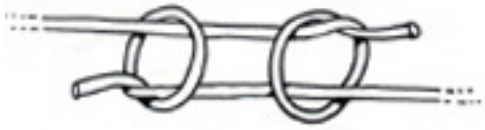
Looped String Bag

The textile technique of intertwining cordage to make a usable container or bag is found throughout much of the world, from the Pacific Islands to Australia, Africa, Europe and the Americas, both prehistorically and historically. This form of producing fabric, also known as knotless netting, is as old as cloth itself. It has been used by virtually every culture through history.

Using just a string and a needle, we'll create a looped string bag to hold your primitive tools.
Fee: $25

Knots and Lashings

Cordage was one of mankind's first inventions, certainly predating the wheel, and its structure has remained essentially the same for centuries. Cordage and knots are two words that go hand in hand, for one is useless without the other. What use is a length of cordage without at least one knot in it? The art of knot work was used to haul, secure and repair the items that were used everyday.



The workshop will be a hands-on activity involving knots and lashings that are most used and are useful in the field. You'll learn several knots and lashings from a clove hitch to a tripod lashing to perform various tasks.

Fee: $20

KAHIKO Workshops I

KAHIKO Workshops II

KAHIKO Workshops III

Course Schedule for 2003

Registration

Thumb Loop Hand Drill Fire Kit

KAHIKO Artwork & Replicas

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Course Schedule for 2003

Looped String Bag

May 26 (Monday - Memorial Day)
10 am - 4 pm
Fee: $25

NOTE: No registration will be taken after May 16 (register early).

Carrying Net

June 28 & 29 (Saturday & Sunday)
10 am - 4 pm (Two days workshop)
Fee: $45 for both days

NOTE: No registration will be taken after June 1 (register early).

Pump Drill

July 12 (Saturday)
10 am - 4 pm

Fee: $65

NOTE: No registration will be taken after July 1 (register early).

Twined Tule Basket

August 16 (Saturday)
10 am - 4 pm
Fee: $35

NOTE: No registration will be taken after August 1 (register early).
We will only be making a twined tule basket, no coiled grass basket.

Netting for Twined Tule Basket

(netting can also be used for containing other objects)

August 17 (Sunday)
10 am - 4 pm
Fee: $20

NOTE: No registration will be taken after August 1 (register early).

KAHIKO Workshops I

KAHIKO Workshops II

KAHIKO Workshops III

KAHIKO Workshops IV

Registration

Thumb Loop Hand Drill Fire Kit

KAHIKO Artwork & Replicas

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REGISTRATION

For registration, information, and questions,
contact: **Dino Labiste** at e-mail **dlabiste@yahoo.com** or call **(510) 792-9755**.

Place your reservations early. It's easy. E-mail a message or call in the workshops you would like to attend and you will receive a registration confirmation, directions, and other pertinent information. Please note that no reservations will be taken after the deadline date posted on the Course Schedule webpage for each class.

After you receive your Registration Confirmation via e-mail or phone call:

1. A $5 deposit per workshop is required. For example, if your take 3 workshops, the deposit total is $15. The $5 per workshop will be deducted from the class fee. The balance of the workshop fee will be collected at the beginning of the class. Please note that no workshop deposit fee (for that particular workshop canceled by the student) will be refunded if you cancel within 7 days before a class starts.
Submit a check, money order, or cashier's check payable to Dino Labiste. If you wish, you may also pay the total fee amount for all your workshops in advance.

2. Make a copy of the Registration Form or, if you don't have access to a printer, write out a similar form with the pertinent information, and fill out the form. Submit a separate Registration Form for each participant.

3. Make a copy of the Release of Liability form, fill it out and sign the form with the appropriate signatures. Submit a separate, signed form for each workshop taken. Please do not write out a similar form of the Release of Liability. If you do not have a printer, forms will be available at the start of the class. A signed Release of Liability form is required to take any of the workshops.

Mail your deposit check or money order, Registration Form, and Release of Liability form to:

KAHIKO Workshops
4768 Cortez Avenue
Fremont, California 94536

Make your check or money order payable to Dino Labiste.

KAHIKO Workshops is also available for cultural programs / demonstrations / lectures to schools, organizations, or groups. Choose any topic from the workshops or inquire about other early technology skills. Contact Dino Labiste for more information.

The class size is kept small, so that the instructor can interact with each student. The workshops are taught at a local park or, depending on the necessary tools, in the backyard of the instructor's home.

The workshops are held in **Fremont, California (United States)**
Head Instructor: Dino Labiste

*Definition of **Kahiko**: **1.** To think, act, speak in the old way. **2.** Ancient; a long time ago.*

"Teaching enriches me in the sense that I am sharing my knowledge of native skills. Hopefully, in turn, the students will pass down their skills to someone else who wants to learn early technology.

Both teaching and learning are essentially experiences of sharing. Sharing is based upon the interdependence and interconnectedness of life. In such a world of interrelationship, a single act of sharing, kindness, or giving benefits not only the receiver but the giver.

There is nothing in this world that cannot teach us. I am constantly learning from everyone I meet. Aun aprendo (I am still learning)."

KAHIKO Workshops I

KAHIKO Workshops II

[KAHIKO Workshops III]

[KAHIKO Workshops IV]

[Course Schedule for 2003]

[Thumb Loop Hand Drill Fire Kit]

[KAHIKO Artwork & Replicas]

[PrimitiveWays Home Page]

KAHIKO Workshops
REGISTRATION FORM

Date _____

_____
Name

_____
Address

_____
City, State, Zip Code (Country)

_____
Phone

_____
E-mail

WORKSHOP	DATE	DEPOSIT FEE	COURSE FEE	BALANCE (course fee minus deposit fee)

	TOTAL			

NOTE: The deposit fee ($5) of each workshop will be deducted from its corresponding course fee. The fee balance will be collected at the beginning of the workshop. **No deposit fee (for that particular workshop canceled by the student) will be refunded if you cancel within 7 days before a class starts.**

KAHIKO Workshops

KAHIKO Workshops
RELEASE OF LIABILITY

By signing below, I,

_____,
(print name)

agree that I will in no way hold anyone associated with this workshop, including, but not limited to:
KAHIKO Workshops, PrimitiveWays, PrimitiveWays.com, the property owners, instructors, or anyone else,
personally responsible for injury, illness, or property damage. I accept full responsibility and liability for any injury, illness, or property damage that may occur to me or to my family members while attending the

_____
Workshop.

Signature(s):

_____
Participant

_____
Parent/guardian

_____
Date

Each person attending must sign the release. Parent/guardian must sign for minors.

KAHIKO Workshops

Thumb Loop Hand Drill Fire Kit

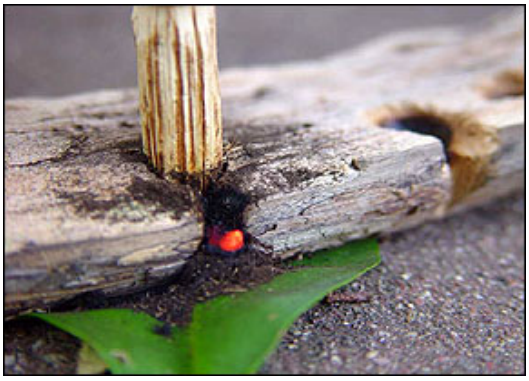
Produced by KAHIKO Artwork & Replicas

Wood everywhere, but never a spindle long enough for a hand drill fire. Creating fire by friction is never easy and finding the right materials in the wilderness can be difficult, if you don't know what particular wood you're looking for. Any advantage in the wild to help you create the fire-by-friction method is always useful. The solution can be found in a device called the Thumb Loop Hand Drill.

Spindle rotation and downward pressure are two important requirements for starting a hand drill fire. The Thumb Loop Hand Drill Fire Kit will help you with that all important downward pressure. It will also allow you to use short pieces of wood for your spindle. Long, straight branches or stalks do not have to be hacked out of a plant for your spindle needs.

The Thumb Loop Hand Drill can be taken anywhere with you on backpacking or hiking trips. It's light weight and handy. The Thumb Loop Hand Drill is also great for demonstrating the fire-by-friction process to boy scout or girl scout troops, campers, for nature programs, or to anyone who is interested in Stone Age skills. Making fire has a strong positive psychological impact upon an individual in a survival situation.

Instructions and sample wood materials are included in the kit to get you started. There is information on troubleshooting your fire kit. The most frequently asked questions concerning the fire-by-friction procedure are discussed. A list of wood recommendations is also provided in the kit. **Increase your success rate with the Thumb Loop Hand Drill.** Learn the art of calling down the Sun. Awaken the spirit of the wood and discover the mystery of **FIRE!**



"Short wooden spindles everywhere
and an ember is ready to be coaxed out of the hearthboard
with my Thumb Loop Hand Drill."

Included in each Thumb Loop Hand Drill Fire Kit are:

Main spindle shaft

Cordage & leather thumb loops

5 wooden spindle bits

1 hearthboard

Tinder nest

Instructions, including information on:

Gathering Fire-by-Friction Wood
Making the Spindle Bit
Creating the Hearthboard & Notches
Troubleshooting
Starting a Campfire with Your Tinder Fire
Wood Recommendations

The **PYRO 200** is the standard Thump Loop Hand Drill Fire Kit. The main spindle shaft has hand grooves, but no artwork. The design is constant with every PYRO 200.

All other kits will have different woodburning artwork and various hand groove designs on each main spindle shaft. The customized pieces will vary in price according to the artwork, designs, and type of wood used. The custom kits will be available soon.

To order your **Thumb Loop Hand Drill Fire Kit**, select the item number from any of the kits below. Print out a copy of the **Order Form** (or write a facsimile), fill out the form, and mail it to **KAHIKO Artwork & Replicas**, along with the total amount.

Read the e-mail comments from customers about the fire kit.

E-mail your questions or comments to **Dino Labiste** at dlabiste@yahoo.com

Item Number - **PYRO 200**
Price: **$20**

KAHIKO Artwork & Replicas

KAHIKO Workshops

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Thumb Loop Hand Drill Fire Kit
Order Form

Date _____

_____
Name (print)

_____
Address

_____
City, State, Zip Code, Country

_____ _____
Phone E-mail

_____
Your Height
(This information will help me customize the length of the cordage for the thumb loops to accommodate a short or tall person.)

Item Number	Quantity	Price per Item	Item Total
1. **PYRO 200**		**$20.00**	
2.			
3.			
		Subtotal	

		California residents only: **Add 8.25% sales tax** ***The sales tax for the PYRO 200 kit is $1.65*** *(for each additional PYRO 200 kit, add $1.65 sales tax)*	
		Shipping & Handling (see rates below for continental United States)	
		TOTAL DUE	

Order Subtotal	Shipping & Handling rate		Order Subtotal	Shipping & Handling rate
Up to 20.00	6.95		60.00 - 80.00	9.95
20.00 - 40.00	7.95		80.00 - 100.00	11.95
40.00 - 60.00	8.95		100.00 - 120.00	13.95

Inquire about shipping and handling rates for Alaska, Hawaii, or international orders.

To Order: Make a check (check must have a United States address), money order, or cashier's check payable to **Dino Labiste**. Send the Order Form including the amount due to

KAHIKO Artwork & Replicas
4768 Cortez Avenue
Fremont, California 94536
United States

Thumb Loop Hand Drill Fire Kit

Thumb Loop Hand Drill Fire Kit

E-mail Comments From Customers

Hello Dino;
I just recived my thumb loop hand drill. It is almost too nice to use. On my first try I got a ember to form, my second was even faster. I think it's even faster than the bow drill I have.

Thank you,
Shannon E.
Fort Bragg, California

Hey Dino;
This summer I will be introducing the drill at Camp Chrysalis in the Sierras.

Naturally,
David S.
El Cerrito, California

Dear Mr. Dino Labiste,
Thank you so much for sending me the kit.

Unfortunately, however, I couldn't succeed in making fire with it . . . . Smoke started to come out soon after 2 or 3 seconds, but couldn't maintain twirling the spindle bit for as long as it was necessary to make a fire. Guess I lack the strength needed for the job (am I getting old or what?). I felt a twinge of jealousy when a younger friend of mine succeeded on his second trial!!! (So it shows there's nothing wrong with your kit; the problem is with my physical strength!)

As to the hearthboard, I was quite surprised at its excellent quality: it's so light and produces lots of spindle powder with ease (am not sure from where the powder comes from, but am assuming that it mainly is produced from the hearthboard).

Anyway, I did have lots of fun with it and am surely going to try it again and again, until I succeed in making fire with it!!!!!

Thank you, again, for your kindness.

Best wishes,
Masaaki M.
Tokyo, Japan

Got it last night. Cool! Thanks. Got a little blister and got lots of smoke and punk but no coal yet. I'll keep hard at it.

Darren B.
Madison, Wisconsin

For years, I've attempted to demonstrate the creation of fire-by-friction utilizing traditional techniques. I have practiced until I had blisters upon my blisters. However, due to my small hands and physical stature, I was able to produce heat and smoke, but never fire. However, with the Thumb Loop Hand Drill, I am now capable of producing enough downward force to create the ember which can then be blown into a fire. Besides finding a lot of personal satisfaction in my accomplishment, it has made my demonstrations much more effective and memorable. Instead of just talking about the process and producing smoke, I can actually make fire! The thumb loop method enables more of us to be successful and will save many hands from blisters!

Cindy T. (Park Naturalist)
Sunol, California

Hello Dino;
I received the Thumb Loop Hand Drill and it is "beautiful". I hope that is a good enough word for the set.

This is all new to me, but I'm learning more all the time. I have not used it yet. I'm waiting for next when I will be spending some time with my nephew in the pine barrens of New Jersey, showing him how to call down the sun.

Thanks again,
Mark B.
Maplewood, New Jersey

Thumb Loop Hand Drill Fire Kit

KAHIKO Artwork & Replicas

KAHIKO Workshops

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FRIENDS of PRIMITIVE TECHNOLOGY

Past Activities

1. Birch Bark Baskets
2. Pottery From Natural Clay
3. Nomadic Coastal Collecting, Shells and Edibles
4. Mammoth Painting
5. The Rattlesnake Rendezvous
6. Tan Your Own Hide
7. Lauhala Weaving
8. The Coyote Hills Knap-In
9. Gourd Crafting

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Birch Bark Baskets

Instructors: Bill Scherer & Ken Peek

[View past Friends of Primitive Technology activities]

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Pottery From Natural Clay

Instructor: Dino Labiste

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Nomadic Coastal Collecting, Shells and Edibles

Instructor: Kennie Elvin

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Mammoth Painting and Mineral Pigments

Instructor: Chuck Kritzon

[View past Friends of Primitive Technology activities]

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[PrimitiveWays Home Page]

Rattlesnake Rendezvous

Sunol-Ohlone Regional Wilderness
Sunol, California

Travel 7 miles (by car)
and about 2,000 years into the past to experience life with no metal or electricity. Practice a wide range of primitive skills including cooking, stone tool use, cordage, fire and fun.

May 23 - 25, 2003
Course #3930

Leaving: noon (or evening) Friday - **Departing campsite:** 6 pm Sunday
Fee: **$80 (adult) / $40 (child)** ($88/ $44 for non-Alameda or Contra Costa County residents)
Call East Bay Regional Park District for registration & additional information, **(510) 636-1684**

Contact Norm Kidder at:
Sunol-Ohlone Regional Wilderness
P.O. Box 82, Sunol, CA 94586
Information: (925) 862-2600
E-mail: Atlatl1@aol.com or Svisit@ebparks.org
Registration: (510) 636-1684

Paul McHugh (reporter) and **Eric Luse** (photographer) from the **San Francisco Chronicle** attended the Rattlesnake Rendezvous - 2000. Access website: http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2000/06/01/SP93369.DTL to see the article written by Paul in the "Outdoors" section of the San Francisco Chronicle.

Photos of Rattlesnake Rendezvous - 2001

Photos of Rattlesnake Rendezvous - 2000

Photos of Rattlesnake Rendezvous - 2000 (continued)

E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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Rattlesnake Rendezvous - 2001 (Activities / Workshops)

page 1 of 3

Cooking

Cooking

Smoking a Buffalo Hide

Basketry

Basketry

Basketry

Cordage Making

Knotless Netting

Knotless Netting

Knotted Netting

Obsidian Knapping

Making a Rabbitskin Blanket

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Rattlesnake Rendezvous - 2001 (Activities / Workshops)

page 2 of 3

Making a Rabbitskin Blanket

Making a Rabbitskin Blanket

Painting with Earth Pigments

Painting with Earth Pigments

Painting with Earth Pigments

Painting with Earth Pigments

Painting with Earth Pigments

Painting with earth Pigments

Painting with Earth Pigments

Painting with Earth Pigments

Fire Saw

Fire Saw

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Rattlesnake Rendezvous - 2001 (Activities / Workshops)

Boiling with Hot Rocks

Boiling with Hot Rocks

Boiling with Hot Rocks

Boiling with Hot Rocks

Boiling with Hot Rocks

Primitive Lottery

Norm Kidder

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Rattlesnake Rendezvous - 2001 / Boiling with Hot Rocks

Bob started the morning by making coffee for everyone. Inside the fire you can see the basalt rocks heating up.

Rattlesnake Rendezvous - 2001 / Fire Saw

The fire saw started to smoke and eventually an ember ignited between the slit in the hearthboard.

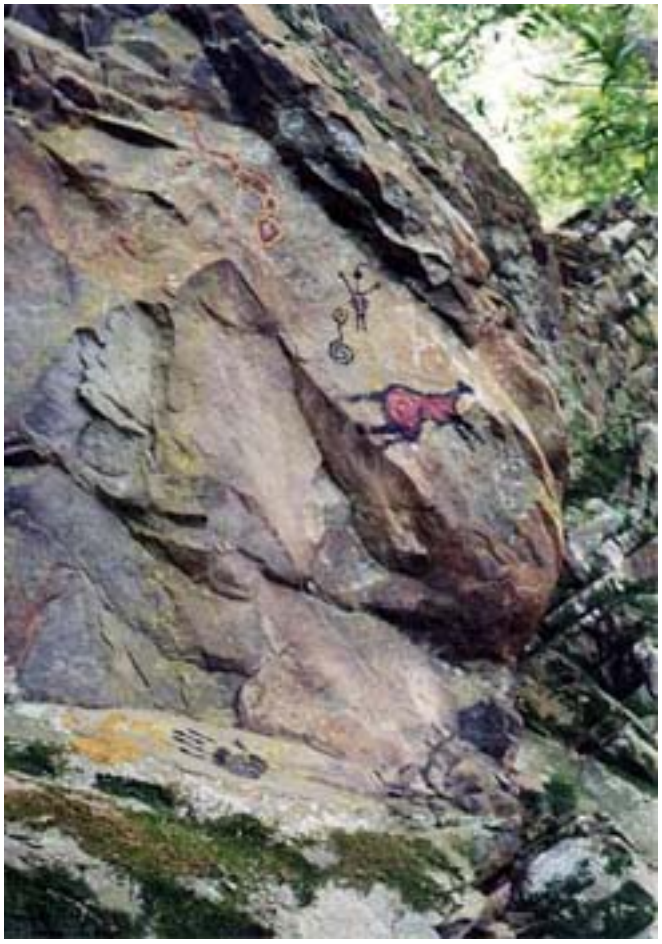
Rattlesnake Rendezvous - 2001 / Fire Saw

This fire saw required three people to operate. One stood on the hearthboard to stabilize it and the other two did the sawing.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments

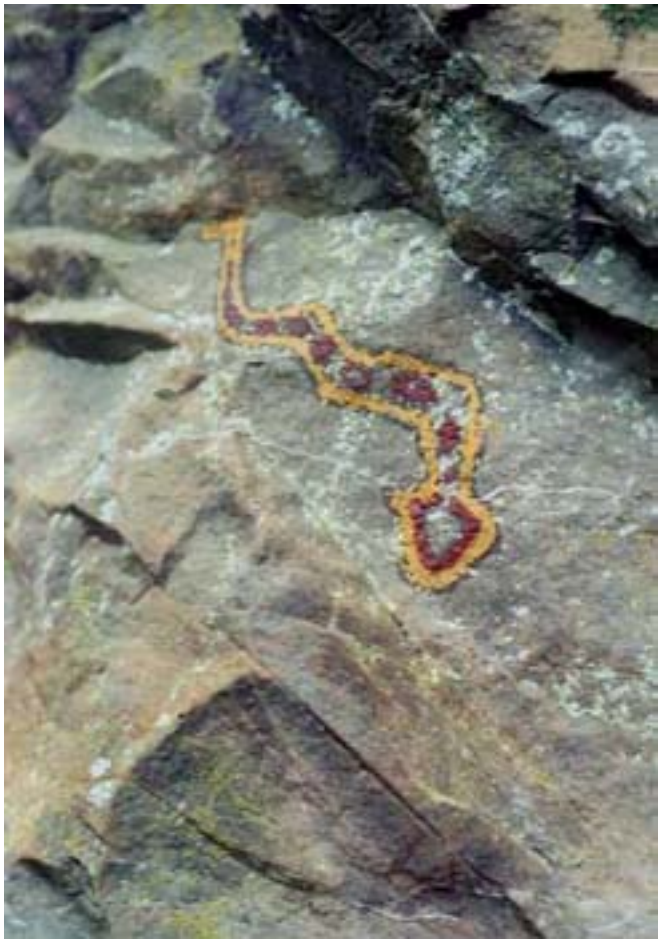
All Stone Age artists signed their work.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments



Another view of the mysterious pictographs on the rocks above the Rattlesnake Rendezvous campsite.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments

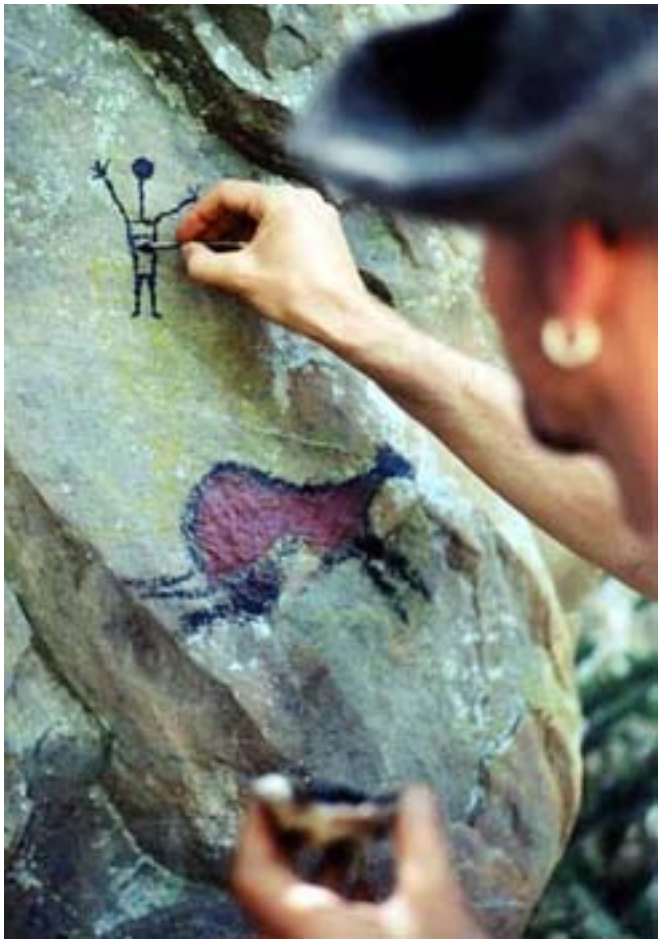


What better pictograph to paint for the Rattlesnake Rendezvous than the rattlesnake itself.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments

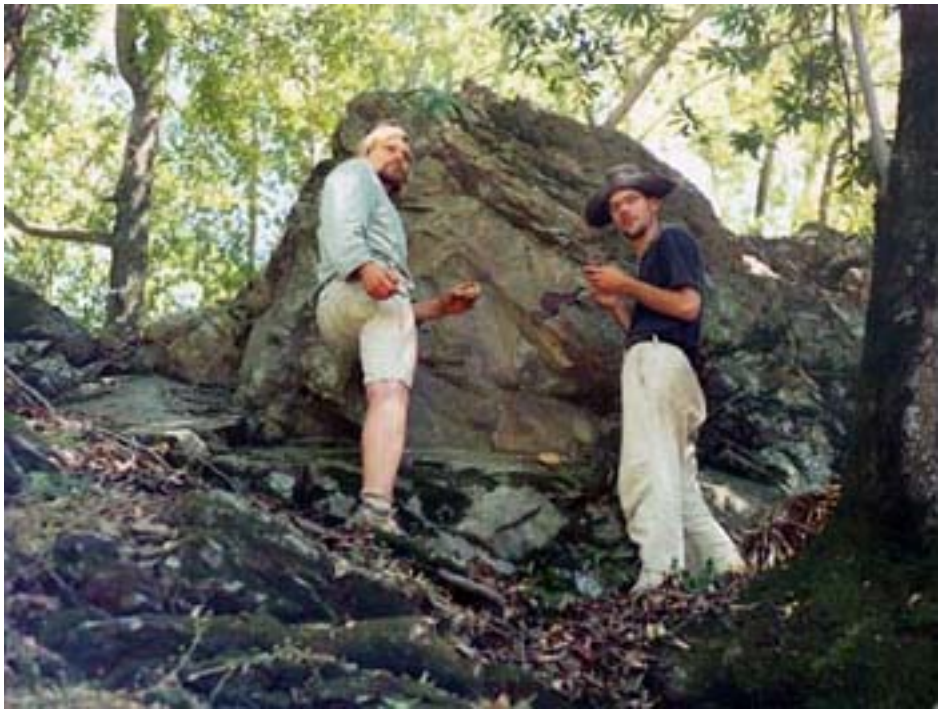
The porous rock absorbed the mixture of oil and powdered pigments.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments



Rock depressions and protrusions were taken into consideration to accentuate the forms of the pictographs.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments



The Stone Age artists at their rock easel.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments

The three different colors were individually mixed with melted lard and placed into oyster shell containers. Charcoal from the fire pit was used for the black color. Bound grass and shredded twigs were used for brushes.

Rattlesnake Rendezvous - 2001 / Painting with Earth Pigments

Blake is grinding the earth pigments into powder with a stone against a flat stone.

Rattlesnake Rendezvous - 2001 / Making a Rabbitskin Blanket

Several feet of twisted rabbitskin.

Rattlesnake Rendezvous - 2001 / Making a Rabbitskin Blanket

A new strip of rabbitskin is added to the dogbane cordage by untwisting the 2-ply cordage and sliding one end of the new rabbitskin strip between the cordage.

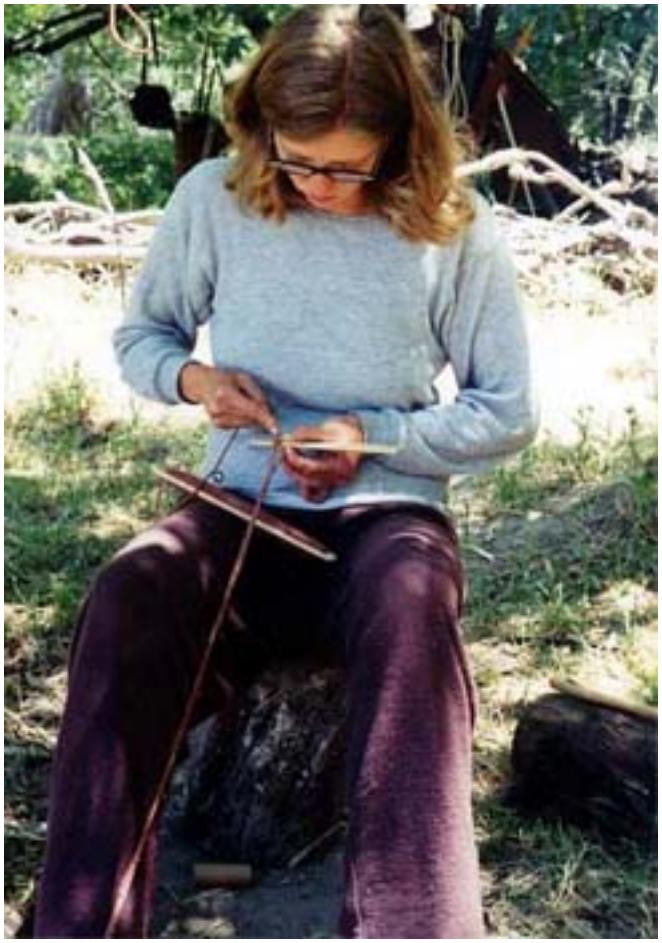
Rattlesnake Rendezvous - 2001 / Making a Rabbitskin Blanket

Alice is wrapping strips of rabbitskin around a dogbane two-ply cordage.

Rattlesnake Rendezvous - 2001 / Obsidian Knapping

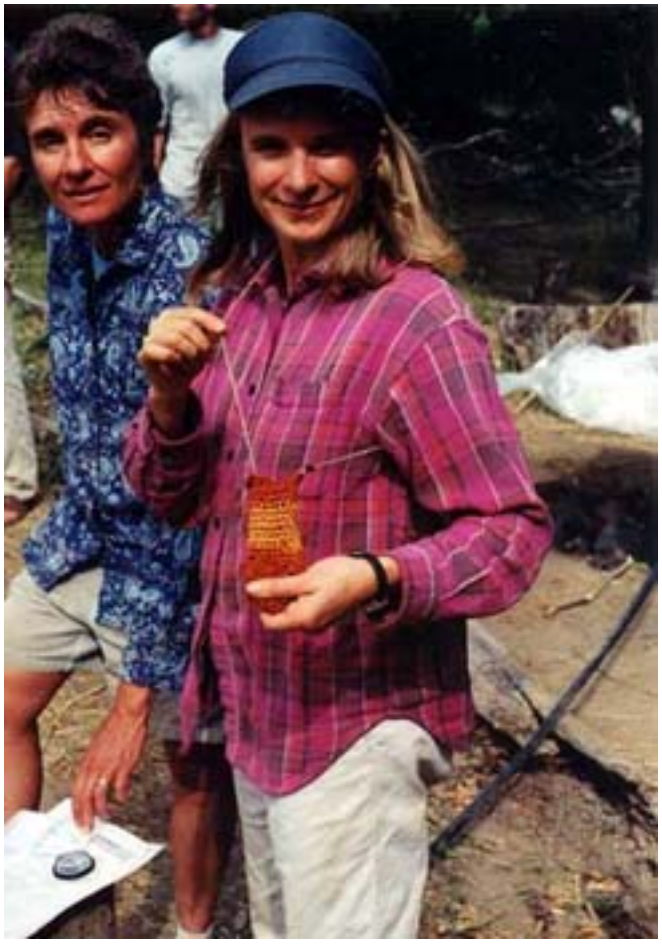
Beginning knapping skills were taught to people who wanted to learn how to make an arrowhead.

Rattlesnake Rendezvous - 2001 / Knotted Netting



The start of a netted bag using a shuttle and a gauge to create the sheet bend knot.

Rattlesnake Rendezvous - 2001 / Knotless Netting



A completed looped string bag using two different colors of string.

Rattlesnake Rendezvous - 2001 / Knotless Netting

The technique of knotless netting was used to start a looped string bag.

Rattlesnake Rendezvous - 2001 / Cordage Making

Making a two-ply cordage out of the fibrous plant called dogbane.

Rattlesnake Rendezvous - 2001 / Basketry

A twined basket that's almost completed.

Rattlesnake Rendezvous - 2001 / Basketry

Preparing the materials for the basket.

Rattlesnake Rendezvous - 2001 / Basketry

Shirley demonstrates the start of a plaited basket.

Rattlesnake Rendezvous - 2001 / Smoking a Buffalo Hide

Markus experimented with dry cow dung for smoking material to smoke his buffalo hide. A pit was dug in the ground, a willow frame was built over the smoking pit and the tanned buffalo hide was draped over the willow frame.

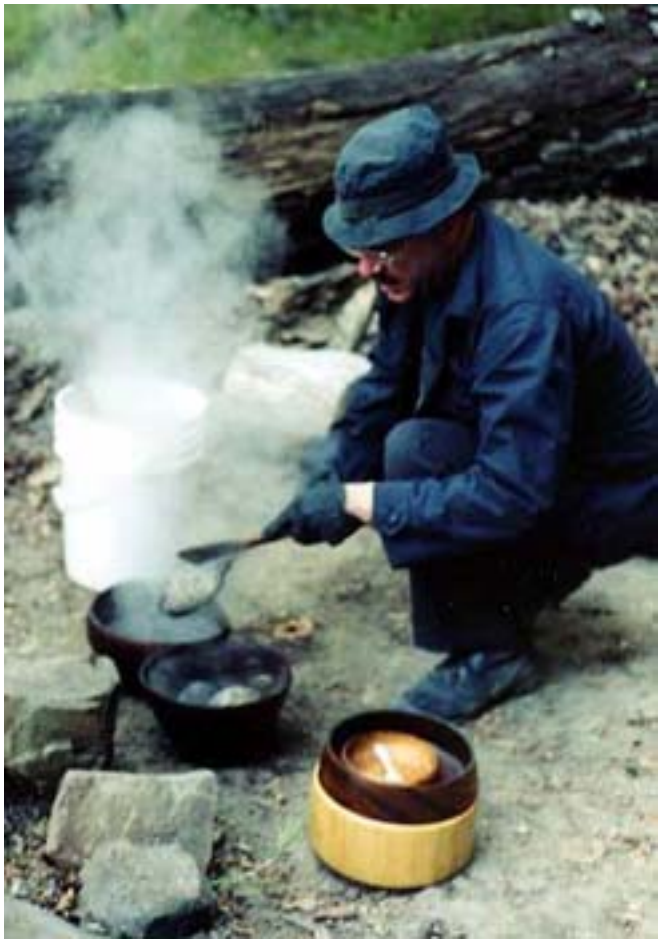
Rattlesnake Rendezvous - 2001 / Cooking

People got creative on how to skewer their meat and potatoes.

Rattlesnake Rendezvous - 2001 / Cooking

Cooking was done over an open pit fire. Various methods were used to cook food: skewering chicken on a spit, placing potatoes and corn directly on the hot ashes, laying beef on a flat rock next to the fire and boiling stinging nettle soup in a clay pot.

Rattlesnake Rendezvous - 2001 / Boiling with Hot Rocks



The hot rocks were first rinsed in a wooden bowl of water to remove the ashes, then placed into another wooden bowl of water. The second bowl of water eventually heated up and began to boil.

Rattlesnake Rendezvous - 2001 / Boiling with Hot Rocks

The hot water was mixed with coffee grounds in a third wooden bowl.

Rattlesnake Rendezvous - 2001 / Boiling with Hot Rocks

Serving up a steaming cup of hot java.

Rattlesnake Rendezvous - 2001 / Boiling with Hot Rocks

All of the coffee addicts getting their morning fix of caffeine.

Rattlesnake Rendezvous - 2001 / Primitive Lottery

The winners of the primitive lottery.

Rattlesnake Rendezvous - 2001 / Norm Kidder

Our fearless leader for the Rattlesnake Rendezvous event -- Norm Kidder.

Rattlesnake Rendezvous - 2000 (Activities / Workshops)

Archery

Archery

Basketry & Brush Making

Gourd Class

Gourd Bowl

Primitive Tools

Bone Flute Class

Knapping Class

Drumming

Gourd & Bone Needle

Hide Smoking

Sweat Lodge

Photos of Rattlesnake Rendezvous 2000 - (continued)

Paul McHugh (reporter) and Eric Luse (photographer) from the San Francisco Chronicle attended the Rattlesnake Rendezvous - 2000. Access website: http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2000/06/01/SP93369.DTL
to see the article written by Paul in the "Outdoors" section of the San Francisco Chronicle.

E-mail your comments to "Norm Kidder " at atlatl1@aol.com

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Rattlesnake Rendezvous - 2000 / Archery

Ready! Aim! Fire!

Rattlesnake Rendezvous 2000 / Archery

Allie Kritzon instructing one of the younger participants in the use of the atlatl at the shooting range. Bows and throwing sticks were also used during the event.

Rattlesnake Rendezvous - 2000 / Basketry and Brush Making

The paint brush is made from a fox leg bone with the ends cut off on the edge of a sharp stone. The bristles are horsehair that was folded in half and pulled into the tapering bone with a short piece of cordage forcing it to bind in the narrows, then trimmed.
The miniature basket is made from pine needles twined with freshly processed New Zealand Flax cordage. Everyone was truly impressed with Jeanne's creations.

Not to be outdone, husband John twined about 30 feet of two ply dogbane cordage!

Rattlesnake Rendezvous - 2000 / Gourd Class

Betsy Kritzon surrounded by the accouterments of her primitive camp: wooden bowls, baskets, water gourds. She is sitting comfortably on a capote and sheepskins, while putting finishing touches on a gourd cup.

Rattlesnake Rendezvous - 2000 / Gourd Bowl

One of the traditions at the Rattlesnake Rendezvous is that of donating items made by participants during the event for a giveaway. This beautiful gourd bowl was one of several items given away in a draw of straws by all the participants on the last day of the event. It is decorated with pine needles, pinenut beads, dentilia shells and glass trade beads. The gourd bowl was made by Betsy.

Rattlesnake Rendezvous - 2000 / Primitive Tools

A bone wedge and wooden mallet were used to split a branch in half.

Rattlesnake Rendezvous - 2000 / Bone Flute Class

Chuck Kritzon is helping a student fine tune her bone flute.

"Pssst! Pssst! Nope, let's change the angle of the pine pitch a bit. There, now let's try it. Tweet! TWEEEET! TWEEEET! Alright!"

Rattlesnake Rendezvous - 2000 / Knapping Class

Dick Baugh lecturing and demonstrating the fine art of obsidian knapping.

Rattlesnake Rendezvous - 2000 / Drumming

Rattlesnake Rendezvous Unplugged!

The night air was filled with the rhythms and beats of primitive instruments.

Rattlesnake Rendezvous - 2000 / Gourd and Bone Needle

Jeanne hollowing out her gourd and Mary abrading her deer bone shard on a stone to make a needle.

Rattlesnake Rendezvous - 2000 / Hide Smoking

Markus smoking his third buffalo hide.

Rattlesnake Rendezvous - 2000 / Sweat Lodge

A sweat lodge was built out of willow frames and covered with canvas and tarp. After enduring the sweltering heat of the sweat lodge, the participants cooled off in the nearby stream.

Rattlesnake Rendezvous - 2000 (Cooking / Shelter)


Cooking


Cooking


Cooking


Cooking


Cooking


Cooking


Hungry Camper


Cooking


Primitive Clothing


Primitive Clothing


Primitive Clothing


Shelter


Shelter


Shelter


Shelter


Rattlesnake Rendezvous

Photos of Rattlesnake Rendezvous 2000

Paul McHugh (reporter) and Eric Luse (photographer) from the San Francisco Chronicle attended the Rattlesnake Rendezvous - 2000. Access website: http://www.sfgate.com/cgi-bin/article.cgi?file=/chronicle/archive/2000/06/01/SP93369.DTL to see the article written by Paul in the "Outdoors" section of the San Francisco Chronicle.

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Rattlesnake Rendezvous - 2000 / Cooking

Long shadows announce the time of day our small tribe begins gathering around one of the two cooking pits to prepare dinner.

Rattlesnake Rendezvous - 2000 / Cooking

Bob Pratt ready to cook a salmon fillet on a grill made out of green willow.

Rattlesnake Rendezvous - 2000 / Cooking

The cooking fire seemed to wake the creative muse in us all. Whether it was grilling, roasting or baking; breakfast, lunch or dinner, the variety of cooking methods never seem to wane. Who needs metal!

Rattlesnake Rendezvous - 2000 / Cooking

The fires were always a focal point of the event. It seemed that no matter the time of day or night, there was always a person or group close by the fire; cooking, working on a project or just talking. It was the center and heart of our tribe.

Rattlesnake Rendezvous - 2000 / Cooking

Time to turn over the salmon fillet.

Rattlesnake Rendezvous - 2000 / Cooking

The smell of roasted salmon fillet, baked trout, skewered beef brisket and grilled chicken was overpowering!

Rattlesnake Rendezvous - 2000 / Cooking

"Ahhhhh! Smell that delicious food."

Rattlesnake Rendezvous - 2000 / Cooking

Primitive cooking at its best.

Rattlesnake Rendezvous - 2000 / Primitive Clothing

Close-up of the mighty lizard hunter, Norm, wearing his tule sun visor and holding his rivercane blow gun. Dino to the right of him modeling his ti leaf rain cape. The leaves were individually tied to a cordage net foundation.

Rattlesnake Rendezvous - 2000 / Primitive Clothing

Markus and his primitive "Punk" outfit.

Rattlesnake Rendezvous - 2000 / Primitive Clothing

"Let it rain!"

Rattlesnake Rendezvous - 2000 / Shelter

The foundation of the wickiup was made out of willow.

Rattlesnake Rendezvous - 2000 / Shelter

One side of the exterior consisted of cattail and the other side was covered with coyote brush (due to the shortage of additional cattail).

Rattlesnake Rendezvous - 2000 / Shelter

Norm and Chuck inspecting the final structure.

Rattlesnake Rendezvous - 2000 / Shelter

The Wickiup

Rattlesnake Rendezvous - 2000 / Group Photo

Most of the 38 hearty souls who "survived and thrived" at the Rattlesnake Rendezvous - 2000.

On the right side in the back, Norm is about to skewer a lizard climbing a tree about 20 ft. away with his Cherokee style rivercane blowgun. He missed by an inch!.

HIDE TANNING

Instructor: Bill Scherer

[View past Friends of Primitive Technology activities]

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LAUHALA WEAVING

Instructor: Shirley Albright

[View past Friends of Primitive Technology activities]

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Coyote Hills KNAP-IN AND THE GATHERING OF OHLONE PEOPLE

at the Coyote Hills Regional Park in Fremont, California

Fellow primitive technologists gathered for two fun filled days
of breaking rocks, making fire, chucking darts, and generally talking to the visitors.
Sunday was also the Gathering of the Ohlone People at the park.

Continued

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Coyote Hills KNAP-IN AND THE GATHERING OF OHLONE PEOPLE

at the Coyote Hills Regional Park in Fremont, California


PROPERTY OF
R.V.M. EQUIPMENT

Back to the beginning

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GOURD CRAFTING

Instructors: Chuck Kritzon & Ken Peek

View past Friends of Primitive Technology activities

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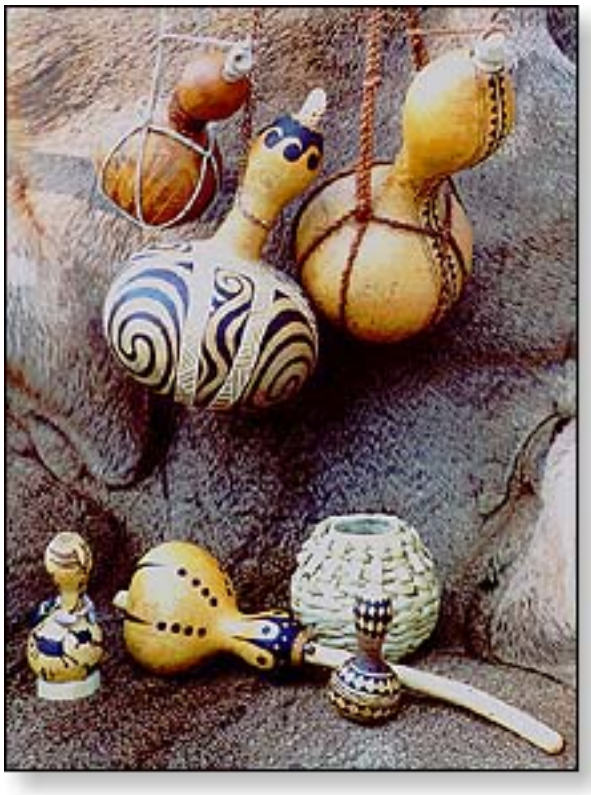
Art & Replica Gallery



Gourd water containers and gourd rattle.

Gourd water container

Gourd water container

Bone saw for cutting tule.

Netting shuttle

NEXT GALLERY

KAHIKO Artwork & Replicas

Thumb Loop Hand Drill Fire Kit

KAHIKO Workshops

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Art & Replica Gallery

Brain tanned medicine bag

Flint and steel fire kit.

Fishing gear: dogbane fishing line (2-ply cordage), bone gorge, bone hooks, and stone weights (holes were drilled with a flint hand drill).

Stone (basalt) axes

Twined tule quiver

NEXT GALLERY

Art & Replica Gallery 1

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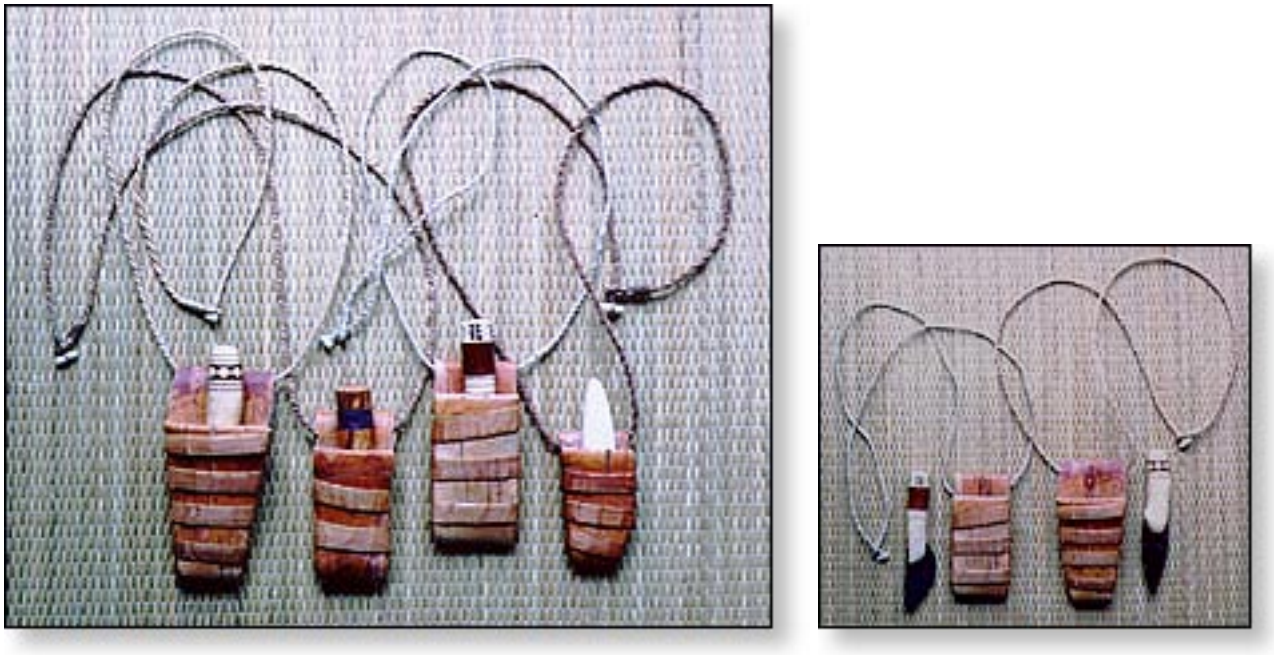
Art & Replica Gallery



Papoose: obsidian knife and birch bark sheath necklaces.

Neck pendants (palaoa style)

Puniu (coconut knee drum) and kilu puniu (gourd knee drum).

Pump drills

Diigubuhu (tule bittern toys)

NEXT GALLERY

Art & Replica Gallery 1

Art & Replica Gallery 2

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Art & Replica Gallery

Antler handle knife with celtic knot engraving.

Atlatls

Buffalo bone awl with abalone shell inlay.

Arrow with mahogany obsidian arrowhead.

Coiled sweetgrass basket

NEXT GALLERY

Art & Replica Gallery 1

Art & Replica Gallery 2

Art & Replica Gallery 3

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Art & Replica Gallery

Bamboo cup

Knife sheath made out of brain tanned buckskin.

Oak burl cup

Soaproot brushes

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Art & Replica Gallery

Bone knife and birch bark sheath.

Slate ulu and flint knife.

Twined baskets made out of tule.

Stone (basalt) mortar and pestle

NEXT GALLERY

Art & Replica Gallery 1

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Art & Replica Gallery 5

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Art & Replica Gallery

Gourd drums

Wooden ladle

Gourd shakare. The netted noise makers consist of manzanita seeds, white bone beads and black horn beads.

Hafted stone (basalt) axe

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Art & Replica Gallery 1

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Art & Replica Gallery 6

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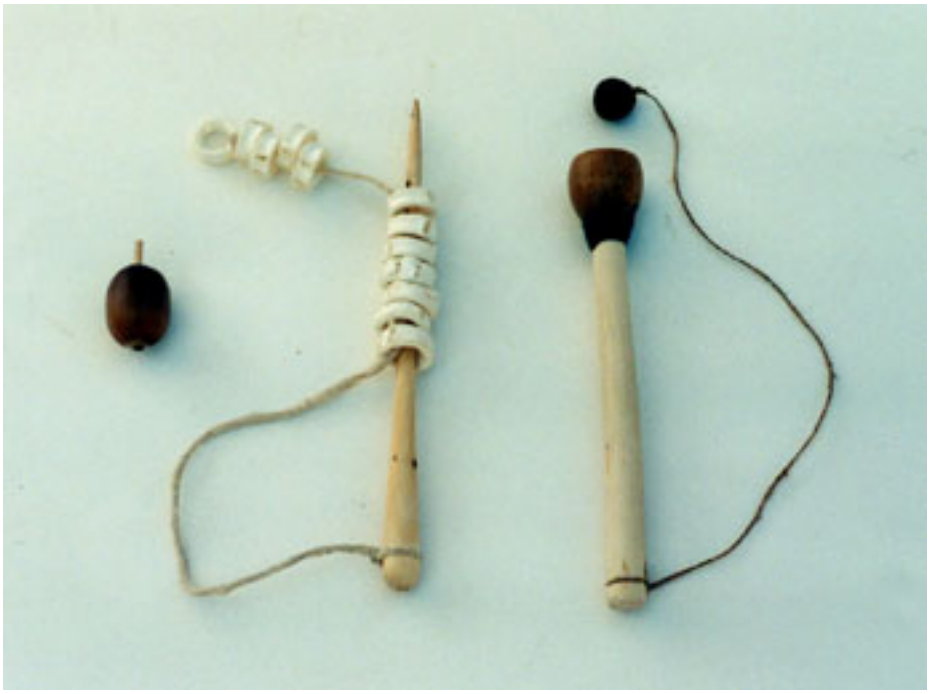
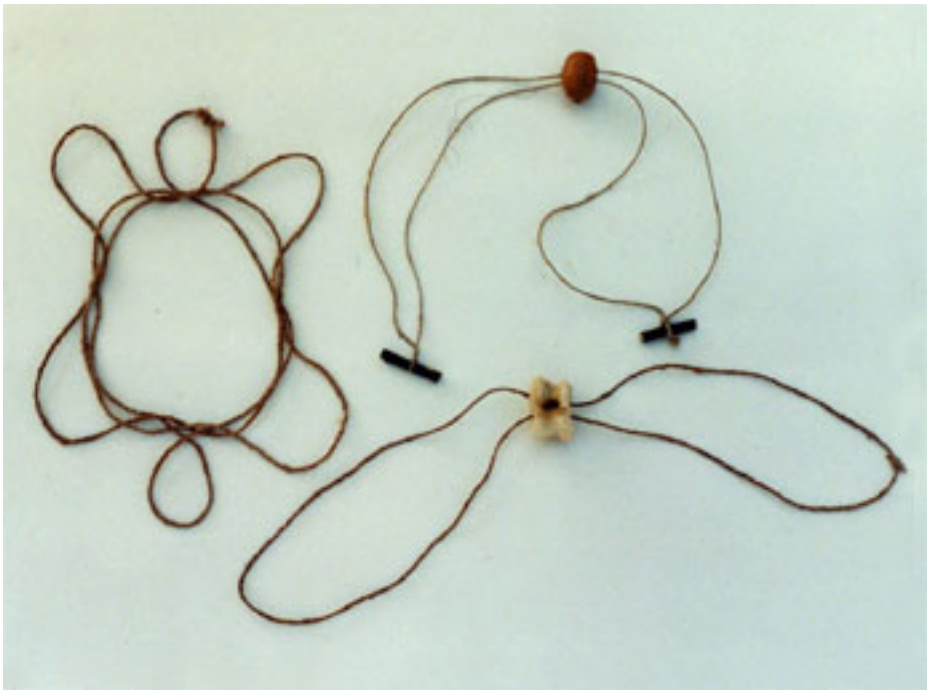
Art & Replica Gallery

Games: Stick dice, counter sticks, and shell dice.

Hand games: bones, olivella shells, and counter sticks.



Children's games: acorn top, pin & ring, and cup & ball.



String games: string figures, acorn buzzer, and bone whirligig.

NEXT GALLERY

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Art & Replica Gallery 7

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Art & Replica Gallery

Looped string bag made from dogbane, milkweed, and stinging nettle.

Birch bark basket

Antler arrow straightener

Soapstone arrow straightener

NEXT GALLERY

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Art & Replica Gallery 8

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Art & Replica Gallery

Wooden spoons

Bone awls

Knife sheath worn around the neck.

Bone awls for coiled basketry.

NEXT GALLERY

Art & Replica Gallery 1

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Art & Replica Gallery 9

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Art & Replica Gallery

Charm stones

Netting shuttles

Cocoon rattle

Atlatls

Necklace made from abalone shells, Washington clam shell beads, pine nuts, and juniper seeds.

Art & Replica Gallery 1

Art & Replica Gallery 2

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Art & Replica Gallery 6

Art & Replica Gallery 7

Art & Replica Gallery 8

Art & Replica Gallery 9

Art & Replica Gallery 10

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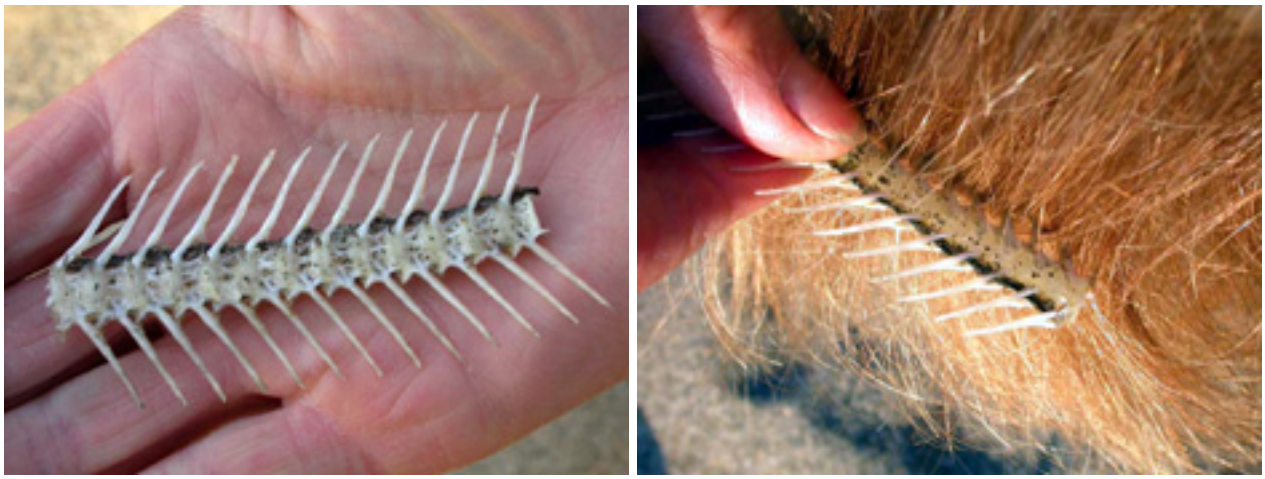
Wilderness Grooming

by Dino Labiste, Bob Gillis, & Susan Witmore



An eel vertebrae makes an ideal primitive comb.

Brushes for grooming hair were made from soaproot or yucca.

Find an abrasive stone and start filing your fingernails.

Depilating with a clam shell.

Washing up with yucca leaves that were first pounded with a rock. Water was added to the crushed yucca leaves as they were rubbed between the hands to produce green suds. The leaves contain a compound called saponin that creates the soapy lather.

The soaproot bulbs were also used for soap. The bulbs were crushed, water was added, and suds were created when rubbed between the hands. Saponin is also present in soaproot.

"Small chunks of the peeled cactus can be added to a container of water, the water mixed, and the resultant slimy water used as a hair rinse and conditioner. This can also be lathered into a soap." *(from **Guide to Wild Foods** by Christopher Nyerges)*

When the blossoms of ceanothus (also called wild lilac or buck brush) are mixed with water and

rubbed vigorously, they make a fragrant soap. The bride and groom of some Native American people used the soap to wash each others hair as part of the wedding ceremony. The flowers bloomed from March to April.


Toothpicks from plant thorns.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com or "Bob Gillis" at shelter@best.com

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RECOMMENDED READING

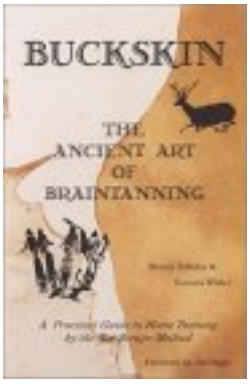
Books: M - Z	Magazines & Newsletters

BOOKS: A - L

Androgynous Objects, String bags and gender in central New Guinea
Author: Maureen A. MacKenzie

"This book deals with the understanding of the relationship between string bags (bilum), material culture and gender in Central New Guinea. It contains detailed study of the form and function of the bilum. The hardcover is a bit pricey, but there is an affordable paperback out on the market."
Order this book

Buckskin: The Ancient Art of Braintanning
Authors: Tamara Wilder and Steven Edholm

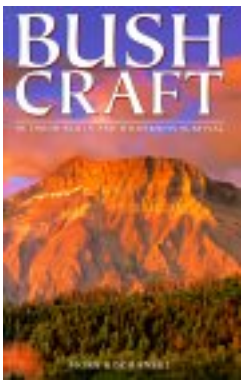


"This book is written as an easy to use practical guide for the beginning home tanner and as a long term reference. It goes in-depth into the beginning process of preparing the hide to the final process of smoking the hide. Each step is covered in its own chapter, augmented by a total of 148 photos and illustrations."
Order this book

Bushcraft: A Serious Guide to Survival and Camping
Author: Richard Graves

"An excellent book on bushcraft from Australia. Out-of-print and hard to find."
Order this book

Bush Craft: Outdoor Skills & Wilderness Survival
Author: Mors L. Kochanski

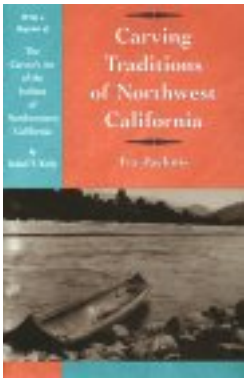


"A gold mine of information on wilderness survival in the Great White North."
Order this book

Camping & Wilderness Survival
Author: Paul Tawrell

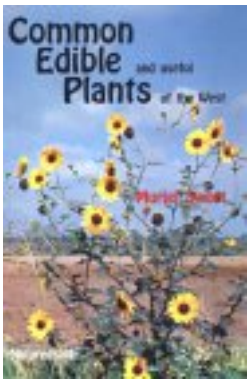
"This book contains a wealth of survival and camping techniques. It was labeled "The Ultimate Outdoors Book". A must get for those who are into wilderness survival."
Order this book

Carving Traditions of Northwest California
Author: Ira Jacknis



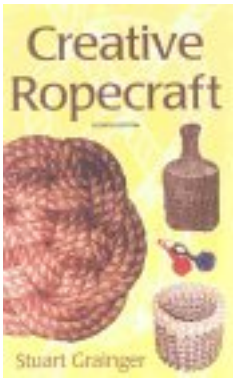
"The book covers the history of the traditional carving techniques of the Northwest California Indians. The construction and aesthetic form of the elk spoons and acorn mush paddles are revealed in chapters in the book as well as in photographs."
Order this book

Common Edible and Useful Plants of the West
Author: Muriel Sweet



"If you want to know how the Native Americans, pioneers and the early Spanish-Americans used many of the common wild plants of the west for food, building shelters or making artifacts, and as tonics or in other ways to help bring back or preserve health, this is the book for you."
Order this book

Creative Ropecraft
Author: Stuart Grainger



"The standard work on the subject of practical and decorative knots and ropework. It is a treasure trove of knots, hitches, bends, plaits, netting and decorative ropework, enabling the layman to follow in the footsteps of the traditional seamen who have gone before him. Well illustrated by Stuart Grainger."
Order this book

Crafts of the North American Indians; A Craftsman's Manual
Author: Richard Schneider

"Native American skills."
Order this book

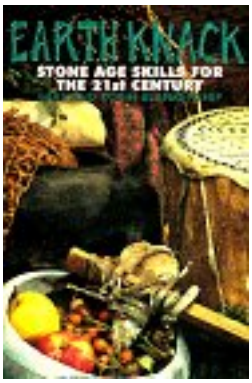
Deerskins into Buckskins
Author: Matt Richards

"Over 130 photos and illustrations bring you step by step from raw skin to velvety soft buckskin and then show you how to create beautiful garments and useful goods. Designed to be easily understood by the beginner yet rich with details for the experienced, this book teaches tanning as a natural process."
Order this book

Early Uses of California Plants
Author: Edward K Balls

"Information from many sources has been compiled here to present the most important uses of plants by early inhabitants of California, as well as methods of preparing the plants for use."
Order this book

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

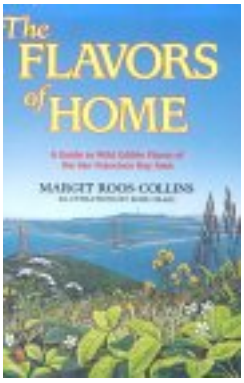


"This book is chock full of instructions on primitive skills. Learn about the fire plow, pottery, netting, plants, basketry and more."
Order this book

Edible and Medicinal Plants of the West
Author: Gregory L. Tilford

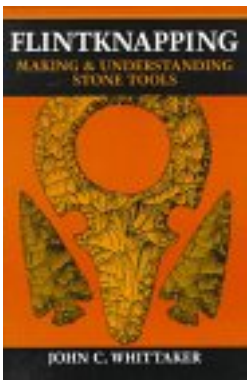
Order this book

Flavors of Home: A Guide to Wild Edible Plants of the San Francisco Bay Area
Author: Margit Roos-Collins



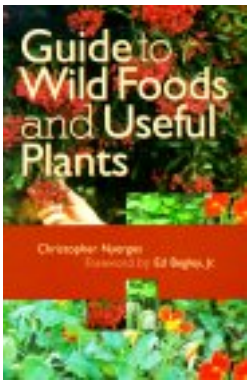
"A guide to wild edible plants of the San Francisco Bay Area."
Order this book

Flintknapping: Making and Understanding Stone Tools
Author: John C. Whittaker



"A thorough summary available on flaked stone technology. The book skillfully blends instruction on how to make stone tools with information on how to interpret flaked stone artifacts."
Order this book

Guide to Wild Foods and Useful Plants
Author: Christopher Nyerges



Christopher Nyerges has been teaching people about wild foods and useful plants for many years down in southern California. An excellent guide book on wild plant foraging and uses.
Order this book

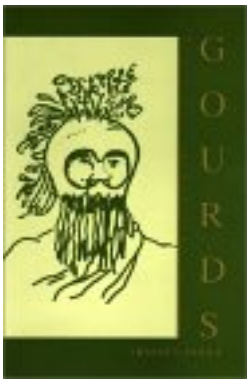
Gems Trails of Northern California
Author: James Mitchell

"A great source locator for gems in Northern California."

Handbook of Yokuts Indians
Author: Frank F. Latta

"Richly detailed account of California"s most populous native society. An excellent study of Yokuts culture and history."
Order this book

Hawaiian and Other Polynesian Gourds
Author: Ernest S. Dodge



"Dr. Dodge was the former director of the Peabody Museum of Salem for over 30 years. Excellent information on the various uses of Polynesian gourds."
Order this book

How To Make Primitive Pottery
Author: Evard H. Gibby

"Included are sections on Finding Clay, Clay Preparation, Tempering Clay, Making Pottery, Finish and Decoration, Drying Pottery, Primitive Firing, How To Cook in a Clay Pot, Other Objects Made From Clay and more."
Order this book

Indian and Eskimo Artifacts of North America
Author: Charles Miles
Bonanza Books

"In this primarily pictorial guide with explanatory captions, Miles has organized photographs of over 2,000 examples of all of the major kinds of North American native-made and -used artifacts, and presents them under several functional headings."
Order this book

Indian Uses of Native Plants
Author: Edith Van Allen Murphey
Mendicino County Historical Society

Order this book

Books: M - Z	Magazines

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E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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RECOMMENDED READING

Books: A - L	Magazines & Newsletters

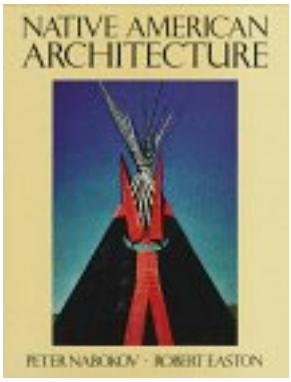
BOOKS: M - Z

Made in Hawai'i
Author: Jane Fulton Abernethy and Suelyn Ching Tune

"Made in Hawaii will make a trip to Hawaii into a primitive experience. You'll learn how to make leis, ti leaf skirts, play native games and other crafts the old fashion way. Lots of fun. This book made me feel like I was a part of the land and the culture. Highly recommended book on native Hawaiian crafts."
Comments by Bob Gillis
Order this book

Miwok Material Culture
Authors: S. A. Barrett and E. W. Gifford

Native American Architecture
Authors: Peter Nabokov and Robert Easton

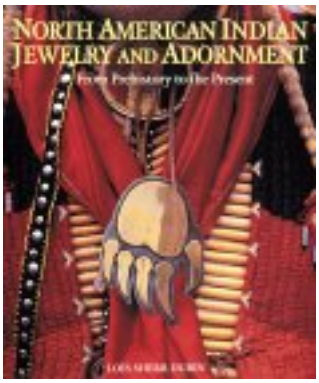


"This book is about ritual, religion and family life as much as it is a definitive book about the diverse building structures utilized by the various Native American tribes and groups."
Order this book

North American Dye Plants
Author: Anne Bliss

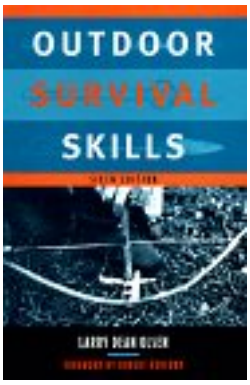
"Guide for everyone who enjoys plants and would like to learn more about those best suited for brewing natural dyes. Complete instructions for mordanting and dyeing, as well as ideas for foraging and using plants at home."
Order this book

North American Indian Jewelry and Adornment
Author: Lois Sherr Dubin



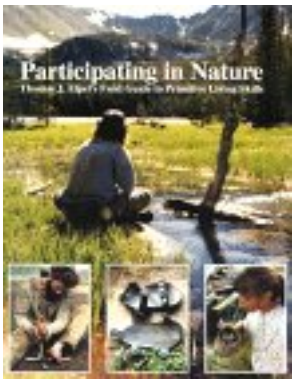
"Gorgeously illustrated, this is a comprehensive study of jewelry, beadwork, clothing and ceremonial objects from ancient times to the present, made by indigenous peoples throughout the United States, Canada and northern Mexico."
Order this book

Outdoor Survival Skills
Author: Larry Dean Olsen



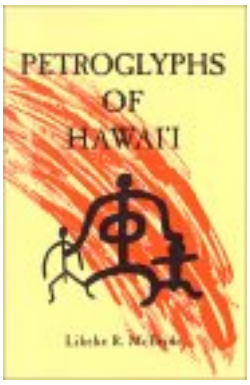
"The first good book on the subject. Larry got a lot of us started down this path."
Order this book

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



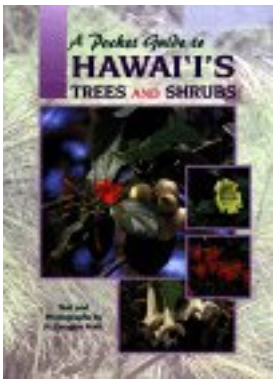
Order this book

Petroglyphs of Hawaii
Author: Likeke R. McBride



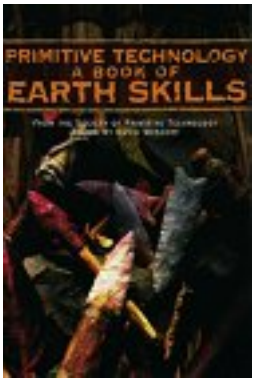
Order this book

A Pocket Guide to Hawai'i's Trees and Shrubs
Author: H. Douglas Pratt



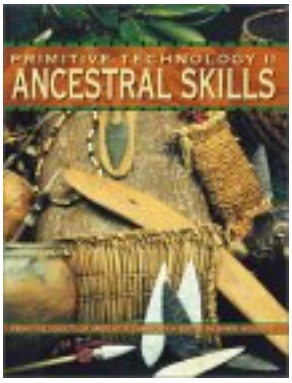
"If you are going to Hawaii and want to learn about the native plants and their many uses, you have to be able to identify them. This book has excellent photos and fits in your pocket. All the plants are different and thus the need for this book."
Comments by Bob Gillis
Order this book

Primitive Technology: A Book of Earth Skills
Edited by: David Wescott



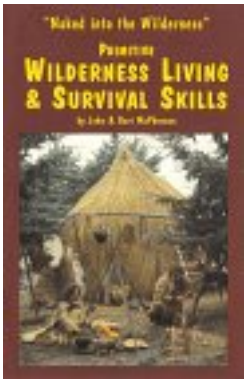
"Included in this valuable resource are instructions for creating fire and tools of wood, stone and bone, as well as fiber adhesives, projectiles, art and music.This book is a sharing of ideas - the philosophies, the history and the personal stories by the authorities on primitive technology from the pages of *The Bulletin of Primitive Technology*. Many of the articles on PrimitiveWays are featured in this book as well as ***Primitive Technology II: Ancestral Skills*** (see below). If you are into primitive technology, this is the book for you. Highly recommended"
Order this book

Primitive Technology II: Ancestral Skills
Edited by: David Wescott



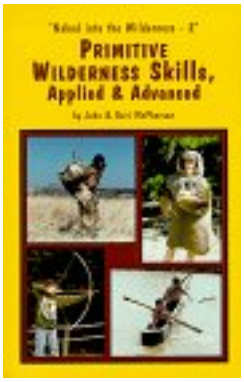
"This is the continuation of David Wescott's previous primitive technology book. More instructions on various primitive skills that were not included in the first book are also from the pages of *The Bulletin of Primitive Technology*. Many of the articles on PrimitiveWays are featured in this book as well as **Primitive Technology: A Book of Earth Skills** (see above). If you loved the first book, then you'll also enjoy reading this one. Highly recommended"
Order this book

Primitive Wilderness Living and Survival Skills
Authors: John and Geri McPherson



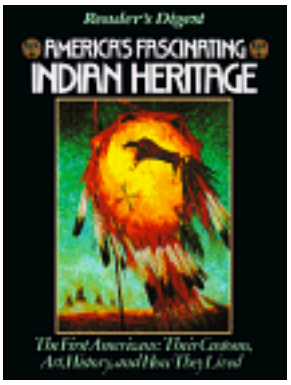
"John and Geri takes you into the woods and teaches you the survival skills of living in the wilderness."
Order this book

Primitive Wilderness Skills, Applied & Advanced
Authors: John and Geri McPherson



"More wilderness skills are introduced in the second book by John and Geri McPherson. They'll show you the practical application of these skills while you read about their adventure as they create their own tools for survival in the wilderness."
Order this book

Reader's Digest, America's Fascinating Indian Heritage
Editor: James A. Maxwell



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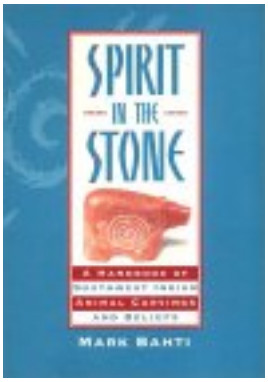
Simon & Schuster's Guide to Rocks and Minerals

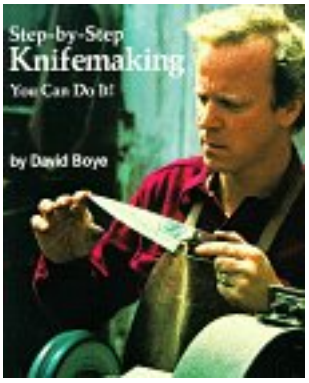
Authors: Annibale Mottana, Rodolfo Crespi and Giuseppe Liborio
ISBN 0-671-24417-5

Spirit in the Stone: A Handbook of Southwest Indian Animal Carvings and Beliefs
Author: Mark Bahti



Order this book

Step-by-Step Knifemaking: You Can Do It!
Author: David Boye



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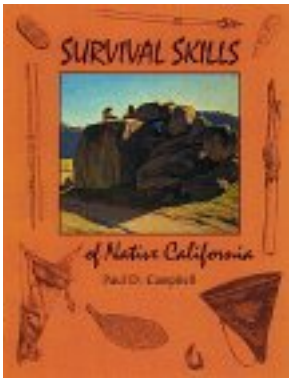
Survival Arts of the Primitive Paiutes
Author: Margaret Wheat

"Paiute elders demonstrate the material culture skills of their ancestors. Good photo reference."
Order this book

Survival Skills of Native California
Author: Paul D. Campbell



"This book is astounding in the breadth of skills taught, and contains more than 400 pages with 2,000 skills and nearly 1,000 instructional illustrations. A great compilation of Native California skills."
Order this book

The Art and Craft of Natural Dyeing, Traditional Recipes for Modern Use
Author: J. N. Liles

"Liles consolidates the lore of the older dyers with his own first-hand experience to produce both a history of natural dyes and a practical manual for using pre-synthetic-era processes on all the natural fibers."
Order this book

The Coast Miwok Indians of the Point Reyes Area
Author: Sylvia Barker Thalman

Order this book

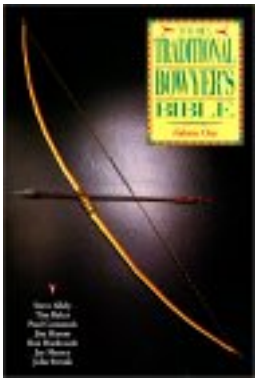
The Mystic Warriors of the Plains
Thomas E. Mails

"The culture, arts, crafts and religion of the Plains Indians. Profusely illustrated."
Order this book

The Native Americans, The Indigenous People of North America
Editorial Consultant: Colin F. Taylor,
Technical Consultant: William C. Sturtevant

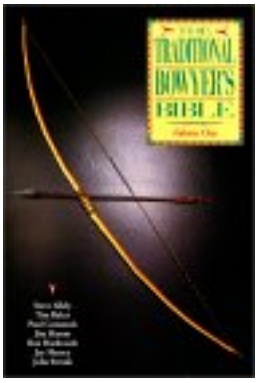
"This book looks at various cultural aspects, beliefs, key individuals and historical events in the lives of many tribes and groups of Indians. Photographs dating from about 1850 to 1940 have been selected from the National Anthropological Archives and other sources; the artifacts date between 1860 and 1920. An excellent book that is uniquely complimented by 38 superb artifact spreads, and many archive and color illustrations."
Order this book

The Traditional Bowyer's Bible, Volume One
Authors: Steve Alley, Tim Baker, Paul Comstock, Jim Hamm, Ron Hardcastle, Jay Massey and John Strunk



"The definitive book on traditional bows and arrows. With combined experience totaling over a century, the authors have constructed thousands of bows. They reveal their secrets and techniques in this book for anyone interested in the ancient lure of archery. One of three volumes."
Order this book

The Traditional Bowyer's Bible, Volume Two
Authors: G. Fred Asbell, Tim Baker, Paul Comstock, Dr. Bert Grayson, Jim Hamm, Al Herrin, Jay Massey and Glenn Parker



"The definitive book on traditional bows and arrows. With combined experience totaling over a century, the authors have constructed thousands of bows. They reveal their secrets and techniques in this book for anyone interested in the ancient lure of archery. One of three volumes."
Order this book

The Traditional Bowyer's Bible, Volume Three

Authors: Tim Baker, Paul Comstock, Gabriela Cosgrove, Jim Hamm, Gene Langston, Jay Massey, Jay St. Charles, Jeff Schmidt, Scott Silsby and David Tukura

"The definitive book on traditional bows and arrows. With combined experience totaling over a century, the authors have constructed thousands of bows. They reveal their secrets and techniques in this book for anyone interested in the ancient lure of archery. One of three volumes."
Order this book

Tribal Living Book: 150 Things to Do and Make from Traditional Cultures Around the World
Authors: David Levinson and David Sherwood

"This book covers a wide range of topics from making an Ingalik snow goggle, creating a Thailand crossbow, the Jivaro Indians of Ecuador's technique of shrinking a head to various fire by friction methods around the world."
Order this book

Wildwood Wisdom
Author: Ellsworth Jaeger

"This book was my first teacher in the ways of the woods. Wildwood Wisdon is worth the study. It taught me to tell weather by the sky, which way is north in the thick woods, make sun goggles, talk like the birds, create bark tools, drink the sweet birch sap and much more. Get this book and it will enrich your experience of nature and your woodland skills."
Comments by Bob Gillis
Order this book

Woodsmoke, Collected Writings on Ancient Living Skills
Compiled by: Richard and Linda Jamison

"Woodsmoke is a handbook of survival skills - time-saving hints for experienced outdoorsmen and possible life-saving advice for the novice."
Order this book

Books: A - L | Magazines

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RECOMMENDED READING

Books: A - L | Books: M - Z

MAGAZINES

Bulletin of Primitive Technology
P.O. Box 90
Rexburg, Idaho 83440

News from Native California
P.O. Box 9145
Berkeley, California 94709

Primitive Archer
P.O. Box 79306
Houston, Texas 77279-9306

Wilderness Way
P.O. Box 203
Lufkin, Texas 75902-0203

NEWSLETTERS

Wild Food Adventurer Newsletter

A revealing source about edible wild plants in North America.
John Kallas, Ph.D., Publisher, Editor, Feature Writer
5036 SE Mitchell St, Portland, OR 97206-4814
Phone: (503) 775-3828 / e-mail: mail@wildfoodadventures.com

Books: A - L | Books: M - Z

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E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Educational Videos | How-To Videos

MOVIES

Entertainment

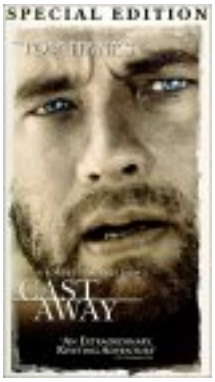
Black Robe (1991)
Starring: Lothaire Bluteau, August Schellenberg
Director: Bruce Beresford
Order this movie

Synopsis: Historical epic about French priest trying to convert Algonquin Indians in 17th century Canada. This slowly unfolding sleeper pleases historical drama fans who appreciate lush cinematography and a bleak, non-Hollywood approach. Some graphic violence, but historically correct.

"Smell the wood smoke."

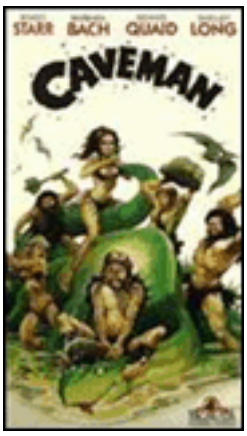
Cast Away (2000)

Starring: Tom Hanks, Helen Hunt
Order this movie



"Following a mid-Pacific plane crash, Chuck Noland's (Tom Hanks) four-year survival on a remote island, totally alone save for a Wilson volleyball (aptly named "Wilson") that becomes Chuck's closest "friend." It's fascinating to witness Chuck's emerging survival skills, and Hanks's remarkable physical transformation. Chuck's frustration is witnessed when he attempts to use the fire plow technique to start a fire. His elation is seen when he finally succceeds in his hard earned efforts at creating fire with the help from Wilson."

Caveman (1981)
Starring: Ringo Starr, Barbara Bach, Shelly Long
Director: Carl Gottlieb
Order this movie



Synopsis: Prehistoric screwball comedy finds weakling Cro-Magnon battling bullish rival. While the plot is purely pedestrian, fans of the cast and stop-motion creature effects may find it a campy, nostalgic diversion.
Run time: 92 minutes
MPAA Rating: PG
Genre: Comedy

"This movie, although not having anything to do with survival, etc. is a great diversion. The cast members are all familiar, the claymation is funny, and there is a great scene of an improve primitive musical session! Zug-Zug!"
Comments by Chuck Kritzon

The Clan of the Cave Bear (1986)

Starring: Daryl Hannah, Pamela Reed
Director: Michael Chapman
Order this movie

Synopsis: Feminist caveman drama about blond Neanderthal in prehistoric times. Critics thought Hannah was perfectly cast, but panned script, pacing. May appeal to fans of camp for unintentionally funny moments.
Run time: 100 minutes
MPAA Rating: R
Genres: Action, Drama

"If you loved the book, you will hate the movie! But! It does have some redeeming value sprinkled throughout. Great visuals of a Neanderthal group on the move during the Ice Age, bull roarers being used and more."
Comments by Chuck Kritzon

Dersu Uzala (1975)
Starring: Maxim Munzuk, Yuri Solomin
Director: Akira Kurosawa
Order this movie

Synopsis: Two men whose contrasting lives are bound by a common thread of survival learn friendship and respect in Siberian wasteland. Engrossing character study for drama fans who appreciate deliberate, simple stories.
Run time: 124 minutes
MPAA Rating: NR
Genres: Classic, Drama, Foreign
Country of Origin: Japan

"This is one of the best movies about experiencing the wilderness. Directed by Akira Kurosawa. A Russian army officer at the turn of the century befriends an old Asian man who has spent his life living off the land in the wild. The segment when the two of them are caught away from camp in a steppe type environment and a very sudden snow storm comes over them is one of the best parts of the film. Don't miss this one!"
Comments by Chuck Kritzon

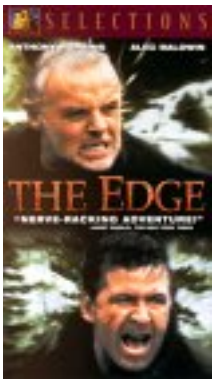
The Earthling (1981)

Starring: William Holden, Ricky Schroder
Genre: Drama
Order this movie

"A touching and thoughtful portrait of two reluctant survivors, one a life-worn fifty something seeking to reclaim his history before terminal disease claims him first; and the other, a young boy, played by Ricky Schroder, violently thrust from a sheltered childhood. The two are brought together when the boy's parents are killed in a fearsome accident while on vacation in the remote Australian wilderness; the older man, played by William Holden, is the only witness for many miles around. Preoccupied with his own demise and his own demons, Foley (Holden) must take the boy with him and teach him the survival skills he learned as boy living in the same wilderness many years before. He does not have time to walk the boy out himself, so he much teach him what he needs to go on alone. While both characters are derailed by fate from their anticipated courses, both end up with what they truly needed because of one another. To take a moral from a much more recent movie: Life, as always, finds a way."
Summary by Cory Burt

"This movie is a little slow but well worth the time. Beautiful scenes of the Australian wilderness. Neat physical and spiritual aspects of Australian Aboriginal culture shown."
Comments by Chuck Kritzon

The Edge (1997)
Starring: Anthony Hopkins, Alec Balwin
Order this movie



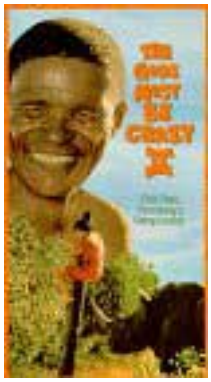
"Alec Baldwin and Anthony Hopkins, who played Hannibal Lechter in "Silence of the Lambs", are stranded in the wilderness and have to practice survival skills, all the while being stalked by a grizzly bear."
Movie suggestion by JRine31369@aol.com

Emerald Forest (1985**)**
Starring: Powers Boothe, Meg Foster
Order this movie

"Powers Boothe plays an American engineer working on a dam project in Brazil. When his young son is seemingly absorbed one day into the dense perils and beauty of the Amazon rain forest, Boothe's character searches endlessly for his missing son for 10 years. The director, John Boorman, leads us into the life of a forest tribe who have assimilated the missing child and who will ultimately send him back with the opposite of his father's pro-development sensibility. The acting is very good and the location is beautiful."

"Emerald Forest deals with the primitive mind. Who we really are when stripped of our cultural guise. The movie takes place in the Amazon jungle. There are scenes of drug induced communion with nature."
Comments by Bob Gillis

The Gods Must Be Crazy
Order this movie

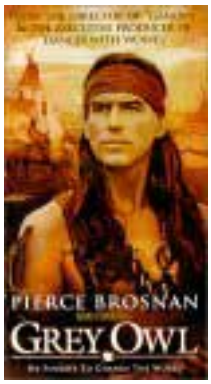


"The Gods Must Be Crazy is a film made in South Africa many years ago that stirred up a bit of controversy in its depiction of Black Africans. Basically, the movie makes fun of civilized folk of all types and contrasts them to the pure logic of the unspoiled Bushmen. It deals with the events that evolve from a pilot dropping a coke bottle into an area where there are Bushmen unaware of civilization (oh that there really were!) After they find many uses for the bottle, which they think was sent to them by the gods, they decide that it is actually evil and destructive to their social order, so their leader sets off to through it off the edge of the world. On the way he encounters a group of whites who are having their own adventures and gets involved in an incident with revolutionaries and so on. The film contrasts his purity and basic understanding and skills, with the complex, nonsensical dealings of the modern world. It has some great humor and scenery shots, and portrays some good hunter/gatherer skills. Its a low budget sort of film but I love it."
Comments by Norm Kidder

"African Bushman discover a soft drink bottle that becomes an important cultural object."

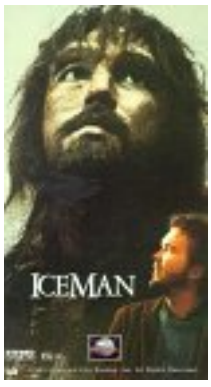
Movie suggestion by JRine31369@aol.com

Grey Owl (1999)
Starring: Pierce Brosnan, Annie Galipeau
Order this movie



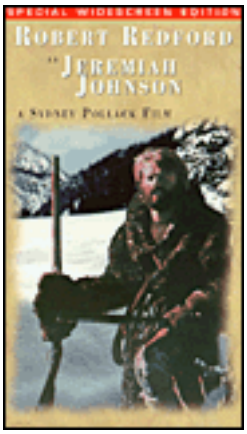
"The true story of a pioneering conservationist in the Canadian wilderness. Pierce Brosnan stars as Grey Owl, who was raised by the Canadian Ojibwa peoples. He gets by as a trapper, hunting guide, and sometime writer, but becomes an internationally revered activist in the 1930s when he publishes a book on the vanishing wilderness. The real star of the film is the magnificent Canadian wilderness: carpets of forests, clear crystal lakes, and vast blue skies."

Iceman (1984)
Starring: Timothy Hutton, John Lone
Order this movie



"A Neanderthal man is found frozen in ice. Scientists manage to bring him back to life, but only Hutton is interested in him as a human being and not a lab specimen. Fascinating, credible science fiction made all the more involving by Fred Schepisi's fine direction. Remarkable performance as the caveman by Lone.

Jeremiah Johnson (1972)
Starring: Robert Redford, Will Geer
Director: Sydney Pollack
Order this movie



Synopsis: Mountain man saga, with its simple, powerful characters, early frontier setting, and leisurely pace, will please fans of historical Westerns and drama lovers who enjoy stunning natural cinematography. Good depiction of Native American culture and basic survival techniques in Rocky Mountain winter.

" Larry Dean Olson was a consultant for the movie."

The Last of the Mohicans (1992)
Starring: Daniel Day-Lewis, Madeleine Stowe
Director: Michael Mann
Order this movie

Synopsis: Lush, sweeping historical/romantic drama about battle for control of North America in 18th century. With its stunning cinematography, gripping action, strong performances, this is a hit with romance, Western, epic lovers. Good depictions of frontier trappers, settlers and Native Culture during the French and Indian Wars. The opening sequence is not to be missed!

Lost in the Barrens (1990)
Starring: Nicholas Shields, Evan Adams, Lee J. Campbell, Graham Greene (*Dances With Wolves*)
Run time: 91 minutes
Order this movie

"The movie won an Emmy for "outstanding children's entertainment", but don't let that fool you. That just simply means it's good, and doesn't have any graphic scenes or coarse language. It is distributed by "Feature Films for Families" (1-800-347-2833), which, again, let's you know that the movie is clean. Rather than try to tell you about the movie, I'll just write what's on the back of the case."
Jamie, an orphan who must leave his upper-class boarding school to live with an uncle in the wilderness of Manitoba, Canada, has no idea of the incredible adventure that awaits him. During a hunting trip, he and Awasis, a Native American Indian, become separated from the group. Finding themselves lost and alone in the icy and dreaded wilderness called The Barrens, their struggle to survive against impending doom strips away their prejudice toward one another's cultures, and demands from them more courage, determination and trust than they ever thought they coud muster. This compelling story is filled with emotion and climaxes in triumph.
Comments by Alan Harrison, dna0323@coiinc.com

Man in the Wilderness (1971)
Starring: Richard Harris, John Huston
Director: Richard Sarafian
Order this movie

Synopsis: A member of an expedition team in the Northwest Territory is left for dead after a bear attacks him. He struggles to survive in the wilderness while plotting his revenge.
Run time: 108 minutes
MPAA Rating: PG
Genres: Action, Drama

"Starting with nothing but the buckskins on his back and left for dead, a wilderness scout manages to live and make everything he needs to survive and catch up with the men that deserted him. Also has some good Native American representations."
Comments by Chuck Kritzon

The Mountain Men (1980)
Starring: Bian Kieth, Chuck Heston
Order this movie

"They use quite a few primitive skills and give the watcher a peek at some beautiful country as they survive the fur trapping era. Worth the look."
Comments by Westwind32@hotmail.com

The Naked Prey (1966)
Order this movie

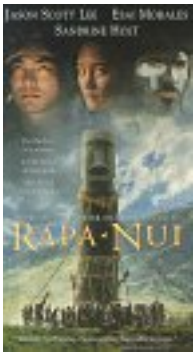
"Over a 100 years ago, a group of white hunters, on a safari for elephant ivory, were captured by a tribe that the white hunters refused to pay off. They killed off all but one of the white hunters, this one white hunter known as "Man" (played by the actor Cornel Wilde. He also directed the film). The Tribe, being impressed by Man's bravery, reserved a special death for Man. They gave him the "lion's chance". They stripped him naked and allowed him a head start before he would be chased by the tribe's best warriors. But Surprise!!! One of the warriors gets killed by Man, and grabs the warriors machete, flint & steel, loincloth, and spear (he keeps loosing that tool) and having the same wilderness skills knowledge as the tribe. Man uses those skills to survive, escape and evade his pursuers.
Lots of primitive skills used in this film."
Comments by Bryan Lee Sammis

No Escape (1994)

Order this movie

"The year is 2022, USMC Captain John Robbins (Ray Liotta) has been sentenced for assassinating his commanding officer, by banishment to an unescapable remote island prison. No guards, no fence, just a remote island of the damned. There are 2 major camps on the island: the "outsiders" led by the bloodthirsty Merak (played by Stuart Wilson), and the community known as the"Insiders" led by the strong willed benevolent Father (played by Lance Henriksen). In this film look at the Insiders community. They improvised and adapted every piece of material and "junk" that washed up on the shore to be used for the "betterment" of the community. Almost an epitome of primitive self reliance."
Comments by Bryan Lee Sammis

Rapa Nui (1994)
Starring: Jason Scott Lee, Esai Morales, Sandrine Holt
Director: Kevin Reynolds
Order this movie



"Highly romanticized saga of Easter Island (Rapa Nui), the remote southern Pacific outpost whose mammoth human-faced statues have long baffled historians. Set in 1680, prior to Dutch colonization, with hero Lee (of the Long Ear tribe) and villain Morales (of the Short Ears) as rivals since boyhood, now facing civil war. Climactic endurance test - a grueling race on land and sea."

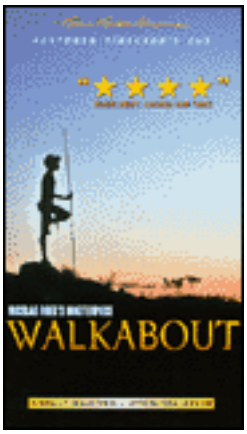
Quest For Fire (1982)

Starring: Everett McGill, Rae Dawn Chong
Director: Jean-Jacques Annaud
Order this movie

Synopsis: Widely appealing drama about a prehistoric tribe seeking fire for survival. Much-admired for its ability to develop colorful characters, intriguing story without use of modern language. Great for drama fans.
Run time: 75 minutes
MPAA Rating: R
Genres: Action, Drama, Sci-Fi/Fantasy

"Some outrageous mistakes, but well worth the time to watch. Even has a scene with Mammoths!"
Comments by Chuck Kritzon

Walkabout (1971)



Starring: David Gulpilil, Jenny Agutter
Director: Nicolas Roeg
Order this movie

Synopsis: Hypnotic, once-experimental, nearly dialogue-free art-house hit about siblings marooned in Australian outback and befriended by a young aborigine on his "walkabout". With its stunning cinematography, "respect nature" message, this coming-of-age drama pleases fans seeking homage to primitive, uncivilized world.
Run time: 95 minutes
MPAA Rating: NR
Genres: Classic, Cult, Drama
Country of Origin: Australia

"Great movie from early 70's. Walk About is kind of different and it starts out really surprising. Really good!"
Comments by Chuck Kritzon

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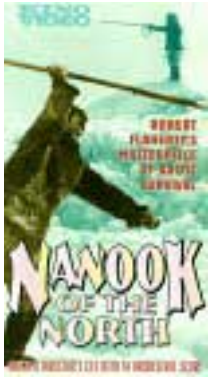
Educational

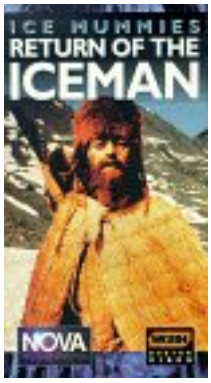
Nanook of the North (1922)
Starring: Nanook
Order this video



"Classic Silent Documentary about an Inuit named Nanook. Movie shows Nanook hunting and fishing as well as building an igloo. Rereleased on video tape."
Movie suggestion by JRine31369@aol.com

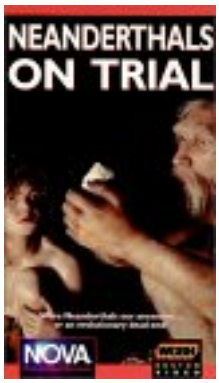
Nova: Ice Mummies - Return of the Iceman (1998)

Order this video



"A man wandered into the Italian Alps about 5,000 years ago and never returned - until his astonishingly well-preserved body was discovered by hikers in 1991. *Return of the Iceman* by NOVA looks at the scientific research, and political controversy, that emerged from this spectacular find. Using CAT scanning and carbon dating, scientists were able to learn much about the man's health and lifestyle, from the tools he used to the foods he ate, giving us much greater insight into the life of our ancestors during the Stone Age. Much of the research was conducted in Austria, but after surveyors determined that the body was found in Italian territory, a small battle was launched to return the body to its "homeland." The research continues, however, and the outstanding science reporting we expect from Nova keeps us informed and amazed."

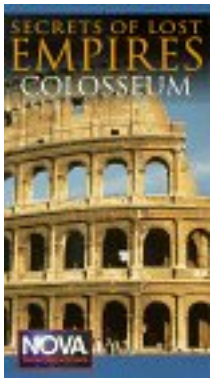
Nova: Neanderthals on Trial (2001)
Order this video



"Were Neanderthals human ancestors or an evolutionary dead-end? After more than a century of investigation, the jury is still out. Exploring one of the most contentious debates in human origins, NOVA offers a surprising look at how the science works, and how investigators sometimes fool themselves into seeing what they want to see."

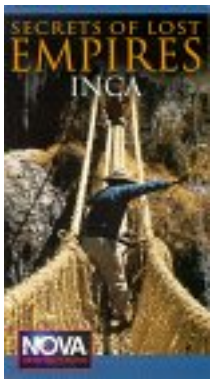
Nova: Secrets of Lost Empires - Colosseum (1997)

[Order this video]



"Uncover the secrets of ancient civilizations as NOVA journeys to an archaeological site where teams of experts use traditional techniques to test their hypotheses. Try out two possible designs for the canopy that once covered the Colosseum, one of them borrowed from ancient ships. "

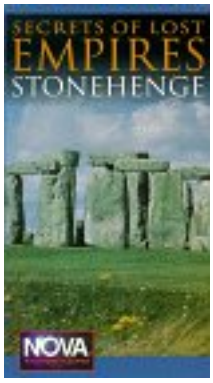
Nova: Secrets of Lost Empires - Inca (1997)
[Order this video]



"Uncover the secrets of ancient civilizations as NOVA journeys to an archaeological
site where teams of experts use traditional techniques to test their hypotheses. Explore the magnificent mountainside citadels, and marvel as villagers create a 150-foot suspension bridge using nothing but grass."

Nova: Secrets of Lost Empires - Stonehenge (1997)

Order this video



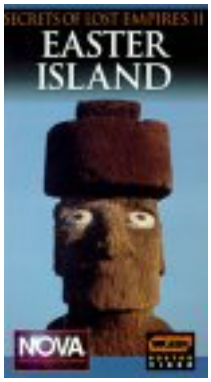
"Uncover the secrets of ancient civilizations as NOVA journeys to an archaeological site where teams of experts use traditional techniques to test their hypotheses. Watch a band of experts move, raise, and cap a structure like the mysterious Stonehenge, armed with Stone Age tools. "

Nova: Secrets of Lost Empires II - China Bridge (2000)
Order this video

"Travel to 12th-century China as engineers, scientists and scholars help reveal the intricate mysteries behind the revolutionary strength and elegance of the Rainbow Bridge."

Nova: Secrets of Lost Empires II - Easter Island (2000)

Order this video



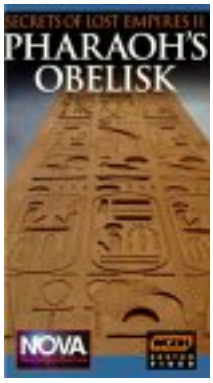
"Approximately 900 moai (giant human form sculptures made of stone) were carved over a period of 500 years by ancient people who had only stone tools hewn from volcanic rock. How did the people quarry the stone, carve the figures, and move them to their locations? NOVA assembles a team of archeologists, engineers, and local residents in this episode. The problems the team members encounter make the successes all the more rewarding as they re-create the moai, transport them, and erect these amazing marvels."

Nova: Secrets of Lost Empires II - Medieval Siege (2000)
Order this video

"This is a very well-done documentary about two medieval historians who take on a mission: given two weeks, build a trebuchet and use it to knock a hole in a 5-foot thick castle wall 200 yards away. The documentary covers the little known history of this amazing siege weapon. It's really incredible seeing these massive catapults launch 250-pound stones into the air."

Nova: Secrets of Lost Empires II - Pharoah's Obelisk (2000)

Order this video



"How did the ancient Egyptians raise their obelisks, which were over 100 feet tall, weighing about 500 tons, and carved from a single block of stone? Nautical experts and engineers came together to re-create the endeavor. Clues to how it could be done were found on the painted walls of tombs, yet they didn't make the task immediately successful. Various methods were tried with little success. Setback after setback occurred, and frustration among the team grew. Finally through perseverance, a team member and his group successfully attempts this remarkable feat."

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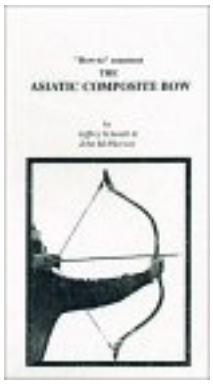
MOVIES

How-To

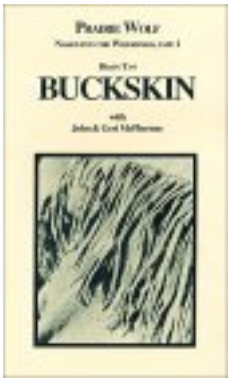
Asiatic Composite Bow
Produced by: John McPherson
Running time: 2 hours
Order this video



"Learn to build the remarkable horn bow. Highly detailed information from start to finish."

Also see McPherson's 2 books entitled, *Primitive Wilderness Living and Survival Skills* and *Primitive Wilderness Skills, Applied & Advanced* in our Recommended Books & Magazines section.

Brain Tan Buckskin

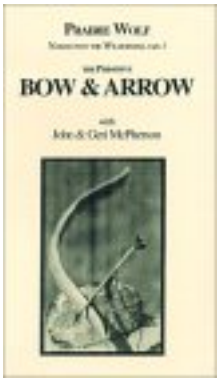


Produced by: John McPherson
Running time: 80 minutes
Order this video

"Shows the fastest and simplest method of processing your skins into soft, supple brain tanned clothing grade leather."

Also see McPherson's 2 books entitled, *Primitive Wilderness Living and Survival Skills* and *Primitive Wilderness Skills, Applied & Advanced* in our Recommended Books & Magazines section.

Primitive Bow and Arrow



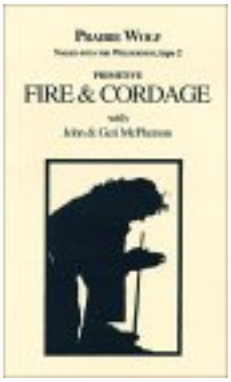
Produced by: John McPherson
Running time: 115 minutes
Order this video

"Self bow building from start to finish. Finding staves, curing, shaping, tilling and more."

Also see McPherson's 2 books entitled, *Primitive Wilderness Living and Survival Skills* and *Primitive Wilderness Skills, Applied & Advanced* in our Recommended Books & Magazines section.

Primitive Fire and Cordage

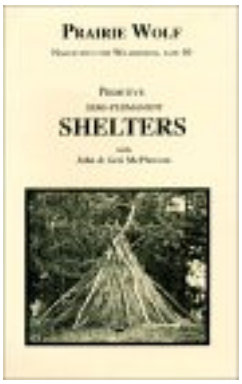
Produced by: John McPherson
Running time: 100 minutes
Order this video



"Learn important survival skills. Three types of fire by friction. Finding and preparing natural fibers for cordage. Step by step on sinew bow strings. Full color."

Also see McPherson's 2 books entitled, *Primitive Wilderness Living and Survival Skills* and *Primitive Wilderness Skills, Applied & Advanced* in our Recommended Books & Magazines section.

Primitive Semi-Permanent Shelters
Produced by: John McPherson
Running time: 90 minutes
Order this video



"Details construction of real shelters. In emergencies, prepare a shelter that will protect you, with a degree of comfort built in."

Also see McPherson's 2 books entitled, *Primitive Wilderness Living and Survival Skills* and *Primitive Wilderness Skills, Applied & Advanced* in our Recommended Books & Magazines section.

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Stores That Offer Resources for Primitive Technology Projects

Bamboo Giant Nursery
(variety of bamboo)
5601 Freedom Blvd.
Aptos, CA 95003
(831) 687-0100
www.bamboogiant.com

The Bone Room
(bones, skulls, & bugs)
1569 Solano Ave.
Berkeley, CA 94707
(510) 526-5252

The Caning Shop
(raw materials, books on primitive skills, crafts, & basketry)
926 Gilman St.
Berkeley, CA 94710
(510) 527-5010
www.caning.com

Gems Galore
(minerals, gemstones, & lapidary equipment)
Mountain View, CA
(650) 968-8707

Kestrel Tools
(hand crafted metal adze & carving tools)
Route 1, Box 1762
Lopez, Washington 98261
(360) 468-2103

Michael Foltmer
(rawhides, sinew, braintan buckskin, drum frames, powder earth paints, porcupine quills, and other craft & primitive living supplies)
1330 Brantner Road
Evans, Colorado 80620
(970) 339-5608

Moscow Hide and Fur
(rawhides, furs, bones, antlers, etc.)
P.O. Box 8918
Moscow, ID 83843-1418
(208) 882-0601
www.hideandfur.com

Mostly Natives Nursery
(California native plants)
Tomales, CA 94971
(707) 878-2009

Mountain View Surplus
(camping gear & military surplus)
Mountain View, CA
(650) 969-2381

Paleotechnics
(tools, handicrafts, teaching aids, classes & demos on primitive technology)
Steven Edholm & Tamara Wilder
PO Box 876
Boonville, CA 95415
voice mail 707-793-2287 fax 707-485-8187
http://www.paleotechnics.com

Three Rivers Archery Supply
(traditional archery supply & knapping equipment)
P.O. Box 517
Ashley, IN 46705
(219) 587-9501
www.3riversarchery.com

Yerba Buena Nursery
(California native plants)
19500 Skyline Blvd.
Woodside, CA 94062
(650) 851-1668
www.yerbabuenanursery.com

The Wanderibng Bull
(Native American crafts & supplies)
247 So. Main St.
Attleboro, MA 02703
1-800-430-2855
www.wanderingbull.com

Gems by Jak
(catlinite - Minnesota pipestone)
P.O. Box 23
Pipestone, MN 56164
507-348-8617
e-mail: jak4@earthlink.net
store address: 113 Sherman Ave N, Ihlen, MN 56140
Owner: Paul E. Eich

Stone Age Trading Company
(flintknapping products, tools & supplies)
www.stoneagetradingco.com

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Calendar of Activities & Events

2003

All activities and events are held in California, United States unless specified.

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Calendar of Activities & Events

JANUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2	3	4 **Tom Brown Jr.'s California Speaking Tour** / 1 pm / Camp Herms / 1100 James Place, El Cerrito / For info: (831) 338-3415 / Reservations: (908) 813-8689 or email CHPDH@aol.com

5 **Tom Brown Jr.'s California Speaking Tour** / 6:30 pm / New College of California North Bay / 99 6th St., Santa Rosa / For info: (707) 568-2605 **Tracking in the East Bay** / 10 am -12 pm / Don Edwards San Francisco Bay National Wildlife Refuge Visitor Center, Fremont / Led by Ken Clarkson / Call (510) 792-0222 for more info	6 **Tom Brown Jr.'s California Speaking Tour** / 7 pm / Kresge Auditorium Stanford University, Palo Alto / For registration, go to: http://sci3.stanford.edu/conference/ Information: (650) 725-8781	7 **Tom Brown Jr.'s California Speaking Tour** / 7 pm / Bookshop Santa Cruz / 1520 Pacific Ave., Santa Cruz / Information: (831)460-3240 / www.bookshopsantacruz.com	8	9	10	11 **Friends of Primitive Technology Meeting & Swap Session** / Noon - 4 pm / Sunol-Ohlone Regional Wilderness / Visitor Center / Contact Norm Kidder for more info (925) 862-2600
12 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info	13	14	15	16 **Tibetan Monks Make a Sand Mandala** / 10 am - 5 pm / The California Academy of Sciences / Golden Gate Park, San Francisco	17 **Tibetan Monks Make a Sand Mandala** / 10 am - 5 pm / The California Academy of Sciences / Golden Gate Park, San	18 **Tibetan Monks Make a Sand Mandala** / 10 am - 5 pm / The California Academy of Sciences / Golden Gate Park, San Francisco

					Francisco	
19 **Strings and Things** / 10 am - 11:30 am / Sunol-Ohlone Regional Wilderness / Learn about the native plant dogbane and its uses. Contact (925) 862-2601 for more info **Tibetan Monks Make a Sand Mandala** / 10 am - 5 pm / The California Academy of Sciences / Golden Gate Park, San Francisco	20	21	22	23	24	25 **Survivor - California** - Old Ways Workshops
26	27	28	29	30	31	
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

All activities and events are held in California, United States unless specified.

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Calendar of Activities & Events

JULY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 **Tule House Construction and Making Tule Mats** at Coyote Hills Regional Park with Bev Ortiz / volunteer help / 3:30 pm - 6:30 pm / info: (510) 795-9385	2	3	4	5
6	7	8	9	10	11	12 **Pump Drill** - KAHIKO Workshops of Native Skills
13 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at sean.clemenza@hgst.com	14 **Tule House Construction and Making Tule Mats** at Coyote Hills	15 **Tule House Construction and Making Tule Mats** at Coyote Hills				

for more info **Ohlone-Style String Making** - Coyote Hills Regional Park, Fremont, CA **Shellmound Open House** - Coyote Hills Regional Park, Fremont, CA	Regional Park with Bev Ortiz / volunteer help / 3:30 pm - 6:30 pm / info: (510) 795-9385	Regional Park with Bev Ortiz / volunteer help / 3:30 pm - 6:30 pm / info: (510) 795-9385	16	17	18	19
20	21	22 **Tule House Construction and Making Tule Mats** at Coyote Hills Regional Park with Bev Ortiz / volunteer help / 3:30 pm - 6:30 pm / info: (510) 795-9385	23	24	25	26 **Tule Boats & Cordage of Native California** - Coyote Hills Regional Park, Fremont, CA
27 **Educator's Academy:** Mustsun Ohlone: A Language Primer - Coyote Hills Regional Park, Fremont, CA **NCOCA Outrigger Canoe Sprint Championship Races** - Lake Natoma, Sacramento, California / 9 am / Hosted by Northern California Outrigger Canoe Association / Contact Marilyn Steele at (916) 988-2419	28 **Tule House Construction and Making Tule Mats** at Coyote Hills Regional Park with Bev Ortiz / volunteer help / 3:30 pm - 6:30 pm / info: (510) 795-9385	29 **Tule House Construction and Making Tule Mats** at Coyote Hills Regional Park with Bev Ortiz / volunteer help / 3:30 pm - 6:30 pm / info: (510) 795-9385	30	31		
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

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Calendar of Activities & Events

FEBRUARY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 **Pine Needle Basketry** - The Caning Shop
2	3	4	5	6	7	8 **Basic Twined Baskets** - Old Ways Workshops **Hawaiian Ipu Wai (gourd instrument)** - The Caning Shop
9 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info	10	11	12	13	14	15 **Splint Market Baskets Workshop** / 10 am - 4 pm / California Academy of Sciences, Golden Gate Park. Taught by Kathleen Hubbard. Fee involved.
16 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	17 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	18 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	19 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	20 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	21 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	22 **Winter Count** (primitive skills conference) / Maricopa, Arizona / Feb.16 to Feb. 22 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
23	24	25	26	27 **A Glimpse of Ishi Country Seminar** / 7 pm - 9 pm / California Academy of Sciences, Golden Gate Park. Taught by Kurt Rademacher. Fee involved.	28 **Gem & Jewelry Show and Sale** / 10 am - 6 pm / Centennial Hall, 22292 Foothill Blvd., Hayward, CA / The Mineral and Gem Society of Castro Valley. Call (510) 887-9007 for more info.	

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Calendar of Activities & Events

MARCH

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1 **Gem & Jewelry Show and Sale** / 10 am - 6 pm / Centennial Hall, 22292 Foothill Blvd., Hayward, CA / The Mineral and Gem Society of Castro Valley. Call (510) 887-9007 for more info.
2 **Gem & Jewelry Show and Sale** / 10 am - 5 pm / Centennial Hall, 22292 Foothill Blvd., Hayward, CA / The Mineral and Gem Society of Castro Valley. Call (510) 887-9007 for more info.	3	4	5	6	7	8 **The Incredible Edible Wild** - Old Ways Workshops

9 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info **Shellmound Open House with Carol Bachmann** (Ohlone Culture Programs) at Coyote Hills Regional Park, Fremont, CA / 10 am - noon & 1:30 pm - 4:30 pm. Discuss and demonstrate Ohlone basketry. Call (510) 795-9385 for more info.	10	11	12	13	14	15
16	17	18	19	20	21	22
23 **Soaproot Brush Making** (Ohlone Culture Programs) at Coyote Hills Regional Park, Fremont, CA / 10 am - 4 pm. Workshop taught by Mona Garibay. Call (510) 795-9385 for more info. Reservations & fee required: phone (510) 636-1684.	24 31	25	26	27	28	29

30						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

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Calendar of Activities & Events

SEPTEMBER

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6 **Making a Pine Nut Bead Basket** - MAPOM **Brain Tanning Buckskin** - MAPOM
7 **Brain Tanning Buckskin** - MAPOM	8	9	10	11	12	13 **Flintknapping** - MAPOM **Clam Shell Beads & Abablone Pendants** - MAPOM **Native Plants & Medicine** / California Indian Museum / 5250 Aero Dr. / Santa Rosa, CA / (707) 579-3004
14 **Rabbitstick Rendezvous** / Rexburg, Idaho / Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	15 **Rabbitstick Rendezvous** / Rexburg, Idaho /	16 **Rabbitstick Rendezvous** / Rexburg, Idaho /	17 **Rabbitstick Rendezvous** / Rexburg, Idaho /	18 **Rabbitstick Rendezvous** / Rexburg, Idaho /	19 **Rabbitstick Rendezvous** / Rexburg, Idaho /	20 **Rabbitstick Rendezvous** / Rexburg, Idaho / Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com) **Traditional Uses of Fall Plants** - MAPOM **Advanced Looping Techniques** - The

The Riekes Center Bay Area Tracking Club Meeting / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info	Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	Sep.14 to Sep. 20 - Contact Dave Wescot at Backtracks, LLC (208-359-2400 or dwescot@aol.com)	Caning Shop **Bay Miwok: Past, Present, and Future** / Diablo Valley College Performing Arts Center / 321 Golf Club Road / Pleasant Hill, CA / (925) 228-2379 **19th Annual Ohlone Day** - Henry Cowell Redwoods State Park / Hwy. 9 / Felton, CA / 10 am - 4 pm / (831) 335-3174
21	22	23	24	25	26	27 **Zittel Farm Gourd Festival** **S. California Juncus Twined Basket & Chia Preparation** - MAPOM **Utilitarian Uses of the Deer** - MAPOM **Pine Needle Basketry** - The Caning Shop **Big Time** / Chaw'se Indian Grinding Rock State Historic Park / 14881 Pine Grove-Volcano Rd., Pine Grove / (209) 296-7488
28 **Zittel Farm Gourd Festival** **S. California Juncus Twined Basket & Chia Preparation** - MAPOM **Big Time** / Chaw'se	29	30				

Indian Grinding Rock State Historic Park / 14881 Pine Grove-Volcano Rd., Pine Grove / (209) 296-7488						
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

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Miwok Archeological Preserve of Marin

Spring Classes - 2003

MAPOM's Fall Classes in California Indian Skills will take place in the Spring and Fall. Classes are held at the reconstructed Miwok village, Kule Loklo, at beautiful Point Reyes National Seashore near Olema in western Marin
County.

The classes are designed to give students a concentrated look at one aspect of Native culture. The subjects of all classes are adult skills taught on an adult level and usually involve hands-on participation by students. Traditional materials are used in our classes. Students provide some tools.

Classes are for adults (over 15-years-old) and participants must pre-register by mailing a check or money order to MAPOM, 2255 Las Gallinas, San Rafael, CA 94903. Please add $5 membership fee if you are taking a class from us for the first time (or are a senior or a full time student), and $10 if you are renewing your membership. We'll send a confirmation with details of what to bring and a map. Price reductions for California Indians and people working with groups of Indian children.
MAPOM thanks the American Indian Cultural Center of San Francisco for a generous donation in support of these classes.

FOR MORE INFORMATION: Call Sylvia Thalman 415-479-3281 or e-mail us at MAPOM@aol.com. For registration information or detailed info, see our website at www.MAPOM.com.

TOOLS FOR CHOPPING, SCRAPING AND DRILLING - April 5 (Saturday) **10 am - 4 pm**

This new class will cover manufacture of chert hand tools, including hafted hand axes, used for working wood as in bow and arrow making, adzes for reducing wood on bows and arrows and for scraping willow for basket making, bits for shafted drills. These were fastened to the shafts with sinew and asphaltum.
Instructor: Joe Dabill
$65

CLAM SHELL BEADS AND ABALONE ORNAMENTS - April 13 (Saturday) **10 am - 4:30 pm**
Beads made from clam shells (Saxidomus nuttalli) traditionally were used as money by Coast Miwok people, as well as for religious and ceremonial jewelry by Coast Miwok and their Pomo neighbors. Abalone ornaments were part of dance regalia. Clam beads and abalone were traded from this area to distant parts of California and beyond. You'll make a clam shell bead and abalone necklace with traditional methods and tools, including pump drills and rock grinding. Limit: 16
Instructors: Sylvia Thalman and Pat Rapp

SELF BOW AND SOME ARCHERY - April 12 and 13 (Saturday and Sunday) **10 am - 4 pm**
This class is designed for beginning bow makers, but will also be geared to people who may have already made traditional bows. The self bow is larger than the sinew-backed bow, and will be finished during the class. The goal is to help students become competent in bow design and enable them to make fast and efficient bows of any type of wood. Bay laurel, oak or cedar staves will be used, and staves of other woods will be available. Students will steam-bend wood for reflex and recurve, Sunday afternoon will be devoted to archery practice with your new bow
Instructor: Joe Dabill
$110

TRADITIONAL USES OF NATIVE PLANTS IN SPRING - April 19 (Saturday) **10 am - 4 pm**
Plant identification and traditional uses of plants at Kule Loklo and the surrounding area. Ethnobotanist Renee Shahrokh will discuss gathering practices as well as edible, cermonial, medicinal and material culture of plants used by local tribes. Limit: 15
Instructor: Renee Shahrokh
$60

STRAWBERRY FESTIVAL (open to the public) **- April 26** (Saturday) **12 noon - 4 pm**
KULE LOKLO, PT. REYES NATIONAL SEASHORE. The Strawberry Festival is the traditional spring Thanksgiving for the first fruits, with blessing of the strawberries and traditional prayers and dances. Free admission. Bring strawberries to be blessed, and something to sit on. Indian tacos and fry bread and soda pop for sale by the Federated Indians of Graton Rancheria (Coast Miwok and Southern Pomo).

FIREMAKING - May 3 (Saturday) **10 am - 4 pm**
Make fire by friction with your own hand drill firemaking kit made from local native materials. Both hand drill and bow drill techniques will be explored and you will have ample opportunity to

practice making fire. Time permitting, we will also try other firemaking techniques. Limit: 15.
Instructor: Tamara Wilder
$55

SOUTHERN CALIFORNIA SERRANO BASKET - May 3 and 4 (Saturday and Sunday) **10 am - 4 pm**
Students will make a miniature coiled trinket basket of juncus and deer grass with the design made with Joshua tree root which creates a red pattern. The combination of these materials creates the unique style used among the Serrano's in the making of their basketry. The Serrano people live in the desert areas in San Bernadino County, east of Los Angeles. **Instructor: Abe Sanchez**
$105

FLINTKNAPPING: STONE ARROWHEADS & SPEAR POINTS - May 17 (Saturday) **10 am - 4 pm**
Arrow, spear and drill points and knife blades of obsidian (volcanic glass) and chert have been made in California for thousands of years. In this introductory course, you will learn about styles of points and blades, and how they were made and used. Your own flintknapping kit will be provided and used to make obsidian points.
Instrucotr: Bill Mulloy
$65

MINIATURE POMO COILED BASKET- May 17 and 18 (Saturday and Sunday) **10 am - 4 pm**
Tiny finely worked baskets are a highlight of California basket weaving. Students will learn to make the miniature coiled basket of willow and sedge with the design in redbud bark.
Instructor: Julia Parker
$110

PINE NUT BEAD NECKLACE MAKING - May 24 (Saturday) **10 am - 4 pm**
Class participants will make a necklace of pine nuts made traditionally by the Maidu and other tribes in California from the gray/bull pine tree. Pine nuts will be sanded into beads using sandstone, and students will have an opportunity to start shaping an abalone piece to add to their necklaces. Additional design beads will be available to add to the necklaces. There will be a demonstration of cordage making and blackening of the pine nut beads. Additional colored beads may be purchased at the class. Limit: 15
Instructor: Renee Shahrokh
$50

CALIFORNIA INDIAN GAMES FOR FUN AND PROFIT - May 31 (Saturday) **10 am - 4 pm**
A wide variety of games of chance and skill were played by California Indians. Stick dice and the hand game are gambling games. Children played with dolls, acorn buzz toys, acorn tops and other diversions. Students will learn these games and make the pieces for them.
Instructor: Chuck Kritzon
$55

USING BUCKSKIN - June 7 (Saturday) **10 am - 4 pm**
Braintanned buckskin is a material widely used by most Native American groups for a variety of products. While California Indians have a material culture largely dominated by fiber arts, leather still plays an important role and is used for moccasins, skirts, breechclouts, dolls, "footballs", and certain styles of cradleboards, as well as for bags to hold beaded necklaces, gaming sticks, pipes, etc..Come explore a variety of patterns, stitches, sewing materials, and sewing methods. Bring an awl and your own buckskin piece to get started on your personal project, or purchase a piece of buckskin from the instructor to make a small sampler bag. A limited number of awls will be available to use and/or buy. Limit: 20.
Instructor: Tamara Wilder
$55 Fee includes buckskin but bring your own, too, if you wish to.

PAIUTE TWINED MINIATURE BURDEN BASTKET (TRINKET BASKET) - June 7 and 8 (Saturday and Sunday) **10 am - 4 pm**
A miniature Paiute burden basket will be made of willow and California redbud . Each student will learn how to prepare willow and redbud for the foundation and the strings. A form of twining will be used to construct the basket and a redbud design will be added. Burden baskets are used to gather acorns, pine nuts and other food materials.
Instructor: Lucy Parker
$110

ABOUT OUR INSTRUCTORS:

Joe Dabill, survival specialist, has taught classes for the Santa Cruz Mountains Natural History Association and the Santa Barbara Museum of Natural History, and demonstrated his skills at the California Academy of Science. He has taught primitive technology at Rabbitstick and Wintercount gatherings He also teaches from his home in San Juan Bautista.

Chuck Kritzon is a long time volunteer at the California Indian Museum in Sacramento. He is very knowledgeable about rock art and has made jewelry showing rock art motifs.

Bill Mulloy is an archeologist, anthropologist and lithic specialist with many years of experience in the field. He lives in Redway.

Julia Parker, Coast Miwok/Kashia Pomo, is a renowned basketweaver and cultural demonstrator at Yosemite National Park and the California Academy of Sciences in San Francisco, as well as elsewhere in the United States and abroad. She is the co-author of It Will Live Forever, Traditional Yosemite Acorn Preparation. She lives at Midpines.

Lucy Parker, Coast Miwok/Kashaya Pomo/Sierra Mewuk, lives in Lee Vining on the eastern

slope of the Sierra She is a basketry instructor and a well known demonstrator in the Bay Area, Yosemite National Park, the California Academy of Sciences in San Francisco and in Nevada. Lucy and her mother Julia have also demonstrated at museums in New York City and Milwaukee recently.

Abe Sanchez has been a student of Justin Farmer and is an ongoing student of Lucy Parker. As a weaver of Southern California Native American basketry his intentions are to contribute knowledge and skills to all those interested in the revival and preservation of this ancient art. He makes all efforts to learn and to teach others all that he can about the growing conditions of basketry plants, processing the plant materials, and applying all the respected traditional techniques of weaving. He dreams of making a difference in the well being of this local art form that has been threatened by extinction like numerous other Indigenous craft forms around the world.

Renee Shahrokh is a Professor of Botany at American River College where she teaches Ethnobotany, Botany and Plant Identification. She has also taught Ethnobotany at DQ University, the only tribal college in California and for other Native organizations. She gives professional lectures and teaches field courses on edible, medicinal and the material culture of plants used by Native tribes in central and northern California.

Pat Rapp lives in the Santa Cruz Mountains. She is a long-time bead maker. She is a cultural demonstrator at Henry Cowell Redwoods State Park and at Ohlone Day.

Sylvia Thalman of San Rafael was a founding member of MAPOM, a demonstrator with Don Thieler at Kule Loklo, and has been an instructor for the Santa Cruz Mountains Natural History Association, the Effie Yeaw Nature Center in Sacramento and the Jesse Peter Museum of Indian Art in Santa Rosa. Her work has been published in the Bulletin of Primitive Technology. She has written and edited books about the Coast Miwok people.

Tamara Wilder of Redwood Valley is a primitive technologist who teaches and demonstrates ancient living skills at different locations across the Western States, including the California Academy of Sciences. The work of Tamara Wilder and Steven Edholm has been published in the Bulletin of Primitive Technology and Woodsmoke: Collected Writings on Ancient Living Skills. Their book Buckskin: The Ancient Art of Braintanning will be available at the class.

Some of our instructors are California Native Americans with a special interest in their tribal traditions; others are non-Indians who have actively studied traditional skills for many years.

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Calendar of Activities & Events

APRIL

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5 **Tools for Chopping, Scraping, and Drilling** - MAPOM
6 **Shellmound Workday** at Coyote Hills Regional Park with Bev Ortiz / 10 am - 4 pm / info: (510) 795-9385 **Spring Wildflower Festival** at Sunol-Ohlone Regional Wilderness / 10 am - 4 pm / Info: (925) 862-2601	7	8	9	10	11	12 **Self Bow and Some Archery** - MAPOM **Springtime Tracking** - Old Ways Workshops **Mother Nature's Bloomers** - Old Ways Workshops

13 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info **Clam Beads and Abalone Ornaments** - MAPOM **Self Bow and Some Archery** - MAPOM	14	15	16	17 **Central California Indian Coiled Basketry** (6 continuous classes) at Coyote Hills Regional Park / 7 pm - 9:30 pm / Course #3438 / Registration required: (510) 636-1684 / Fee	18	19 **Traditional Uses of Native Plants in Spring** - MAPOM **Sherman Indian High School Annual Powwow** / 10 am - 10 pm / 9010 Magnolia Rd., Riverside, CA / Info: (909) 276-6718
20	21	22	23	24	25	26 **Strawberry Festival** (open to the public) - April 26, 12 noon - 4 pm / Kule Loklo, Point Reyes National Seashore

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
27 **Arrowhead Making Workshop** at Coyote Hills Regional Park with Ken Peek / 10 am - 4 pm / Course #3441 / Registration required: (510) 636-1684 / Fee **Yomen: Maidu Spring Ceremony** / 10 am - 3 pm / Maidu Interpretive Center / 1960 Johnson Ranch Dr., Roseville, CA / Info: (916) 772-4242	28	29	30			

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Calendar of Activities & Events

MAY

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2	3 **Firemaking** - MAPOM **Southern California Serrano Basket** - MAPOM
4 **Southern California Serrano Basket** - MAPOM	5	6	7	8	9 **32rd Annual Stanford Powwow** - Stanford University / Eucalyptus Grove on Stanford Campus, Palo Alto, CA	10 **32rd Annual Stanford Powwow** - Stanford University / Eucalyptus Grove on Stanford Campus, Palo Alto, CA

11 **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info **23rd Annual Powwow & Arts Festival** - DeAnza College, 21250 Stevens Creek Blvd., Cupertino, CA / (408) 864-8355 **32rd Annual Stanford Powwow** - Stanford University / Eucalyptus Grove on Stanford Campus, Palo Alto, CA	12	13	14	15	16	17 **Flintknapping** - MAPOM **Miniature Pomo Coiled Basket** - MAPOM **15th Annual American Indian Cultural Days** - Balboa Park at Park Blvd. & President's Way, San Diego, CA / 10 am - dusk / intertribal dancers & singers, food, info booths, & more / (619) 281-5964
18 **Miniature Pomo Coiled Basket** - MAPOM **15th Annual American Indian Cultural Days** - Balboa Park at Park	19	20	21	22	23 **Rattlesnake Rendezvous** - Sunol-Ohlone Regional Wilderness / Learn Stone-	24 **Rattlesnake Rendezvous** - Sunol-Ohlone Regional Wilderness / Learn Stone-Age and primitive skills at the annual gathering **Pine Nut Bead Necklace Making** - MAPOM

Blvd. & President's Way, San Diego / 10 am - dusk / intertribal dancers & singers, food, info booths, & more / (619) 281-5964					Age and primitive skills at the annual gathering	**4th Annual Southern California Indian Storytelling Festival** - Malki Museum, 11-795 Fields Rd., Banning, CA / contact Ernest Siva at (909) 849-4676
25 **Rattlesnake Rendezvous** - Sunol-Ohlone Regional Wilderness / Learn Stone-Age and primitive skills at the annual gathering	26 **Loop String Bag** - Kahiko Workshops of Native Skills	27	28	29	30	31 **California Indian Games for Fun and Profit** - MAPOM **Indian Market** - Pacific Western Traders, 305 Wool St., Folsom, CA / Native California craftspeople will be demonstrating & selling their work / (916) 985-3851
Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

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Calendar of Activities & Events

JUNE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 **Shellmound Workdays /** (Ohlone Culture Programs) at Coyote Hills Regional Park, Fremont, CA (10 am - 4 pm). Contact (510) 795-9385 for more info. For reservations phone (510) 636-1684. **Indian Market** Pacific Western Traders, 305 Wool St., Folsom, CA / Native California craftspeople will be demonstrating & selling their work / (916) 985-3851	2	3	4	5	6	7 **Tule or Not Tule?** / Learn about the tule reed and make a tule bittern at the Sunol-Ohlone Regional Wilderness (10 am -11:30 am). Call (925) 862-2601 for registration and more info. Instructor: Dino Labiste **Using Bucksin** - MAPOM **Paiute Twined Miniture Burden Basket** - MAPOM

8 **Paiute Twined Miniture Burden Basket** - MAPOM **The Riekes Center Bay Area Tracking Club Meeting** / 8 am / Meet 1/2 mile south of Gazos Creek Road , San Mateo County, off Hwy 1. Come track with us. Contact Sean Clemenza at clemenza@us.ibm.com for more info	9	10	11	12	13	14 **Wilderness Skills: The Nature of Survival** Sunol-Ohlone Regional Wilderness (10 am - 2 pm). Contact (925) 862-2600 for more info. For reservations phone (510) 636-1684. Course #3932 Instructor: Norm Kidder **20th Annual Indian Fair** San Diego Museum of Man, 1350 El Prado, Balboa Park, San Diego / 10 am - 4:30 pm / call (619) 849-4676 for info
15 **20th Annual Indian Fair**						21 **Wilderness Skills: Knots with Knorm** Sunol-Ohlone Regional Wilderness (10 am - noon). Contact (925) 862-2600 for more info. For reservations phone (925) 862-2601. Instructor: Norm Kidder

San Diego Museum of Man, 1350 El Prado, Balboa Park, San Diego / 10 am - 4:30 pm / call (619) 849-4676 for info	16	17	18	19	20	**Summer Solice Sunset Celebration** Coyote Hills Regional Park (6 pm - 8:30 om). Contact (925) 862-2600 for more info. For reservations phone (510) 795-9385. Instructors: Norm Kidder & Jan Southworth
22	23	24	25	26	27 **2003 California Indian Basketweavers Gathering** Yurok Conference Center, Klamath / 10 am - dark / call (530) 478-5660 for info	28 **Carrying Net** KAHIKO Workshops **2003 California Indian Basketweavers Gathering** Yurok Conference Center, Klamath / 10 am - dark / call (530) 478-5660 for info **5th Annual Big Time** Lake Sonoma, Dry Creek Dam, Healsburg / 10 am - dusk / call (707) 837-8596 for info

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
29 **Carrying Net** KAHIKO Workshops **2003 California Indian Basketweavers Gathering** Yurok Conference Center, Klamath / 10 am - dark / call (530) 478-5660 for info **5th Annual Big Time** Lake Sonoma, Dry Creek Dam, Healsburg / 10 am - 5 pm / call (707) 837-8596 for info	30					

All activities and events are held in California, United States unless specified.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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What to Teach Kids and Why

by Dick Baugh

Why It's Important

Everyone finds it easy to complain about what is taught in our public schools but how many people take the opportunity to actually do something about it? I am fortunate enough to work for a large company, one of whose corporate objectives is to be a good citizen of the community. This is interpreted fairly broadly. In my case it means I take time off during my regular work hours to go into the local public schools and show students the material culture of everyone's stone age ancestors as well as that of the local Native Americans (Ohlone Tribe) of the San Francisco Bay area in California. I make up the lost work time whenever convenient.

This article is not a "how to do it' but instead it is a "what you can do" or "what's possible". It assumes the reader is already skilled in some aspects of primitive living skills and is interested in passing them on to young people.

Why do I teach primitive skills? With all the "practical" things that children need to learn to survive in the heart of Silicon Valley why should they learn all this primitive stuff? Lots of reasons:

They live in a multi-cultural world. There are at least 15 different languages spoken in the local schools. This stone age heritage is one thing that everyone shares, a common bond between children whose ancestors came from North America, South America, Europe, Africa and Asia. I hope that realizing this would be a unifying factor for the students.

They need to balance knowledge with experience. By their nature and by the practical constraints of having to teach 25 to 30 students, most grade school teachers must emphasize knowledge which can be quantified and put down on paper: essays, arithmetic work sheets, etc. This is fine for many children. What about those students who are more at ease expressing themselves by making something with their hands? These are the people who will grow up to be the engineers, mechanics, carpenters who keep our society "working". The message needs to get out that there are many types of skills and knowledge beyond what can expressed on a 2-dimensional piece of paper. It is my hope that by showing the students things that Ohlone children and their own stone age ancestors made with their hands they will gain a greater appreciation of what they can do for themselves.

They need positive values. I am really concerned abut children who spend too much time in front of television sets, playing video games, being car pooled from piano lessons to Little League Baseball to Scouts to ballet lessons to soccer league . . . I would hope that exposing them to some of the ancient crafts would make them more resourceful and self-sufficient.

They need to know their history. How can you tell where you're going unless you know where you came from? Camille Paglia said "Education has become a prisoner of contemporaneity. It is the past, not the dizzy present, that is the best door to the future."

They need to learn natural skills. When I look a little deeper, we aren't teaching the students how to make cordage, toys and stone tools. We are teaching them to manipulate tools and materials. This is something that transcends time. It is as important now as it was 50,000 years ago.

General Principals

Deal in tangibles. Things students can get their hands on, make, do. I let other people tell stories and teach them games. I want as many as possible to be able to take something home that they made with their hands. I want as many as possible to get their hands on and manipulate different materials.

Try to keep ego out of it. Less time listening to me talk means more time for them to actually do things themselves.

Teach teamwork.

I have a limited amount of time so it is impossible to teach everything to everybody. Therefore I will teach a few students how to do something and then ask those students to teach the rest of the class later if they have time. A second technique is to arrange projects so that several people are involved. Examples of that are cordage making and fire-by-friction.

Prepare students in advance. The students must have some background lessons in either the culture of the local Native Americans or hunter-gatherers. You won't have the luxury of time so you'd better be ORGANIZED.

Specific Things I've Done In Schools

A scenario: A fourth grade class has been studying the pre-European-contact culture of the local Ohlone tribe. Today boys and girls read printed matter. I pull out a quail call made from a split stick and a blade of grass and do a few calls. What is it? It usually takes a lot of guessing before they figure out what sound it is. Conclusion: Ohlone boys and girls were much better at recognizing the calls of wild animals.

A string figure: Ohlone houses were dome shaped (no snow here in Palo Alto). Native American dwellings in the Sierra Nevada mountains were cone shaped to better resist the weight of snow. There is a very simple string figure which looks like a cone shaped house with smoke coming out of the top.

Team cordage: Another universal commodity. To paraphrase Steve Watts "The world of the Ohlone was held together with string and rope". Get the pupils to name some of the things for which the Ohlone used string and rope. Unless they know what the cordage is going to be used for the making of cordage is an abstract exercise which often leads to very poor workmanship. I bring a small model of a Peruvian reed boat and a photo of a contemporary replica of an Ohlone-style tule boat. Limits of time: I have only 10-15 minutes to show them how to make cordage out of shredded cattail leaves. I involve 2 "helpers". One holds the twined cord up while the other helper and I give each strand a twist and pass it on to each other. Out of all the nine or so different methods of making two-ply twined cordage this is the easiest to learn and another big advantage is that it is a cooperative effort. As they become more skilled they will see how they can do it on an individual basis. I teach 2 people how to make cordage and then those two teach the rest of the class after I leave.

The "Hoko" Knife: This is an activity for the "stone age overnight." In sixth grade social studies in California there is a unit on hunter-gatherers. One teacher takes them to a local park for a stone age over night where they cook their meals on an open fire, make shelters and learn some stone age living skills. They've read and heard about flintknapping and want to try it but in an hour what could they learn? I tell them one of the realities of stone age living is that only a tiny fraction of all stone tools and weapons were delicately and finely flaked. The majority of the stone tools used by our ancient ancestors were simple flake tools, made in a few seconds, used until dull and then thrown away. The prototype stone tool that I have the students make is a "Hoko" knife. This tool is a rough copy of a simple hafted stone flake found at a 2,700 year old archaeological site on the Hoko River of Western Washington State.

The "Hoko" knife is simplicity itself. For the handle, select a piece of green willow or other tough, flexible wood that is about as thick as your finger. It needs to be about two hand spans long. Use a

big piece of sharp rock to notch the stick in two places and break it to length. Next, split it down the middle with a wooden or antler wedge. Bind the split halves together at one end (a practical use for the cordage they learned to make). Spread the split apart and insert a sharp stone flake as close to the binding as possible. Squeeze the other ends of the split handle together and bind. This should give you a sharp stone edge held very tightly in a wooden handle.

Fire by Friction: This is an activity whose objectives go far beyond lighting a fire. Primarily it is a lesson in cooperation and teamwork. I try to get as many hands as possible involved. In the case of a hand spun fire drill I have 4 young helpers take turns on the spindle. We go easy at first and then I take over and twirl with maximum effort to get a glowing ember. Once the ember is glowing I have the entire class form a big circle and I walk around the circle with the smoldering tinder bundle so that everybody can help blow on it to bring out the flame. Everyone contributes. I explain to them that because I am no longer young I barely have the stamina to do it by myself and they are still too young to have developed the skill and stamina required to start a fire. When we work as a team we can achieve what none of us could do as individuals.

Acorn tops: Easy and fun. Simply poke a sharp stick in the top of an acorn and spin.

Spit-Willow Deer Figures: I have probably demonstrated and had more students make little deer figures out of tules than out of willow as described in the SPT Bulletin (#8). The reasons are very simple. Tules are easier to acquire and being more flexible they are easier to shape.

A Fourth-Fifth Grade Tule Canoe: Yes, 4th-5th grade students can, with a little adult help, make a tule canoe. This is the watercraft which was used by the Native Americans of the San Francisco Bay region before European contact. Halima Van Tuyl, a teacher at Juana Briones grade school in Palo Alto, contacted me and asked for help on this project. What an opportunity! One weekend in October, when the tules (Scirpus acutus) and cattails (Typha sp.) were at their optimum, a group of parents and students went to the local marshland and cut a sufficient quantity to make our boat. We had one pile of cattails that was about 6 feet (2 meters) in circumference. These would be used for the rope although some contemporary tule boat makers prefer to use tules for the cordage. We cut enough tules to make three bundles 6 feet in circumference and 9 feet (3 meters) in length. For maximum strength and flexibility the cattail leaves should be separated from each other to facilitate drying. Cattails should be dried and then re-dampened before twining them into rope. The ropes were about as thick as my thumb. Ten or twelve ropes were needed, each about 25 feet (8 meters) long, for tying the bundles of tules together. We needed one day to build the boat and the next day was spent paddling it.

Atlatls and darts: Just the thing for little savages. The challenges here are to have equipment which the students can learn to use easily and quickly and to have a process which insures safety. For the former I use a relatively short atlatl, 16 inches (.38 meters) long with a wrist strap and light flexible darts with feathers for stabilization. The main two safety issues are to avoid throwing when someone is near the target and to avoid crowding so that the thrower doesn't reach back and

poke someone in the eye with the atlatl. The first problem is solved by having an adult supervisor hold the darts until the student is ready to throw. The second safety issue is solved by having two lines on the ground. The first line indicates where the thrower should stand while throwing. The second line, which is approximately 6 feet (2 meters) behind the first, is the line of death (LOD). The rule is that students must stay behind the LOD until its their turn to throw. This is to keep eyes and atlatls a safe distance apart. If they break the LOD rule, then they are excluded from participation in that activity.

I've described what I'm comfortable doing in a grade school class. Everyone is different. Do what suits you. I've also been purposefully vague on the exact details of how to do these things. That's because there is no uniquely correct way to do them.

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E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Sharing Old Ways With The Young

by Norm Kidder

I have spent the past 24 years as a park Naturalist, attempting with varying degrees of success to teach local school children about the recent stone age inhabitants of our area, the Ohlone Indians, and more recently, about early man in general. Third and fourth grade curricula mandate that local and state history be taught, and that it include the Indians. Fifth graders study American History (including Indians) and sixth grade covers early man and the Stone-age. Over the years we have developed programs at our park to deal with each of these topics. Our goals include overcoming television stereotypes, providing a base for modern environmental appreciation, understanding the origin of modern technologies and providing a few specific facts. Teaching techniques range from lecture to hands on participation.

In a perfect world, every kid would take a two week immersion style training where they learned all the basics in a real life setting. In the urban reality of today's classroom, with 30 kids, a limited budget and time, the odds are against us and the teachers we serve. The following are some programs that we (my park staff and volunteers) have developed.

The Indoor Indian Program - For 3rd Grade (and youth groups at the same age level), we use our Visitor Center to do 1 1/2 - 2 hr. programs on pre-contact Indian life in our area. After an introduction that includes information on the tribes in the groups local area, and basic hunter-gatherer lifestyles, the class is divided up to try various activities. These might include acorn pounding, fire drill attempts, atlatl throwing (launching), hoop and pole game, stick dice games, bullroarers and acorn tops. In the spring, a short walk can include digging a soap root plant (Chlorogalum) and washing our hands in the marsh, then pulling a cattail shoot and each getting a taste. Cattail leaves and/or tules can be used for cordage making demonstrations as well. These hands on (and tongues on) elements help cement the information, while demonstrations that include transformations of bulbs to soap, of leaves to rope and especially of sticks and effort into fire are sensed by children as true magic, and, if their letters to the 'Ranger' are an indication, are the most remembered events of the field trip. our visitor center also offers exhibits on daily life of the Indians and mounted scenes of our marshlands and wildlife. A store offers books and 'artifacts' (Mexican arrowheads, and items made in our own 'artifactory', or purchased from Native artisans). We also provide checkout materials for the teachers to use on their own, and rental 'culture kits' for

them to take into the classroom.

The Indian Village Tour - Any group older than the fourth grade level is scheduled for a 2- 2 1/2 hour tour to an archaeological site in the park which has reconstructions of different types of shelters used by Central California Indians weather permitting. Following a similar introduction to our Ohlone Indians, the group is divided in half for the half mile walk to the village site. Along the way, students are encouraged to imagine themselves transported back in time to an age when there were grizzly bears and condors, and only five people per square mile - a time of no stores and no strangers. To prepare the group for hunting and gathering, they are taught to read tracks (non-fiction only) and signs, sometimes taught how to walk properly, and given practice being invisible (quiet and still). We each carry a basket of items to illustrate aspects of life in the stone age as we move down the trail - bone saws to cut cattails for cordage, hunting gear to illustrate stalking, tule ducks, games and toys to keep the groups attention. Once at the village site, we compare what is left in the midden to what must have been used by this village of 100 people for roughly 22 centuries. We can discuss archaeology and its techniques and weaknesses, and the changes over time that can be deduced from the debris. Here the fire-making demonstration can be done in its natural setting, baskets are set out around a fire pit, and the illusion of a stone age lifestyle is created while sitting in a pit house, telling tales or playing ancient games. Two hours is never enough time to convey so much information. Our hope is to start an interest that will grow on its own.

Early Man Talks - Recently several sixth grade teachers have requested presentations on the stone age. Time constraints only allow for a 1 hour assembly lecture followed by fire and atlatl demonstrations outdoors. I borrow freely from Steve Watts wonderful "Primitive-grandma and Primitive-grandpa" story of the evolution of tools and culture.

The Stone-age Weekend (Rattlesnake Rendezvous) - This event is held each spring for two nights and three days using as few metal tools as possible, covering cooking and other basic skills. A 7th grade social studies teacher attended this event and then created the:

Stone-age Overnight - A teacher attended one of my first Stone age Weekend programs at which we practice all the basic skills, and did our cooking over a handdrill-lit fire using only non-metallic utensils. She then began an annual overnight with 7th graders selected from each social studies class who wear the furs of the wild polyester, living in shelters built from the blue tanned hides of the polypropylene tied with raffia cordage made in the classroom. They cooked over fires and ate from baskets they had each made. The program moved down to the 6th grade level after a change in the state curriculum.

The groups were basically on their own with pre-trip training provided by my wife Jan, myself or Dick Baugh. The year my daughter Emily was in 6th grade, I stayed for the whole program, and directed the cooking for 75 people. Two huge fires were started by a team of sixth grade boys, who were exceedingly proud of themselves. The menu consisted of potatoes carbonaise, roast corn en

husque, and charcoal chicken - all cooked directly on the fire. Breakfast was ash cakes for all. The flour for the ash cakes was ground on a concrete metate which had originally been designed to divert rain water from a down spout. The basket plates were good for about one meal, and the group learned some important lessons about the affects of wind and mosquitoes.

The most interesting part of this for me was to watch the kids adapt their social context to this new format. Courtship behavior was evident, as was the formation of secret societies. Relationships were fluid, and a child who was considered strange because she had lived in the country and could skin rabbits was briefly admired for this ability. After several years of this program, each aspect of the trip has become traditionalized, as each new class is initiated into the 'clan'.

For those schools, it has become like a modern rite of passage with each activity taking on quasi sacred elements. Life was not otherwise complete and harmonious. Stone age skills were, after all, only the means to achieve a harmonious relationship with the world. Over the years the tools change, but the goal remains.

This article was first published in The Bulletin of Primitive Technology (Spring 1996, #11)

E-mail your comments to "Norm Kidder " at atlatl1@aol.com

Some Uses of Fire

by Norm Kidder

Landscape modification

Coppicing basket materials
Clearing brush for ease of travel and hunting
Removing thatch in late fall to promote wildflower seeds and bulbs for food
Burning meadows in summer to promote seed bearing grasses (weeding and fertilizing)
General burning to revitalize plant communities for greater abundance
Clear ground for food gathering

Hunting

Drive grasshoppers into cooking pit
Drive ground squirrels from holes
Smoke bees from hive
Chase bison and other game over cliff or into trap
Night fishing with torch

Cooking

Roasting on coals or grill
Baking in pit or stone oven
Indirect cooking - as planking salmon
Boiling in clay pot or stone boiling in basket or wooden bowl, etc.
Parching seeds

Steam bending wood

Straighten arrow, dart and spear shafts
Recurve and reflex bows
Bend basket rim sticks
Bend looped stirring sticks for stone boiling
Straighten hand drills for fire making

Smoking hides and meat to preserve

Softening tar and pitch for adhesive

Heat treating stone for tools

Wood working

Burn bowls and spoons
Dugout canoes
Burning down trees
Sharpening and fire hardening digging sticks and spears
General burn and scrape shaping

Making charcoal

For cooking and heating
For smelting metals
For firing pottery
For blacksmithing and metal casting
For pigment
For medicine and water purification

Charring to preserve house posts from insects and rot

Smudge fires to repel mosquitoes

Fire to repel predators

Heating shelters, etc.

Lighting (torches)

Smoking tobacco and medicines

Cauterizing wounds

Communication - signaling

Steaming

To extract agave fibers
To soften bone and wood for working

Ceremonies - uses too numerous to list

The listing above is limited to what I could think of sitting at my computer. I'm sure I've left out many other applications of one of our most basic tools - including most modern industrial uses such as generating the electricity that runs my PC. Most anthropologists would agree that the ability to use fire and make tools were what separated us from our earlier ancestors and made us human. Both require memory and advanced planning to be effective. Perhaps the most profound of these uses of fire, and the ones I listed first, are the ways early humans used it to modify the landscape to provide an easier life. Generations of observing accidental burns led most of the world's groups to understand the optimal pattern of burning to maximize valuable food resources.

In California, burning right after the harvest of the largest grass seeds in the summer eliminated shrubs and those species which had not yet set seed, and turned the dead thatch from one years growth into fertilizer for the next. Harvesting techniques were inefficient enough to provide seed. Over time, whole meadows became stands of the food producing grass. Burning the hills just before the winter rains gave a head start to wildflowers and opened up the ground to sunlight. This also favors the growth of bulbs. The two foods that were served to the Spanish explorers near San Francisco Bay were seed cakes from Red Maids and the bulbs called brodeias. Without fire, Red Maids are rather rare today.

This same pattern was common around the world. The Australian Aborigines are referred to as fire stick farmers in some books due to their ability to create farm field like abundance through planned burning. What European settlers saw as a wilderness in the Americas, Africa and Australia was a carefully cultivated garden maintained by fire. A very good book on this subject is *Before the Wilderness - Environmental Management by Native Californians,* T.C.Blackburn, editor, Ballena Press, Menlo Park, CA, 1993. Alice Tulloch makes reference to this work in her discussion of cultivating basketry materials in her lithic challenge piece in the *Bulletin of Primitive Technology,* #21. Without fire, early human lifestyles would have been close to the stereotype of the hand to mouth hunter and gatherer, who eats each day only what he can find. Abundances,

such as fish runs, along with those created by careful use of burning gave these people food quantities as great as farming, but with more variety and nutrition, and less work.

Fire was also useful in food collecting directly. Chasing game such as bison or mastodons into traps, or over cliffs with torches or set fires has been a standard of illustrators of stone-age life for decades. Once the mega-fauna were gone, the same process was done in miniature to chase large numbers of grasshoppers to their deaths in a fire pit in the center of the burned field.

The California landscape was subjected to frequent burning. The life cycle of many plants seems to indicate that fires at least every 20 years or so are necessary to maintain some ecosystems, such as chaparral and the Southern Pine Forest. By burning more regularly, the native folk also provided a better quality of food for deer and rabbits, and kept it at a level that could be reached by these browsers. The burned areas were easier to hunt in because of the greater number of 'huntees' and also the reduced, but not absent, brush for visibility and stalking. The eastern half of the North American continent was described by the first Europeans as being park-like, with tall trees above a grassy floor. Having tried to sneak up on deer in overgrown, unburned brush has taught me this value of fire. Unfortunately, in the modern world, uncontrolled fire is an enemy and has been repressed until our forests, grassland and brushland are constantly in danger from either going senile, or falling victim to a fire so hot it destroys the trees and seeds rather than rejuvenating them. Now the National Park Service has learned, and has started burning the meadows at Yosemite and other parks. Eventually we may relearn the lessons discovered by our ancestors over hundreds of thousands of years.

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E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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Starting Fire With an Ice Lens

by Bob Gillis

Use clear lake or pond ice. To practice, boil water for 10 minutes to remove gas.
Create a foil container 2" deep and freeze slowly. Or buy a clear block of ice. To make fire, the ice must be clear.

Shape the ice lens for fire making. First shave with a knife to get the rough shape of a lens.

You can also grind your ice fire lens on cement or a stone.

Finish shaping your ice fire lens by using the heat of your hand to melt the ice lens smooth.

The edge of your lens should look something like this.

Locate tinder that is completely dry and finely divided. With the sun at its highest in the sky hold your lens perpendicular to the sun and move it up and down to focus the brightest spot of light onto your tinder. Be careful to avoid dripping water onto your tinder. The tinder will first smoke and then ignite. Carefully add more tinder and very small sticks until a good fire is established.

E-mail your commits or questions to "Bob Gillis" at shelter@best.com
E-mail questions answered about fire making.

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The Egyptian Bow Drill

by Dick Baugh (March 24, 2001)

As soon as I think I know all there is to know abut a subject something happens which reminds me that I should never boast about my all-encompassing knowledge.

In February I was teaching people the secrets of making fire by friction at the 2001Winter Count when John Olsen strode up and showed me a cute little friction fire set. It completely eliminated a couple of the problems inherent in teaching the bow drill friction fire method.

John said he saw the original in a book about ancient Egypt.

Many novices are plagued by two problems when they try to start a fire with a bow drill. First, the cord isn't wrapped tightly enough around the spindle so the cord slips, the spindle stops spinning, increased rubbing weakens the cord away and I loose my patience and start yelling at the student. Bad pedagogy. Adding injury to insult, the spindle then slides out of the socket and propelled by the increasing tension in the string, flies through the air and pokes someone in the eye. Whoooaaa!

Leave it to the ancient Egyptians. They placed an extra long cord on the bow and either tied the middle of the cord around the spindle or passed the cord through a hole drilled in the middle of the spindle. Next, they wrapped the extra length of cord around the spindle. Now slippage of the cord is impossible and the spindle can't flip into someone's eye.

This non-slip connection between the cord and spindle may also allow the use of a thinner, weaker cord.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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Fire-By-Friction: Materials of the San Francisco Bay Region

by Dick Baugh

The objective of this report is to list and describe the fire-by-friction materials that are found near San Francisco Bay, California. This is to fill a gap which is found in almost all the outdoor survival and primitive living skills books which I have read. They mention their favorite fire-by-friction material or materials, none of which are native to the area where I live. **My hope is that other "abos" in different parts of the world would also write similar articles describing the fire-by-friction materials of their home territory.** This article is not intended to be a reference for plant identification, although several reference books have relied on my own experiences with using these materials. The opinions are obviously subjective and reflect my own prejudices and skill.

Materials That Work:

Selection of suitable materials is a matter of observing nuances. First, the wood must be dry. Second, just because one piece of wood from a particular species worked once is no indication that it will always work. Another parameter to consider is the degree to which the wood is decayed. Sometimes a small amount of fungal attack makes subtle changes in the ability to twirl up an ember. Heartwood very often works better than sapwood. Selection of woods is very critical. The material must be capable of being ground into a very fine powder. Any tendency for the powder being ground off to feel coarse or gritty is a signal that you are wasting your time and should reject that wood and find something else. Equally important is the ability of the wood to maintain its structural integrity at high temperature (up to 800 degrees Fahrenheit) before the char is ground off. This is discussed in great detail in Bulletin of Primitive Technology #4.

Materials:

California Incense Cedar

Calocedrus decurrens makes the best hearth boards. A very soft, light wood which takes very little effort to twirl up an ember. Use a board or split piece with the annual rings perpendicular to the surface (quarter sawn). It also smells good. Incense cedar is native to the Sierra Nevada Mountains and is only seen in the San Francisco Bay region as a horticultural plant. It is, however, such a superior wood for hearth boards that it should be mentioned. The oldest, least dense heartwood is easiest to ignite with a hand drill.

I have never been successful in creating an ember with an incense cedar spindle twirled on an incense cedar hearth board. The char ground off is always coarse and gritty. My only explanation, albeit not very scientific, is that the wood is so soft that cedar on cedar wears away so quickly that the ignition temperature is never reached. I would appreciate comments from anyone who has had experience with this material.

Elderberry

The common Elderberry of the San Francisco Bay region is Sambucus mexicana. It is seen along roadsides in the hills. Elderberry (Sambucus Sp.) makes excellent spindles, especially for a hand spun fire drill. Select shoots that are about 1/2 inch in diameter and fairly straight. Second or third year growth is best because the wood will be the correct thickness. Elderberry spindles work so well because they have a soft pith core of from 3/16 to 3/8 inch diameter. As a consequence when twirling the drill your muscle power is a rapid rise in temperature. Avoid first year stems which have too much pith and only a thin wood section. Cut elderberry shoots while they are green, heat them in an oven (250 degrees) and straighten them while still damp. Then leave them in the oven a few hours until they are perfectly dry. These "non-abo" techniques can only be justified in that I need to prepare a large number of spindles at a time for the classes that I help teach. The slower alternative in preparing spindles is to straighten them with heat while they are green, tie them in bundles of 2, 3 or 7 and leave them in a warm dry place. Elderberry wood which is larger in diameter is also good for hearth boards although fairly dense. As a consequence of its greater density it requires more "horsepower" from a hand-spun drill to reach ignition temperature. That is a non-problem for a bow drill.

California Buckeye

California Buckeye (Aeschulus californica) works well for hearth boards and bow drill spindles. I have seldom seen shoots which were long enough for hand drill spindles. There is a great variation in its hardness, depending on whether or not it was cut green or allowed to decay slightly. The less dense wood ignites more easily.

Mule Fat

Mule Fat (Baccharus viminea) forms long straight stems in stream beds in California through to Arizona. The soft woody stems are excellent for spindles and hearth boards. There seems to be a large variation in the density of the wood, meaning that some samples require more work than

others to twirl up an ember with a hand drill. The only two times I have ever started a hand drill fire starting from essentially nothing, have been with mule fat spindles and hearth boards.

Redwood

Redwood (Sequoia sempervirens). The heartwood works well for hearth boards. It is a relatively low density wood so little effort is required but I don't use it very often.

Cattail

Cattail (Typha latifolia) bloom spikes were used in prehistoric times in Eastern Oregon for hand spun spindles in conjunction with clematis hearth boards. Jean Auel, author of "Clan of the Cave Bear," etc. learned her stone age survival skills from Jim Riggs in Eastern Oregon. Hence Ayla, the heroine of Auel's books, used cattail bloom spikes plus clematis to start her fires. I haven't had any success with cattail spindles but I know a lot of people who have.

Typha leaves are also usable for cordage for making a bow drill. Cut the leaves at dirt level, ideally while they are still green and scrape off the slimy stuff that accumulates at the base of the leaves. Split them into long strips and then let them dry. Moisten and then twine them into a two-ply cord about as thick as a pencil. The finer you split the leaves the stronger the cord will be. This is not very strong cordage but will suffice for making a few bow drill fires before it breaks.

Mare's Tail

Conyza canadensis, a common weed makes excellent spindles for hand spun fires. It is a member of the sunflower family (compositae) frequently found near freeway on ramps. It forms straight, tapered shoots with relatively soft woody stems which are easy to straighten with heat. The combination of a mare's tail spindle and an incense cedar hearth board for me takes the least effort for a hand drill fire.

Box Elder

Acer negundo is a streamside tree in the maple family. The wood is white, medium hard and very reliable for bow drill spindles and hearth boards and spindles.

Cottonwood

Populus sp. are found near water. They are excellent for spindles and hearth boards.

Willow

Salix sp. are almost always found near a source of moisture, whether it is a stream or natural seepage. My experience with willow wood has been a complete failure. It seems to disintegrate before it reaches ignition temperature but not so fast! Norm Kidder learned from Pegg Matthewson who read it in a book that local Indians used cattail stems for spindles and willow root for hearth boards. Norm tells me that this combination works well. Tree roots are another source of materials which should not be overlooked.

Tinder Materials:

So, you have twirled up a glowing ember. Now what? Gather some tinder. Materials which I have successfully used are:

The husk from Soaproot (Chlorogalum pomeridiadum) is excellent

Dry pounded grass. It's ubiquitous.

Dry shredded cattail leaves (Typha sp.)

Rotten inner bark from cottonwood (Populus sp.)

Nettle fiber (Urtica sp.)

Milkweed fiber (Asclepias sp.)

Dogbane fiber (Apocynum cannabinum)

Redwood bark (Sequoia sempervirens)

Powdered gall from oak trees (Quercus sp.) is useful if you don't have good tinder. It can be sprinkled on a glowing ember and gently fanned to obtain a very large ember. The shavings or dry pine needles are also fanned into a fire. Powdered dry rotten wood can be used the same way as powdered oak gall.

Socket Materials:

The socket for a bow drill can be made either from a pitch saturated knot from a downed rotten Douglas Fir (Pseudotsuga taxifolia) or very hard wood such as greasewood (Adenostoma fasciculatum).

Summary Chart

Common Name	Botanical Name	Uses
Incense cedar	*Calocedrus decurrens*	hb
Blue elderberry	*Sambuccus mexicana*	sp, hd, hb
Mule fat	*Baccharis vimnea*	hb, hd, sp
California buckeye	*Aeschulus californica*	hb, sp, t
Box elder	*Acer negundo*	hb, sp
Mare's Tail	*Conyza canadensis*	hd
Cottonwood	*Populus sp.*	hb, sp, t
Redwood	*Sequoia semervirons*	hb, t
Willow root	*Salix sp.*	hb
Cattail	*Typha sp.*	hd, t, c
Oak gall	*Quercus sp.*	t
Grass	various	t
Soaproot	*Chlorogalum pomeridiadum*	t
Milkweed	*Asclepias sp.*	t, c
Nettle	*Urtica sp.*	t, c
Dogbane	*Apocynum cannabinum*	t, c
dry, rotton wood	various	t
Douglas fir	*Pseudotsuga taxifolia*	so
Greasewood	*Adenostoma fasciculatum*	so

Key: hb=hearth board, sp=spindle (bow drill), hd=hand drill, t=tinder, c=cordage for a bow drill, so=socket for a bow drill

This article was first published in The Bulletin of Primitive Technology (Fall 1994, #8)
E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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Useful and Edible Plants of California / California buckeye (Aesculus californica)

- Grows in moist soils of canyons and on hillsides in chaparral and oak woodland.
- Ground seeds were used to stupefy fish.
- Branches were used as spindles for fire making.

Useful and Edible Plants of California / California black walnut (Juglans hindsii)

- Grows in moist soils of stream borders and valleys.
- Nuts taste like English walnuts, but wilder (the shells are much thicker on the California black walnut).
- Bows were made from the wood.
- The heartwood is rot resistent and is dark in color.
- The green husk of the nut was used as a dark, brown dye.
- The nut shells were made into California Native American game pieces.

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Useful and Edible Plants of California / California bay laurel (Umbellularia californica)

- Grows in moist soils, especially in mountain canyons, valleys and foothills.
- Leaves were used to repel fleas and lice.
- Nuts were baked or roasted to a brown color, then cracked and eaten.
- Leaves were used in cooking for flavor additive (taste the same as European bay leaves, but stronger).
- The wood was made into bows.

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European bay leaves, but stronger).

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Useful and Edible Plants of California / Ithuriel's spear (Brodiaea amaryllidaceae)

- Grows in open grass places and hillsides (prefers dry soil).
- The bulbs were a great source of food for the California Native Americans, who roasted them in earth ovens or ate them raw.
- Digging sticks were used for harvesting brodiaea corms.

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Useful and Edible Plants of California / Broadleaf plantain (Platago major)

- Found near stream banks (likes well-watered areas).
- Stems are tougher than leaves (remove stems before cooking).
- Gather the young leaves for cooked greens (Broadleaf plantain is better tasting than the Narrowleaf plantain).
- A leaf poultice was used for insect bites and cuts.
- The raw, mature seed heads are tastey.

Useful and Edible Plants of California / Tule (Scirpus lacustris)

- Grows in marshes, shallow water and muddy shores.
- Stems used to make mats, baskets, boats, shelters, sandals, duck decoys and various primitive items.
- Rhizomes were made into flour.
- Mats were light and insulating due to the pithy center.

Useful and Edible Plants of California / Blue oak (Quercus douglasii)

- Grows in foothills.
- Leaves have a blue-green cast.
- The acorn cap is fuzzy.

Useful and Edible Plants of California / Blue eyed grass (Siscyrinchium iridaceae)

- Found in open fields.
- Small, beautiful spring flower (Iris family).
- No utilitarian uses / NOT edible for human consumption.
- White-crowned sparrows enjoy eating the seeds and flowers. The word "sisyrinchium" comes from the words "pig" and "snout", since swine

were said to be fond of digging up the woody roots.

Useful and Edible Plants of California / Blue elderberry (Sambucus coerula)

- Favored habitats include open woods, brushy or grass-covered hillsides and stream banks (thrives on warmth, so it is usually more common away from the immediate coast).
- Berries ripen in July and August (rich in Vitamin C).
- The wood was used to make a flute, clapper stick, fire spindle, arrow shaft or bow.
- The red elderberry is poisonous (coastal species grows along streams that flow directly to the ocean).

Useful and Edible Plants of California / Black mustard (Brassica nigra)

- Widespread throughout the area in disturbed or cultivated (abundant in agricultural areas).
- Native to Europe (introduced during the Spanish mission period between 1769 to 1824).
- Blossoms, buds and seed pods were eaten. The young, unopened

flower buds taste like broccoli.

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Useful and Edible Plants of California / Blackberry (Rubus ursinus)

- Found in damp places, waste places, fields and canyons below 3,000 feet.
- Berries ripen in July, August and September (the berries must be black all over to be their best, not just red).
- Best blackberries grow beside streams.

Useful and Edible Plants of California / Big leaf maple (Acer macrophyllum)

- Often found along the banks of streams.
- The wood is a fine grain hardwood. It is easy to work on when green.
- Straight saplings were used for spear shafts and young branches were made into pack frames.

Useful and Edible Plants of California (1)

DISCLAIMER: ***A website is insufficient to convey the knowledge a person needs to safely and responsibly use wild plants. Before eating or using any plant, seek hands-on field training with a qualified professional in the proper indentification and use of wild plants. Gather only what you need or use. You should leave more than enough for the plant to easily reproduce and grow. Also know that gathering in State and National Parks and wildlife preserves may be detrimental and/or illegal. Be sure to get permission from the landowner of private property before gathering wild plants.***

Big leaf maple

Blackberry

Black mustard

Black mustard

Blue elderberry

Blue eyed grass

Blue oak

Tule

Broadleaf plantain

Ithuriel's spear

Ithuriel's spear

California bay laurel

California bay laurel

California black walnut

California black walnut

California black walnut

California black walnut

California black walnut

California buckeye

California poppy

California sagebush

Chickweed

Chickweed

Cleavers

Coffeeberry

Cottonwood

Cottonwood

Curly dock

Curly dock

Currant

Blue Witch

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com or "Bob Gillis" at shelter@best.com

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Useful and Edible Plants of California / California poppy (Eschscholzia californica)

- Found in open field and grass lands.
- Contains opiates.

Useful and Edible Plants of California / California sagebush (Artemisia californica)

- Grows in chapparal.
- Plant was used for smudging purposes.

Useful and Edible Plants of California / Chickweed (Stellaria media)

- Introduced European plant.
- Prefers secluded areas that are shady and moist.
- The entire plant is edible raw or lightly cooked.

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Useful and Edible Plants of California / Cleavers (Galium aparine)

- Found in moist, semi-shaded area near streams and under trees in foothill valleys (also can be found growing on dry hillsides).
- Early spring growth can be gathered and lightly cooked. In the late spring, it becomes more fibrous.
- Roots can be used as a light red dye.

Useful and Edible Plants of California / Coffeeberry (Rhamnus californica)

- Found in chaparral.
- Contrary to its name, it is not a coffee substitute.

Useful and Edible Plants of California / Cottonwood (Populus fremontii)

- Found in wet soils along streams.
- Bark was used as cordage and fire tinder material.
- Wood made an excellent fire hearthboard.

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Useful and Edible Plants of California / Curly dock (Rumex crispus)

- Grows in wet places such as the edges of streams, marshes, ponds, low fields and drainage ditches (needs a lot of water).
- The leaves were chopped coarsely and steamed briefly (has the rich flavor of spinach with a hint of lemony tartness).

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Useful and Edible Plants of California / Currant (Ribes sp.)

- Grows in oak woodland.
- Berries are edible when ripe.

Useful and Edible Plants of California / Blue Witch (Solanum solonaceae)

- Common to moist soil.
- All parts of the plant are toxic.

Fire by Friction

by Norm Kidder

Anthropologists debate the proper place in the fossil record to make the jump from apeman (Australopithecus) to man (Homo). The current trend is to base this arbitrary quantum leap on the first appearance of manufactured stone tools. The earliest case for this so far has been named Homo habilis (Handy man), a being otherwise physically identical to nearby apemen. This approach continues the bias toward stone tools inherent in the term stone-age to describe the human condition until the advent of metallurgy. This bias is the natural result of stone tools being all that's left of ancient technologies, and thus serving the needs of archaeologists. Recently chimpanzee groups in the wild have been found using stone tools. Shouldn't they also then be considered human? I suggest a different theoretical approach - the use of fire as a tool.

The ancient tool kit probably consisted of a crude digging stick, a sharp or pointed stone, a stone hammer, and pieces of bark or leaf used as a cup for water. These are little different from the tools known to be used by chimps. This kit did not change for vast stretches of time. I propose that the stimulus for change that jump started the behavioral evolution for our kind was the discovery of fire as a tool.

Pre-human hominids were omnivorous gatherers and scavengers, killing relatively helpless animals if discovered. They lived at a time of drought, when the great forests of the world were shrinking and being replaced by grasslands. They were forced to make dangerous excursions away from the relative safety of the trees out into the more food-rich plains. Foraging required that group size remain small, and lookouts be always alert for the many large predators. Another element of life a few million years ago was occasional fires, started by lightning or volcanoes,

which would sweep across large areas unchecked. A burned area would provide a major windfall to hominid groups. The ground would be cleared of dead vegetation exposing seeds and tubers, as well as providing the occasional cooked dead animal (one advantage to cooked meat is its shelf life). Burning also tended to run off most predators, and make it much easier to detect any that returned. For millennia perhaps, our ancestors learned to seek out burning grasslands which might provide food, briefly, for large congregations of hominids (the first conventions).

The great leap forward that I feel justifies a new classification for humans came when the first of these ancestors took a burning branch and set a new fire, taking control of the process. This discovery that fire could be used to make food more readily available, to preserve some of it for the future, and help defend against predators, created the technological base for modern society.

Fire Stick Farmers

A study of aboriginal groups around the world gives clues to the advances in the use of fire as technology. One of the oldest uninterrupted cultural traditions known to science was found in the Australian Aborigines before they were 'introduced to modern civilization. One anthropologist described their food gathering practices as fire stick farming. Using fire to determine the species of plants available to them for food. Specifically, they used fire to reduce less desirable plants, and encourage the most useful ones. The result was that most of the continents plant communities were, until recently, maintained by fire.

The evidence for California Indians indicates a similar use of burning to promote seed production in grasses and wildflowers; thatch removal to favor tuberous growth and other wildflowers; and thinning of brush to improve hunting by both increasing animal browse and decreasing cover.

Fire was also a critical element in the hunting process. Many ancient groups used fire to drive animals into traps (blind canyons, pits, tar pits, marshes, cliffs, etc.). In recent times, fire was being used by California Indians to drive ground squirrels from their burrows, bees and hornets from their hives and grasshoppers into a pit oven. Smoke and fire permeate most aspects of daily life. It is used to straighten arrows and spears, harden digging sticks, bend basket rims, waterproof tanned hides, purify and deodorize and of course to cook.

The importance of fire to all ancient people made it nearly inevitable that eventually someone would discover how to make fire. It is unlikely that anything in the fossil record will enable us to know just when this change took place. Hearthfires started from wildfire are identical to those started by fire sticks. Even if by chance a set of fire sticks were to be found, it would only tell us when conditions for preservation existed, not the earliest use. As to how the secret of fire making was discovered, I have my guess:

The same process that produces fire will also eventually produce a hole. I believe that someone trying to drill a hole in a board discovered fire making accidentally.

The wide range of the fire-drill throughout many continents (Australian aborigines use the same method as American Indians, etc.) implies that it may have been known before the great dispersal of humans carried out by Homo erectus around 1.5 million years ago, or at least by the migrations at the end of the ice ages starting around 40 thousand years ago (although it is possible that it arose separately and identically in many different places).

The basic technique for making fire by friction involves spinning a drill against the bottom of a hole in a hearth board. Friction from rubbing the sticks together produces heat and (if the correct woods are used) fine powdery sawdust, or char. The char is collected in a notch cut into the center of the hole. This concentrates the heat, the wood acting as an insulator. If the char is heated to 800 degrees Fahrenheit it will begin to smolder (data courtesy of Richard Baugh). Placing the smoldering char (ember) into a bed of tinder (fine, dry plant fibers) and blowing gently will cause the tinder to burst into flames. This is much easier to describe than to accomplish. Reaching 800 degrees Fahrenheit requires considerable pressure be applied to the drill.

The hand spun fire drill, the oldest method, accomplishes this through hand pressure against the drill while bearing down with the weight of the body while continuing to spin the drill as fast as possible. With practice, a strong, fairly heavy, well conditioned person can get an ember in a few seconds of hard work, under ideal conditions. Smaller or less experienced people can make fire through cooperative efforts and persistence. Mechanical advantages can be achieved through the use of a cap piece which is used to push down on the drill. To keep the drill spinning with one hand, a bowstring is wrapped around the drill and moved back and forth, spinning the drill. Another variant involves using toggles (and normally a second person) to spin the drill. These methods probably evolved where conditions made fire making difficult.

Three other techniques for friction fire use lateral friction rather than rotational - fire plow (movement up and down a groove), fire saw (the edge of one piece cuts through the middle of another), and the fire cord (a vine is pulled through a notch). Two techniques are known using heating by compression - the fire piston (works like a diesel engine), and flint and steel (iron particles are crushed, and torn away, causing enough heat to ignite them). The last of these is the best known, but was probably not common until iron became available. Modern matches use materials which ignite easily with little friction heat. Lighters use miniature flint and steel sets to light their gas fumes. Three new ways to make fire have been developed in recent years - electric spark, electric resistance, and chemical resistance.

This article was first published in The Bulletin of Primitive Technology (Fall 1994, #8)
E-mail your comments to "Norm Kidder" at atlatl1@aol.com
E-mail questions answered about fire-by-friction.

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The Two-Stick Hearthboard for Fire-by-Friction

by Dick Baugh (May 21, 2000)

Many practicioners of stone age technology are interested in fire-by friction methods which require a minimum amount of knife work, the reasons being that 10,000 years ago cutting that notch wasn't as easy as it is today with your fancy Swiss Army knife. One way to eliminate the chore of cutting a notch in your hearthboard when starting a friction fire is to make the hearthboard out of two round sticks tied together. This idea was sketched out in Mors Kochansky's book "Bushcraft" (ISBN # 0-919433-51-0) and also described in an article by Gary Zeh in Volume 3, Issue 3 of Wilderness Way magazine.

I tried this out with a bow drill. There's nothing to it!

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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The Miracle of Fire-by-Friction

by Dick Baugh

Introduction

Starting a fire by rubbing two sticks together. Why do I always get a thrill out of doing it? Is it because there are probably less than 500 people in the United States who can consistently start a fire with a hand drill? Is it the entertainer in me? I don't know. I assure you that the thrill is not diminished by knowing more about the scientific events that go on during the process.

The objective of this article is to provide some scientific insight into the events which happen when two sticks are rubbed together to start a fire. In particular, why is it that some woods don't work at all, some work with great effort and others with relative ease. The principals discussed apply equally well to the fire saw, fire plow, hand spun drill or bow drill. Will it help you start a friction fire more easily or quickly? Probably not. Will it give you a deeper appreciation of the process? I hope so.

Basic Principles

You have to get the char, powder that is rubbed off the wood, heated up to about 800 degrees Fahrenheit before it will start glowing (ignite). I measured this by sprinkling char generated with a bow drill on a soldering iron heated up to a known temperature. Below 800 degrees the wood dust would give off a little smoke but that's all. Above 800 it would smoke and then start to glow. Anything that prevents the char from reaching 800 degrees will interfere with fire making.

Composition and Structure

By this I mean what kind of molecules is the material composed of and how are the molecules arranged? If there is any volatile resin or tarry substance in the wood, then as the friction heats the wood the tarry stuff will take heat away from the char (heat of evaporation) or will condense on the char and form it into a coarse gritty substance, preventing ignition. If the correct molecules are present and all the wrong molecules are absent, there is still a problem if the molecules are not arranged properly. Imagine your best hearth board and hand spun spindle which will twirl up an ember with very little effort. The wood will be very light, a very poor thermal conductor (a good insulator). Now put your hearth board and spindle in a vice and compress the wood to 1/2 its original thickness. It will be twice as dense and its thermal conductivity will be doubled. You can still twirl up an ember but you will have to work twice as hard because you have altered the structure of the wood. You have made it a poorer insulator and you have doubled the amount of muscle power needed to reach ignition. For a person with limited muscle power attempting to start a fire by friction, the use of low density wood is critical.

The simplest test for whether a particular piece of wood will twirl up an ember is the most obvious: try it and see if it works. A quicker test is to examine the char that is ground off as you twirl the spindle on the hearth board. The rule of thumb, literally, is to rub the char between thumb and forefinger. If it is coarse and gritty then reject that particular piece of wood. If it is very fine, like face powder, then you have a good chance of twirling up a fire. Both Kochansky and Graves mention this. What is the difference between these two classes of wood? Those that work and those that don't. We know that in the category of "good" woods there are soft woods, such as yucca, which can be easily dented with the thumbnail and hard woods such as sage brush which are much more resistant to the thumbnail test. Could it be that the "good" woods ignite at a lower temperature than the "bad" woods? That should be easy to measure. The straightforward way would be to measure the temperature of each tiny little particle of char as it is ground off the spindle or hearth board. Trouble is that it is very hard to measure the temperature of something that tiny without disturbing what is going on. The next best way is to measure the ignition temperature indirectly. Sprinkle some char on a piece of metal which has been heated to a known temperature. See what temperature the metal has to be heated to in order to ignite the char. As a practical manner I used a thermostatically controlled soldering iron as a source of known temperature. Tips with two different temperatures, 700 degrees F and 800 degrees F were available. I had observed previously that the char ground into the notch in a "good" hearth board would start glowing (ignite) if a pinch of it was placed on the 800 degree soldering iron tip but would not ignite if placed on the 700 degree tip. The conclusion from this was that if friction heats the char above 800 degrees it will ignite.

What about "bad" woods?

I used a piece of local willow sapwood, a material on which I have wasted countless hours in the past trying to light a friction fire. Never any luck. Always produces a coarse gritty char. This time I

did a different experiment. I charred some of the willow with a match and then ground it off with a file. It was now very fine, much finer than the results of a bow drill. This very fine willow char would ignite almost instantaneously at 700 degrees. Conclusion: the more finely the char is divided the lower the ignition temperature. This hypothesis was tested further by grinding off some un-charred mule fat wood with a fairly fine file. This material was slightly gritty feeling compared with the char that fails into the notch of a mule fat hearth board. The coarser mule fat char failed to ignite at 800 degrees. I did the same thing with char cloth, the favored tinder for flint and steel. Char cloth failed to ignite, even at 800 degrees.

Conclusions

The miracle of fire by friction is that you don't have to heat the char up to the temperature of a glowing ember to make it ignite. You only have to raise its temperature up to the point where it takes off of its own accord. When powdered charred wood is heated up to some critical temperature it begins to spontaneously oxidize. When it starts oxidizing its temperature rises, causing it to oxidize even faster. Eventually it reaches an equilibrium temperature limited by how much air is available and starts to glow, ignition. The critical temperature where this process begins depends on how finely the char is pulverized.

Fire by friction works only because these two events, pulverizing and heating, happen simultaneously. Woods that don't work disintegrate before they reach this critical condition.

Things that can cause problems:

a. If you don't have enough muscle power then you won't be able to raise the temperature high enough. Remedy: teamwork. Have someone else help you. Even if the helper can only get the wood temperature elevated to 300 degrees, then it will make the job easier. Remember that a bow drill is the easiest in that it uses your muscle power most effectively.

b. If the structure of the wood is such that it disintegrates before it reaches 800 degrees then it is a wood that should not be used. I strongly believe that some softwoods such as willow and aspen don't work because they fall apart before they reach the critical temperature.

c. Volatile substances such as water or resin in the wood. Evaporative cooling will prevent the char from reaching the critical temperature.

Fire-by-Friction: The Spiritual Aspects

What is a cynical, agnostic engineer doing talking about the "spiritual" nature of something which can be fully explained by the laws of physics and chemistry? All I know is that there are some things that make me feel good and starting a fire the way my ancestors did 10,000 years ago is one of them. What makes me feel even better is getting a group of people to contribute towards the starting of a fire. I can think of no better way to bond a group of people. We all take turns at twirling the spindle, each according to his or her own ability, we all gently blow on the ember to bring out the flame and the smoke carries our thoughts and our hopes skyward. On the evaluation of a weekend course I gave a couple of years ago one of the students said "Starting a fire is a sacrament". I guess it is.

This article was first published in The Bulletin of Primitive Technology (Vol. 1, Spring 1993, #5)
E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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Making Fire with a Bow Drill

By Dino Labiste

The components of the bow drill consist of the spindle, the hearthboard, bow and the bearing block.

Downward pressure is applied by pushing down on the bearing block and rotation on the spindle is generated by the bow.
In the right hand photo above, notice that the string closest to the left hand holding the bow is underneath the other half of the string. The left thumb is used to push down on the string to separate the string as the spindle is rotating. This keeps the string from abrading each other. Also in the right hand photo above, the right wrist is locked into the shin of the right leg to stabilize the rotating spindle.

Place a leaf underneath the notch to catch the char dust.

Use a consistent sawing motion to create some char build-up in the notch. Continue to rotate the spindle as the hearth- board begins to smoke and the char dust ignites into a ember.

Transfer the glowing ember from the leaf to the the tinder bundle. The white, cattail down in the tinder bundle of the above, left photo will help to extend the fire of the ember. Blow into the tinder bundle to increase the fire of the ember.

Continue blowing until the tinder bundle bursts into flames.

The spindle was California Buckeye. The hearthboard was Incense Cedar. The wooden bow was willow and the string was made from Flax. The bearing block was from a piece of soapstone. The tinder bundle was from the bast fibers of cottonwood with some cattail down in the middle.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com
E-mail questions answered about fire-by-friction.

Making Fire with a Hand Drill

by Dino Labiste

Spindle rotation and downward pressure are two of the most important requirements for starting a hand drill fire. To guide beginners, who are first learning to do a hand drill fire, a leather thong with thumb loops can help apply the downward pressure that is necessary for creating the needed friction. After you get the feel of the downward pressure by using the thong, try using the hand drill without the leather thong. Practice and patience will eventually improve your rate of success.


There are a variety of ways in preparing your notches. The notch in the photo above was cut tangent to the circle of the spindle hole on the hearthboard. Two V-shaped notches were cut on the top and bottom of the hearthboard for catching the char dust.


When you begin to see smoke coming from the spindle and hearthboard, don't think that you have a fire and stop spinning the hand drill. Be sure that the char dust has ignited before you stop rotating the spindle.

A leaf was placed under the hearthboard to catch the ignited char dust. The glowing ember was dropped into the cattail down in the tinder bundle. The bundle was constructed of the bast fibers of cottonwood and a pile of cattail down placed in the middle.

Blow into the cattail down to help extend the ignited char. Once the coal starts to spread, it helps to hold the tinder bundle out and above your head to keep the smoke from getting into you eyes.

Continue blowing into the tinder bundle until it ignites into a flame.

The spindle was Mare's Tail (Conyza canadensis) and the hearthboard was Incense Cedar (Libocedrus decurrens).
Other alternatives for the spindle are Mule Fat (Baccharis salicifolia) or Blue elderberry (Sambuca mexicana).

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com
E-mail questions answered about fire-by-friction.

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Fire-by-Friction with Damp Materials

by Dick Baugh

It is a dark and stormy afternoon. The rain is starting to soak through your tattered poncho. The insignificant little streams that you have to cross are now waist high. Yesterday they were little trickles. You finally get to a cave above Wildcat Creek. It is dry inside and even better, there is dry firewood. You reach into your pack for your trusty hand-drill and hearthboard, eagerly anticipating the fire you're going to twirl up. Disaster! They are both damp. What do you do now?

I've been a part of that scenario in the past but didn't have the experience or confidence to propose a solution. I saw three professional outdoor survival instructors fail to ignite a fire-by-friction when forced to use damp materials. I've spent a lot of time thinking about this problem and I think I have a solution.

The First Experiment

I started with a bow drill set with an incense cedar (Calocedrus decurrens) hearthboard and coyote bush (Baccharus pilularis) spindle about 5 inches (12 cm) long by .5 inches (1.2 cm) diameter. This set was quite reliable at creating a glowing ember with moderate effort. I tossed both spindle and hearthboard in a bucket of water for approximately 30 minutes. Next, I removed them from the water, towel dried them and waited another 30 minutes before carving a starting hole and notch in the hearthboard. The wood looked and felt wet. When I applied my usual bow-drill effort it took a little longer than usual before the wood dust started to smoke. I then gave it maximum effort. Plenty of smoke and black char, but no glowing ember. I repeated that sequence (moderate effort from the beginning) several times without any success at creating a glowing ember. What was happening?

The following description is about a bow drill fire, but the principles are the same for all fire-by-friction methods. I hypothesize that after the spindle starts twirling the following sequence of events occurs:

1. Moisture is driven from the wood. Even "dry" wood contains approximately 10 % by weight of water. Very little wood is worn away. Temperature is probably less than 400 degrees Fahrenheit.

2. The wood starts to decompose and char. Smoke starts coming from the wood. The wood is being worn away. The temperature is beginning to rise from 400 to 700 degrees.

3. The temperature of the fine wood particles being abraded off the junction between spindle and hearthboard rises to above 700 degrees. Ignition takes place if the particles are fine enough.

Ignition will not happen until the temperature gets up to a critical level and the critical level depends on the fineness of the wood particles. In "The Miracle of Fire by Friction" (Bulletin of Primitive Technology, No. 5, Spring, 1993), I stated that very fine charred wood particles would start to glow if they were heated up to 700 degrees, whereas coarser particles have to be heated to 800 degrees. You have to get a charcoal briquette's temperature up to about 1100 degrees before it starts to burn.

When full power is applied to a damp spindle and hearthboard then the material is worn away before its temperature is high enough to cause ignition. Evaporation of moisture in the wood is a major source of cooling. In order to get ignition you must get rid of the moisture before trying to create an ember. Fortunately one can heat the wood without wearing it away appreciably by applying a very light effort. This is a universal phenomenon which is critical for success with damp materials. The pressure has to be above a certain threshold before the material is abraded away. Therefore you should be able to drive the moisture away by twirling the spindle gently for a few minutes.

The Second Experiment

Next, I tried to put this theory into practice. I applied very light effort with the bow-drill to the damp spindle and hearthboard until a very tiny wisp of smoke started to appear and then I stopped for a few seconds before resuming the operation. I did this for a couple of minutes: light effort until a little smoke was created, stop a few seconds before continuing with the light effort. After several minutes of very light effort I then applied the moderate effort that I normally use.

Success! The glowing ember told me that I had successfully dried out the wood sufficiently to generate a glowing ember.

Prior to doing this bow-drill experiment I saw a similar thing happen at the 1998 Rabbitstick Rendezvous. One of the young men from Arizona left his sotol hearthboard and seep willow hand drill outside in a rain storm. By applying lots of effort he could get plenty of smoke but no glowing ember. I suggested that he take it easy for a few minutes to dry the materials before working hard.

It worked.

Now that you have a glowing ember what do you do with your damp tinder? There is no sun out to dry it. You need some source of heat to dry your tinder. If you are alive you have something at 98.6 degrees. Use it. Wrap your tinder bundle very loosely in a bandanna and put it next to your stomach and then be patient. It may take over three hours to dry. Avoid exerting yourself to the point where you perspire.

The preceding suggestions are neither foolproof or unique. Another method is to construct your spindle and hearthboard from wood taken from the center of a large log.

That is not always possible. I would greatly appreciate hearing from anyone else who has ideas on starting friction fires with damp wood.

"After starting a fire without matches with my father"
by Beth Baugh (December 1, 1991)

Today these modern hands remembered the old ways.
Soft and pale, unhardened by sun or experience, not callused by trees and rocks, they held again the shapes of the earth and rejoiced.
They stung with the pain for forgetting, yet now they have given life to one of the four elements.
Taken back to childhood, and beyond, to the time of dreams, where hands were skilled, strong and wise.
Where mouths blew breath on those embers sparking life into flames which burned for generations.
The smoke we held in our raised hands carried a prayer to the Great Spirit.

This article was first published in The Bulletin of Primitive Technology (Spring 1999, #17)
E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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Spindle Extension for Fire Bow Drill

by Dino Labiste

Wood everywhere, but never long enough for a spindle for my fire bow drill. Creating fire by friction is never easy and finding the right materials are never always available. When all you have are short pieces of wooden spindles, then what do you do? The solution can be found in a simple device called the spindle extension. The bone device allows you to attach a short, wooden spindle to create that precious ember. It is very effective and very efficient.

The materials you will need:

1. Canon bone (preferably a deer)

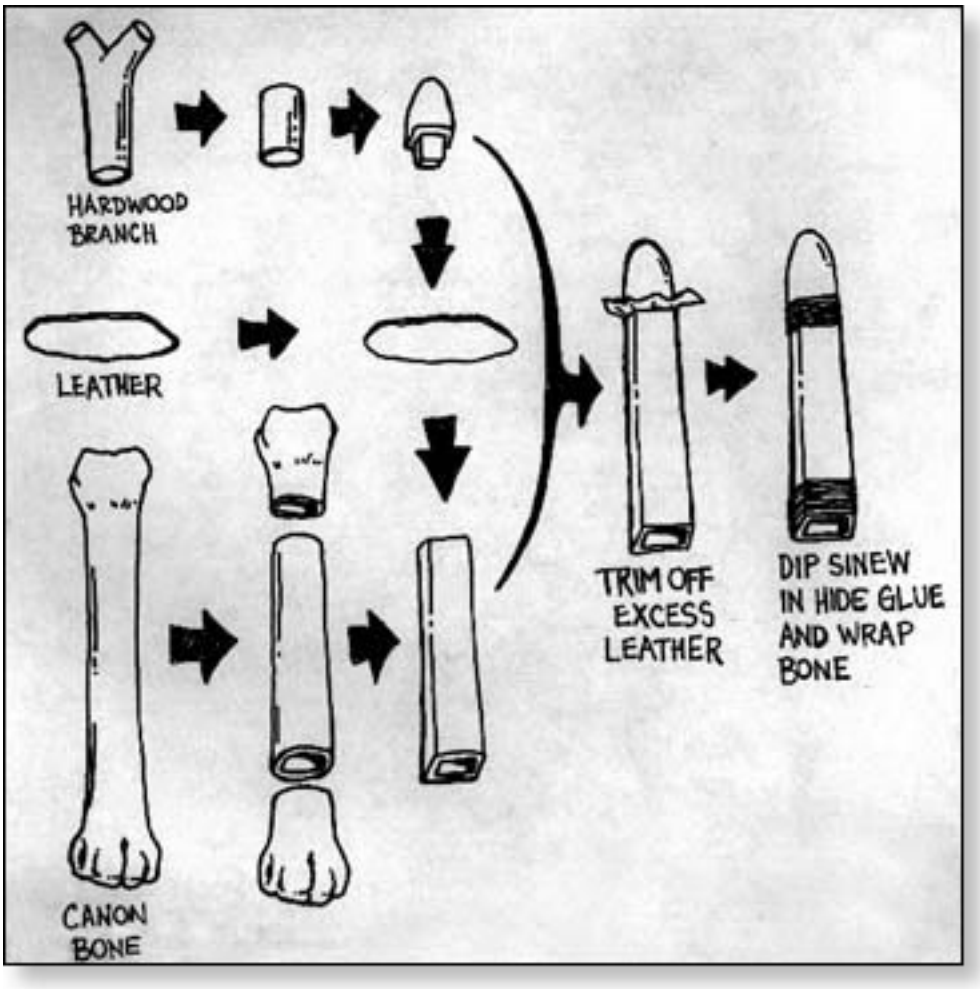
2. Any hardwood from a branch

3. Soft leather

4. Hide glue

5. Sinew (not artificial, although it can still be used)

6. Tools: hacksaw and files (if you prefer to go totally primitive, which will take longer to construct, then you'll need a sandstone block for abrading and a hard stone, like chert or flint, with an edge for sawing)



Cut off the ends of the canon bone, which should leave you about 5 inches of bone. The bone will have 2 openings on both ends. Proceed to square the sides of the exterior of the bone by grinding it on a sandstone block or use a file. Grind the bone exterior to the shape of a long rectangle (tapered, due to the natural shape of the bone). The 4 sides do not have to be perfectly flat and free of natural indentations. As long as the overall shape is rectangular. A trick to get the rectangular shape is to silhouette the bone against a fire or lamp. You'll see where all the irregularities of the shape are located. Grind out the lumps and uneven sides until you come close to a rectangular form. Then use a small flat file to square the inside of both openings of the bone. If you can find a small abrasive stone, you can abrade the inside of the bone instead. Note: Don't grind the bone too thin or it will crack.

Proceed to carve the wood into a cone shape with a flat bottom that has the shape of an angular plug. The wooden plug will fit into the narrow end of the bone spindle.

Take the soft leather, place it on top of the narrow end of the bone, and position the plug end of the wooden cone on top of the leather. Push down on the wooden cone, wedging it into the bone spindle. This will create a temporary, yet secured, wooden cone that could be replaced in case the wood wears down. Be careful during this procedure because it can crack the end of the bone. NOTE: It might be wise to FIRST wrap the sinew onto the bone ends and let it dry, as discussed in the next paragraph, to prevent the bone from cracking while you're inserting the wooden cone. When done, trim off any excess leather sticking out of the bone.

Dip your index finger and thumb in hide glue and drag the sinew between your fingers. Wrap the narrow end of the bone several times with the sinew soaked with hide glue. Proceed to wrap the larger end of the bone with sinew also. Let the hide glue dry. Your spindle extension is now ready to use.

The advantages of the spindle extension:

1) You may use wood that are too short for a complete wooden spindle. Just cut a piece about 2" to 2 1/2" long, taper and square off one end. Then stick it into the wide end of the bone spindle extension.

2) The rectangular shape of the bone grips the bow string very well (no slippage). Unlike round wooden spindles, the pressure from the string will eventually dent the exterior surface of your wooden spindle causing warping of the wood and slippage of the string. The bone extension will

never dent from the string.

Short wooden branches everywhere and an ember is ready to be coaxed out of the hearthboard with my spindle extension.

This article was first published in Wilderness Way magazine (Volume 4, Issue 1)
E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com
E-mail questions answered about fire-by-friction.

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Fire-by-Friction Methods of the Australian Aborigines

by Dick Baugh (January 23, 2000)

There are at least two different methods used by the Aboriginal people of Australia to start fires. This article describes them. Australian Aborigines are one of the few remaining cultural groups which are still familiar with their traditional subsistence methods.

I had always wondered what methods were used by indigenous people who habitually start a fire by friction protected their fire sticks from moisture. This would be particularly relevant in the Northern Territory where 6 months out of each year there are monsoon rains on a daily basis. On a recent trip to Australia my wife and I saw young Aboriginal men (Remember, in Australia 'abo' is a pejorative) at the Tjakupai Cultural Center in the Northern Territory start a fire with a hand-spun drill. They had a nicely made little case, covered with some sort of bark and resin and decorated with red seeds. The business end of the spindle and the hearthboard were protected by this cover. The entire assembly was then leaned, case up, against a tree. Only the parts which needed protection from the elements were protected.

It was clear that most of the Aboriginal men I spoke with in the NT were familiar with starting a fire with a hand drill. That does not mean they were always successful. At a cultural center in Darwin, NT, I asked a man if he had a set of traditional Aboriginal fire sticks and was willing to trade them for a set which I had brought from California. He went to his truck and brought out a spindle and hearthboard but said they belonged to his cousin so they were not available for trading. How many people keep a friction fire set in their vehicle? Of course he had to demonstrate how they worked. He apologized, saying that an essential ingredient was missing. He didn't have any dried kangaroo poo to put in the notch and catch the ember. He promptly assumed the position and stared twirling the spindle. Smoke and sweat but no ember. I know the feeling. Then a mate of his took over. Still no glowing ember. After a couple of blisters they gave up. Examination of the spindle and hearthboard showed that they were made from fairly dense wood. That means that much more energy would have to be applied to them to achieve ignition. Lower density materials with commensurate lower thermal capacity and conductivity require less energy to achieve ignition. Not being the mesomorphic (muscular) type I have to choose materials very carefully

when I try to start a hand drill fire.

In the central desert of Australia a different fire-by-friction method is used. This was described very clearly by Richard A. Gould in his book "Yiwara: Foragers of the Australian Desert", ISBN684-71787-5, published in 1960 by Charles Scribner's Sons. "A branch is split and placed on the ground and thin wedges are inserted to hold the crack open and 'nail' the branch to the ground. One man stands astride the branch to hold it down while another places bits of dry kangaroo dung in the crack and lays the edge of his spearthrower across the branch at a point directly above the dry dung. He holds one end of the spear thrower and a third man kneels and takes hold of the other end. The two men saw vigorously back and forth with the spearthrower, working between the standing man's legs. In about twenty seconds a faint wisp of smoke appears from the dung inside the crack and the men stop sawing and begin to blow on the smoldering dung, adding bits of dry grass to it as tinder. The faint glow spreads until the tinder is alight and the burning tinder is carried around to light the four fires."

Lynn Weise, Monte Boyd, Emilio Lanier and I successfully started a fire using this device, hereby dubbed the Aboriginal fire saw at one of our Tuesday night flintknapping sessions. Lynn supplied a yucca stalk (unknown species but fairly hard, solid) from New Mexico and I brought a piece of split black cottonwood (Populus trichocarpa) to use instead of a spearthrower. These materials are among the most reliable choices for fire-by-friction with either a hand drill, bow drill or Polynesian fire plow. We split the yucca stalk and separated the two halves with a small wad of shredded cattail leaf. Emilio and Monte stood on either end of the split yucca. Our initial attempt didn't work because there was very little friction between the saw and the outer surface of the yucca. We next cut a small notch with a knife into the yucca where the saw rubbed back and forth. This improved the situation considerably and there was an apparently much higher coefficient of friction. A minor effort gave profuse smoke but no ember. The final modification was to push the wad of shredded cattail fiber down further so it was not in contact with the saw. Success! A moderate effort by the two sawyers produced plenty of smoke. We saw a tiny wisp of smoke

coming up from inside the accumulation of powder. Gentle blowing caused it to get brighter. From here it would be an easy matter to transfer it to a handful of dry tinder and create a flame.

An alternate method, involving only two persons, would be to have the two persons kneel on one knee on opposite sides of the split stick. Their forward foot would be placed on the split stick to hold it securely. In this manner two persons could simultaneously hold the split stick down and do the sawing.

Why should one choose one fire-by-friction method over another? Better yet, why would one group of indigenous people select a particular method? What materials are available? What are the human resources available? What are the climatic conditions under which they must work? What tools are available for fashioning the parts? Beats me. The Aboriginal fire saw requires very little in the way tools for construction since it involves only rough cutting and splitting and no precision operations. The method has two advantages for a classroom situation. It is a joint effort. Consequently it can be used to teach the advantages of teamwork and cooperation. The physical efforts of at least two persons are combined. Consequently two people who are not terribly muscular can achieve a friction fire when neither could do it individually. This is important for teaching stone age skills to young people or the weaker sex, whichever one that is. The second reason for teaching it is that it is a method which requires no tools. Give it a try.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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The World's Smallest Bow Drill Fire-by-Friction Set Challenge

Let's see who can make the world's smallest fire-by-friction set.
The rules are:

1. The set must be reasonably reliable at creating a glowing ember.

2. The honor system holds. No cheating!

3. Submit a photo if you can.

4. Submit the dimensions of your miniature bow drill in the following format (see below).

5. .The criteria for winning are very arbitrary.

6. To avoid embarassing the winners by forcing them to accept prizes they don't really want, there won't be any.

From Palo Alto, California (United States):

Submitted by **Dick Baugh**, March 22, 1998 :

Spindle: Baccharis viminea (Mule fat),
.315 in (8 mm) diameter X 3.30 in (84 mm) long

Hearth board: Calocedrus decurrens (California incense cedar),
4.0 in (100 mm) X 1.25 in (31 mm) X .35 in (9 mm)

Socket: Arctostaphylos sp. (manzanita),
2.1 in (52 mm) X .75 in (19 mm) X .45 in (11 mm)

Bow: Showy bottlebrush,
9 in (230 mm)

THE RACE IS ON!

From Nelson Bay, Australia:

Mike Smith of Nelson Bay, Australia, submitted the following fire by friction set. He also sells a bow drill fire set known as "Bandicoot Bill's Bush Matches."

Richard Baugh I think I've gone one better. Inspired by your challenge, on the 25th of April 1999, I constructed the following bow drill which achieved flames.

Spindle: Flowering spike of the grass tree, xanthorrhoea resinosa,
47mm long, 10mm diameter.

Hearth board: Flowering spike of the grass tree, xanthorrhoea resinosa,
50mm long, 17mm diameter.

Socket: Seed case of the woody pear, xylomelum pyriforme,
47mm X 37mm X 15mm.

Bow: Black wattle, callicoma serratifolia,
160mm.

From Flagstaff, Arizona (United States):

Randy Haas Jr. of Flagstaff, Arizona, submitted the following fire-by-friction set.

From Canada:

Dick, I just found out about the smallest bowdrill competition. I am a survival instructor in Canada with Survival In The Bush Inc. This is my smallest set which I can produce fire on on a regular basis. **DMasterscout@aol.com**

Bow length total: 12.2 cm

Lentgth from string to string attachment: 6.7 cm

Spindle - horsetail- length:12 cm, width 8 mm

Fireboard - catalpa: 7 mm thickness

Both the handhold and bow were made from osage orange.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com
E-mail questions answered about fire-by-friction.

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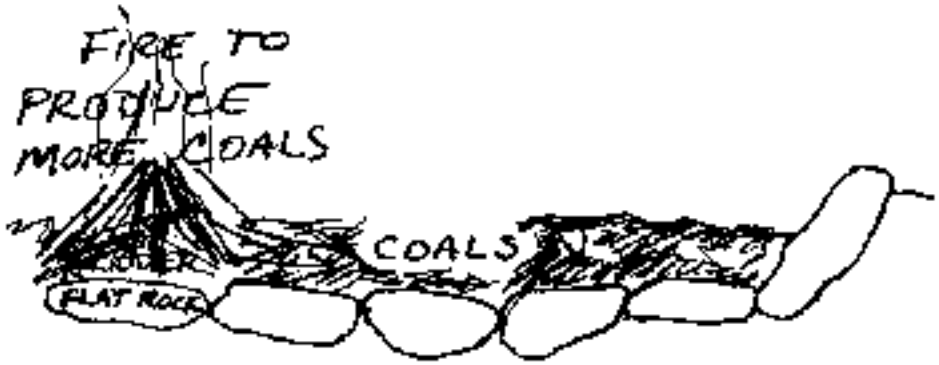
Primitive Cooking

by Norm Kidder

Cooking Fires

FIREWOODS - There are many things which make some woods burn hotter than others - rate of growth, resin content, age of tree, part of tree, structure of the wood itself. As a general rule, fire making woods that are good for making friction fires make bad firewoods, since they are low density and resinless. The best woods include oak, hickory, madrone, manzanita, mesquite, and other dense hardwoods. The worst woods include pine sapwood and many other softwoods and willow, although these make good kindling. Wet wood burns cooler than dry wood, but burns relatively longer. Heart wood burns hotter than sapwood in general. Rotten wood is good for producing smoke, but not heat or light. Charcoal burns hotter than the wood it was made from as the volatile gases which produce flames burn at a relatively low temperature. So your coals are the hottest part of the fire, not the flames. Light comes from the burning gases. The firewood you can actually get always burns better than the firewood you wish you had, but you'll need more of the poor stuff. Think of wood as calories. Better wood has more calories per piece, so can do more work.



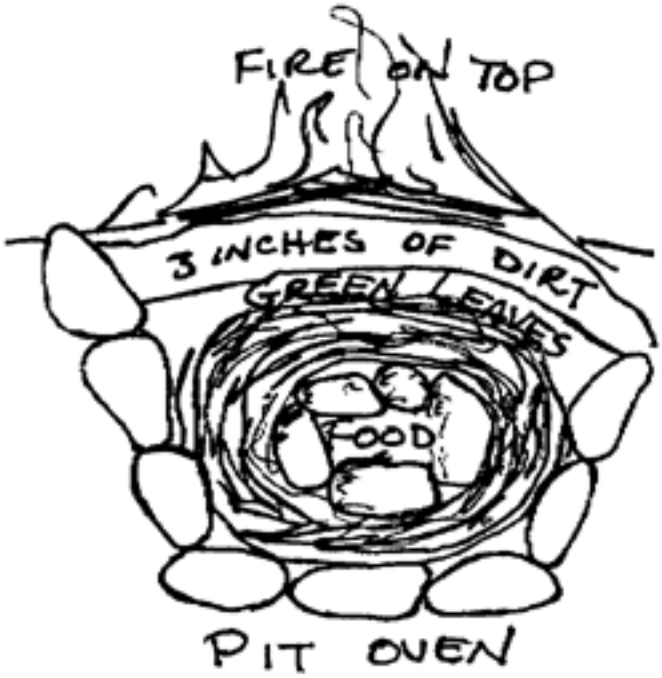
The easiest, but slowest way to get a bed of coals is to build a huge log fire and wait a few hours. This takes the least effort and the most wood. To get quick efficient coals, burn small pieces of wood. In the Scouts, the rule was to find wood (or split it into pieces) the diameter of your thumb. These were neatly stacked next to the fire and added as needed to maintain a constant temperature.

When cooking directly on the coals, the new wood is added at one end of the fire and the coals are pushed down into the cooking area. If you are using wood that doesn't make coals, you need to add pieces very often to maintain any heat.

Fire pit construction varies according to weather conditions, wind direction, what and how much you are cooking and the type of fire wood that is available. Once your fire is started the two important things to manage are fuel, mentioned above, and air flow. If you are building a fire in a windy place such as the grassy plains of the Dakotas, you need to dig out a deep fire well.

The extreme version of this requires two holes dug about a foot deep and a foot apart. They are connected at the bottom by a tunnel. A pot or grill (or big piece of meat) can be placed over one hole, while the other provides access for fuel and air. The Dakota fire is also very efficient, requiring less fuel, as almost all the heat is put to work. Moderately windy conditions can be handled with a wind screen of rocks or logs.

My standard cooking fire is dug down about four to ten inches, depending on soil type and wind. (Save the soil and sod if you can to put back when you're done.) If the wind is not too strong, line up the pit so the breeze flows parallel to it. Make sure the wind isn't blowing the smoke to where you want to sit while you cook. The pit is then lined with the flattest and driest stones I can find, including the bottom. Stones that contain moisture tend to explode as the water becomes steam. The stones come up another four to six inches above ground level.

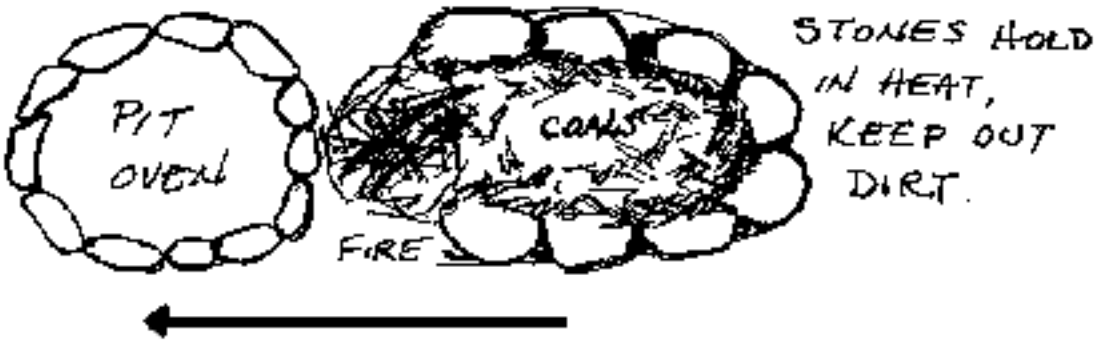


If I am going to do a pit roast, another, deeper pit is dug a foot or so past one end of the main fire, and the hump of dirt between the two is not rock covered. Pit ovens should be dug deep and wide enough to accommodate a stone lining and a green vegetation lining as well as the food. The area between can be used to generate coals to replenish the cooking area, heat rocks for stone boiling or covering the baking pit. The length of the fire varies according to the number of people cooking, the width is from one and a half to two and a half feet. One or two people can easily cook on an 18" round fire.

Extreme case one: you've got mainly big dead trees to burn. Solution one: the star fire. Trim off the side branches and stick the ends of three or more trunks into the center of the fire. Keep pushing them in as they burn. Solution two: a moving fire. Lay two trunks parallel, a few inches apart, and build a fire at one end. The fire will work its way down the logs. Solution three: build a fire against the log and burn it through, then proceed as in one or two above.

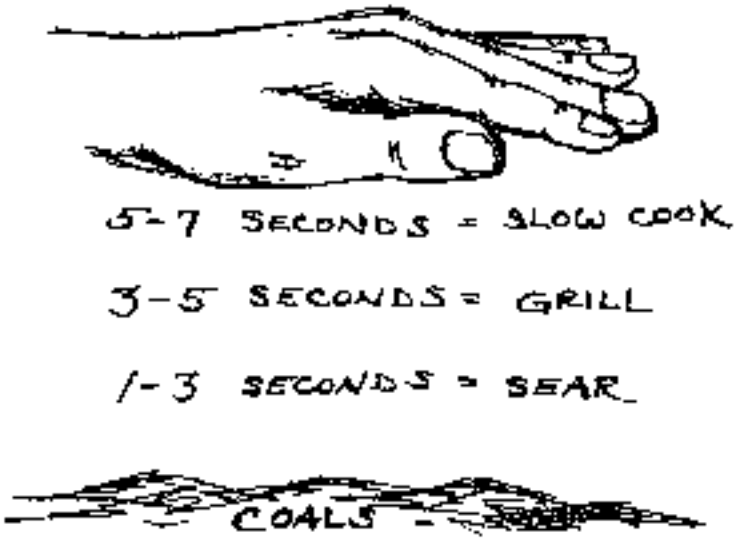
WARNING - always examine the soil in and around your fire. If it is organic, full of roots and other burnable stuff, then build a fire on top of rocks, bedrock if possible. Seal off your fire from the flammable material and really drench the fire when you leave so you won't have to explain your foolishness to a firefighter later on.

Wind /Air Control



Ideal wind direction

For fire to keep burning it needs a continuous supply of heat, fuel and oxygen. Heat radiates out away from the burning fuel, so a single burning stick will lose too much heat and go out. To keep from losing the necessary heat, place the pieces of wood close together. The smaller the wood diameter, the closer together. Big logs can be as much as 4 inches apart, twigs as little as 1/16th of an inch. For most wood, an inch is good. Oxygen flow is most critical from the time you start the fire, until you put it out. Too much flow (high wind) carries away heat and cools the fire. The perfect amount of oxygen is the exact amount necessary to keep the fire burning at its hottest. Regulate airflow by building wind breaks, and by bringing the fuel closer together for too much air, or further apart for too little air. it's possible to smother a fire with too much fuel. You can also put out a fire by pulling the burning logs apart. Changing the flow of oxygen regulates heat. If there is little wind, the fire will create a draft (a column of rising air) above its hottest spot which will draw in air from the outside. This can be enhanced by building the fire in the shape of a chimney. For cooking, this concentrates the heat in the center and is good for boiling water in a pot, and is a good way to get the fire going, and coals produced. The best cooking fire for roasting, and grilling has an even bed of coals, with heat reflected back in from the rocks on the sides of the pit.



Cooking On Coals

Until I tried it, I assumed if I threw a piece of steak right on the coals, that it would become charcoal. After trying it I found that the steak first sears a bit on the hot coals, but cuts off much of the oxygen supply, gradually cooling the fire beneath. It is often necessary to move the meat to allow in enough air to keep the coals burning. The steak was better than many I've cooked on a grill. Whole trout should be laid on the coals for three minutes, then turned over for another three. Excellent! For coal bread, make up dough cakes about 1/2 to 3/4 inch thick and place on the coals. Turn before they blacken. Test for doneness with a sharp stick. For ash cakes, make very thin pancakes and scrape the coals off of the bottom stones and fry on these. When turning food on the coals, don't put it down on the same spot, as this has cooled. Potatoes, yams and squash are placed in a hollow in the thickest part of the coal bed and turned regularly. Again, test with a sharp twig. Even when black on the outside, they are moist and delicious on the inside, and a charcoal layer keeps out bacteria so they will keep for several days. Corn on the cob should be soaked, then set along the edge of the pit, and turned as the husk gets dried out and begins to burn. Eggs can be poached in half an orange rind, or half an onion with all but the outer two layers removed, carefully placed in the coals (thanks to Bob Pratt). Eggs can be fried on a hot rock if you have fat and a bit of bread dough. Mold the dough into a circle to surround the runny eggs. If you keep it thin, it cooks through as well (thanks to Leslie Acuff who heats the rock and then moves it to a convenient spot).

This article was first published in The Bulletin of Primitive Technology (Spring 1997, #13)
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Adobe Horno

by Blake Bufford

The most important thing you need to make a clay oven, called an horno, is adobe clay. I am lucky enough to live in an area with good adobe clay. There is a Spanish Mission built of the same material not 30 miles away.

I'm not an expert on soil, so I don't know how much clay has to be in your soil to make good bricks. You will have to experiment.

I was inspired to make an horno after seeing pictures of one in the "Bulletin of Primitive Technology", Fall, 1988, #16.

To begin, I broke up a 4' x 4' section of my backyard and soaked it with water. Then I agitated it with my feet until it was a thick liquid.

Next, straw (not hay) was added. I crumbled it with my hands and sifted it over the mud. I ran out of straw and gathered several large plastic bags of summer dried weeds (foxtail, oats, etc.). They worked just as well as the straw. I inspected several of the original adobe bricks and found they did not contain much straw, just mud. Perhaps the local clay is thick enough so that little is needed. I know Charlton Heston made brick without straw in the movie "The Ten Commandments", but I wasn't sure if the Lord would do the same for me, so I kept adding straw just to be safe. The amount depends on your soil. I noted that when the brick had an excessive amount of straw, it did not seem as solid when it dried. Again, this was a first attempt and the ratio of straw to clay is something you will have to experiment with.

I made a brick mold from 2 x 4s - 7" wide and 10 3/4" long. The interior dimensions make a brick 4" wide by 71/4" long by 3 1/2" tall.

When the clay is thoroughly mixed, sling it into the mold. The soil had lots of small rocks and I removed the largest ones before putting the clay in the mold.

When the clay is level with the top of the mold, take it to an open, sunny spot and slap it down onto the ground. This helps the clay to release from the sides of the mold. If it still sticks, some short, vigorous shakes should remove it. Sometimes I sprinkled dry sandy dirt over the inside of the mold. This helped the wet bricks drop out better. The same principle is used for adding Crisco to a cake pan.

The brick dried in the sun for about a week.

The base for the horno was made from a single layer of commercial red brick approximately 32 inches square. The dried mud bricks were placed in a circle on top of the commercial brick base, leaving an opening for the door about 9" wide. However wide you make the door, make sure it is large enough to accommodate anything you plan to cook in it. The same clay used to make the bricks was also used to mortar them together. Since the bricks are rectangular and the shape of the horno is round, there will be open corners between the ends of two bricks. Fill this in with more of the same clay mortar. Before adding a second layer, dunk the bottom half of each clay brick into water. This helps it stick to the clay mortar. Keep doing this until you have two or three layers.

After two layers of brick, I stopped to let it dry for two days. When adding additional layers of brick, stagger the new layer over the previous layer so the bricks are not lined evenly one above the other. This will make it stronger. You may want to make some shorter bricks or chop one in half to fill in shorter spaces. As the walls grow higher, they must gradually slope inward to make the conical shape of the horno. If your walls do not dry sufficiently, and if they slope inward too sharply, they could collapse. I proceeded slowly and made sure each row dried a bit before adding each new row. Smooth the inside wall of the horno as you go. Fill in any gaps with clay.

When completed, let it dry thoroughly. If you live in inclement areas, you have to protect it from the rain. I lit a small fire inside and let it burn most of the day to ensure that it was thoroughly dry.

I did not make a smoke hole, and I think I should have. The air for the fire goes in through the door, and the smoke goes out of the door. I think it would be more efficient if there was a small vent near the top of the oven. When thoroughly dry, I plastered the outside with a mixture of commercial mortar and lime, about 1/4" thick. This was an experiment. Plain mortar will work, but I was trying to simulate a homemade lime mortar horno. Before adding a layer of mortar, I dampened the outside of the horno so it would stick better.

When the mortar was dry, I whitewashed it with commercial lime type "S". Hardware stores carry both slaked and unslaked lime. I don't know the difference. You may want to do some research / experiments with this. It is caustic, so wear rubber gloves and eye protection when you use it. For the whitewash, I mixed lime with water to the consistency of thick glue, then slapped it on with a large paintbrush.

I made a rough door from a 2" x 8" pine plank. The door does not fit flush to allow air inside while cooking.

I made this horno four years ago, and it is still standing and works just fine. It is not protected from the weather. However, I have had to add additional layers of thick whitewash to repair cracks.

To cook in my horno, I build a fire and let it burn about an hour. (I've never used a temperature gauge.) Then, after the fire burns down, you may pull out the coals if you wish and slide in the food you want to cook.

The adobe horno after 4 years of use.

The front whitewash coating over the top of the entrance ruptured when someone accidentally bumped into it. Other than that, it still was effective in cooking chicken and steaks, baking biscuits and cornbread, and preparing other delicious meals.

E-mail your comments to "Blake Bufford" at dogbane41@netzero.com

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Bamboo Rice Cooker

by Bob Gillis, Adam Zwicker, and Dino Labiste

Bamboo is an ancient plant that has been utilized in the East by countries like India, China, Vietnam, and many other Asian nations for centuries. Its uses are numerous from housing material, fuel, baskets, ropes, boats, tools, food, musical instruments to furniture. Bamboo is much less known in the West and it's importance as a versatile resource is often overlooked.

One of the uses for bamboo was creating a simple cooking implement that allowed you to boil rice. The following photos take you through the process of using the bamboo as a rice cooker. Ideally, you want to use a species of bamboo that has a thick wall, large diameter, and long sections between the nodes. The species that was used in the demonstration was commonly called Giant Timber Bamboo *(Phyllostachys bambusoides).* The interior diameter was 2 1/2 inches. The length was 12 inches. A section of the bamboo was cut with the closed node on one end and a open section on the other end.

First, you will need to gather a banana leaf from a banana plant.

Place the rice kernels on the banana leaf.

Wrap the rice in the banana leaf creating a tubular bundle.

Stuff the banana leaf bundle into the open end of the bamboo and fill the entire chamber with water.

Place the bamboo upright in hot ashes or coals.

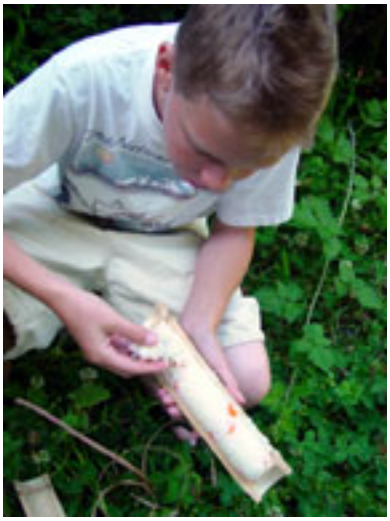
The fire will begin to heat up the bottom end of the bamboo.

As the bamboo begins to heat up, the water will start to boil.

When the rice is ready, take the bamboo out of the fire and split the chamber to remove the banana leaf bundle.

Unwrap the steaming rice from the banana leaf bundle. Create a pair of chopsticks from the bamboo and have yourself a nutritious meal. The banana leaf imparts a mild, sweet taste to the rice.

If you do not have access to banana leaves, you can split the bamboo lengthwise and stuff the chamber with rice. NOTE: *If you split the bamboo further up towards the top, instead of in the middle, the split, bottom chamber will hold more water for the cooking process.* When cutting the bamboo for this procedure, be sure to include the closed nodes on both ends. Fill the chamber with water and tie the two halves with thin bamboo splits. Place the bamboo lengthwise on the coals and let the water boil.



E-mail your comments to "Bob Gillis" at shelter@best.com

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A Note on Indian Bow Making or the Secrets of Sinew Revealed

by Dick Baugh

Sinew, the shredded fibers of animal tendon, was used for cordage, binding points on arrow shafts, and for backing material for bows. Why sinew? What are its properties which make it so desirable for these uses? Obviously it is tough and it shrinks when it dries, but how much? A fairly extensive search of the Stanford library, asking professors of biomechanics, mechanical engineering, and archeology yielded no useful information. It looked like I would have to get my hands dirty and do some experiments on the stuff but first, what did we already know about sinew?

Saxton Pope, a professor of Medicine at the University of California in the first part of this century, an intimate of Ishi's, and an ardent bowman, wrote a delightful little book about Indian bows and arrows titled "Bows and Arrows". He stated that when Ishi made sinew-backed bows he did not worry much about cutting through the heartwood on the back of the bow. This was in

contrast to all of the old-time books which describe the fabrication of longbows out of yew, osage orange, or any of the other classic bowyer's woods. The standard caveat when building a self bow (wood only) was to be very careful about having the back of the bow (the part away from the archer) follow the grain of the wood exactly or else it would break where you cut through the wood fibers.

Pope also did experiments with miniature yew bows backed with rawhide or catgut. His conclusion was that adding the backing made very little increase in the cast or ability of the bow to shoot a long distance. Therefore, he concluded, the presence of the backing only protected the back where the grain wasn't parallel and prevented the bow from breaking at full draw. Pope is to be commended for doing experiments but more needs to be done to understand what sinew does.

The Eskimos also made sinew-backed bows but in their frigid and damp climate it was impossible to do anything with glue, so their sinew was applied in the form of twisted cordage tied on the back of the bow. The tension in the backing material was increased by twisting after it was bound to the back of the bow (see Callahan, Bulletin of Primitive Technology #1 & 2).

Reginald Laubin, in his book "American Indian Archery", described his experiences in replicating Indian bows from osage orange wood and sinew. He stated that as the sinew backing dried it tended to shrink and pull the bow into a deeper and deeper recurved position and contrary to the claims of Saxton Pope, it made the bow more powerful. Laubin's book is full of practical experience but nothing very quantitative.

Another article in "Scientific American" magazine on crossbows (January, 1985) stated that sinew has a tensile strength of 28,000 pounds per square inch. This is useful information but it is only 1/3 of what is needed to characterize sinew.

My own experience with the construction of sinew-backed bows started when I saw a backed bow made by a man living in Oakland. A beautiful job. The replies to my questions were that it was deer sinew applied with Elmer's Glue. Did it shoot well? I didn't ask. Several years later I made a short flat bow out of Santa Lucia fir (initially misidentified as California nutmeg), backed it with horse sinew applied with Elmer's carpenter's glue. It was a lesson in the fact that even a knotty, poor piece of wood will make an acceptable bow when backed with enough sinew. My next attempt was a very close replica of a 36 inch Yurok bow in the Wattis Hall of Man, Golden Gate Park, San Francisco. This was a yew wood plus sinew combination with very wide thin limbs. Some very elementary mechanical engineering theory says that the only way you can make an extremely short bow such as this and still shoot a reasonable length arrow is to make the limbs wide and thin. Again I glued the horse sinew on the back with Elmer's carpenter's glue. What a disappointment! It looked very nice but didn't shoot worth a darn. After shooting awhile and then unstringing the bow, I noticed that the bow followed the string (bent towards the archer) but after being unstrung a few hours it went back to its original shape. In general the bow was "flabby". My last experiment was a plains Indian style bow, made from a 48 inch black locust stave. This time I used hide glue to bond the horse sinew to the back. This bow was dynamite, powerful and fast. Did the hide glue make that much difference?

The engineer in me took over. What are the material properties which will yield a superior bow and how can I measure them? The things which matter are the elastic modulus (how much it stretches with a given tension), the tensile strength (how much tension is needed to break it), and how much it shrinks when it dries. In addition, it helps to define some other useful terms:

Potential energy: the ability to do work. When you pull the bowstring back you store potential energy in the bow limbs. The available potential energy is equal to the distance you pull the string back multiplied by the average force that it took to pull the string back to full draw. When you

release the string the potential energy is transferred to the arrow, giving it . . .

Kinetic energy: the energy of motion. A perfectly efficient bow would transfer all of the available potential energy stored in the bow limbs into kinetic energy of the arrow.

Elastic modulus: a measure of how stiff a material is. Make a one inch cube out of the material and stretch it with a known force. The cube will get slightly longer. The elastic modulus is the force times the length of the block, divided by the area of the block times the distance the block stretched. Steel has an elastic modulus of 30 million psi (pounds per square inch), hickory has an elastic modulus of 2.2 million psi, black locust has 2.1 million psi, and the measurements I have made on yew wood give a figure of 1.2 million psi.

Tensile strength: keep pulling on that one inch cube of material and eventually you will pull it apart. The force per square inch that it takes to pull something apart is the tensile strength. For tempered steel the number is 400,000 psi, for hickory it is 20,000 psi.

For those of you who wonder: yes, it is very impractical to make these measurements on a one inch cube of material. The one inch cube was cited to emphasize the force per unit area nature of the experiment. In actual practice a much skinnier specimen of the material would be tested.

My measurement of the elastic modulus of a dried, solid horse tendon gave a figure of 411,000 psi. Similar measurements on yew wood yielded 1.16 million psi. This said, much to my surprise, that under the best of circumstances sinew had only 21 to 35 percent of the elastic modulus of wood. Put in other words, and leaving out the mathematical formulas, if you make a yew wood bow of 50 pounds pull and add more yew wood on the back to make the limbs 5 percent thicker, the resultant bow will have a 15 percent stronger pull or 57.5 pounds. If, instead of adding more wood on the back of the bow, you make the bow limb 5 percent thicker by adding sinew, the increase in draw with would only be 2.2 percent or an additional 1.8 pounds. **Why bother adding a material to the back of the bow which doesn't add much to its strength? The other 'secret' ingredient must be shrinkage.**

I was pretty well convinced that sinew shrank while it dried and this put the sinew backing under great tension. Did the amount of shrinkage depend on the type of glue used? The experiment to find this out was to glue sinew on the backs of two identical strips of 1/8 inch balsa wood. On the first one, the sinew was glued on with hide glue, on the second, the sinew was glued with Elmer's carpenter's glue. The two samples behaved identically. As the sinew dried and shrank it pulled the wood into a curved shape. This experiment showed little difference between the two types of glue, only that the sinew shrank as it dried. Again I took two identical 1/8 inch strips of balsa wood and put a thick strip of hide glue on one and a similar strip of Elmer's on the other (no sinew on either). This time there was a pronounced difference between the two. The hide glue shrank and curved the wood just as much as the sinew, and the Elmer's glue did not shrink at all. **Moral of the story: don't use anything but hide glue for applying the sinew.** Furthermore hide glue is 'compatible'

with sinew since on a molecular level they are identical. The last experiment with sinew was to see exactly how much it shrank when it dried. I pinned one end of a strip of wet sinew to a piece of plywood, and pinned the other end to the short end of a stick that pivoted at one end. Now, when the sinew shrank, the long end of the lever would move through a greater distance and make the shrinkage easier to see. The result was that the sinew shrank 3 percent upon drying.

In conclusion one can say that the benefits of sinew backing on wood bows come from a combination of several effects acting together. They are:

1. As the sinew dries and shrinks it puts the back of the bow under compression. As a

consequence, the wood fibers on the back of the bow are not stressed as highly when the bow is drawn.
2. The sinew protects the back of the bow where it doesn't follow the grain.
3. The back of the bow, which is stretched a great deal at full draw, is now a material which can stretch 5 percent before breaking (wood can only stretch about 1 percent before breaking).

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A Cordage Backed Bow

by Dick Baugh

Introduction

I had always been intrigued by the meticulous workmanship that went into Inuit (Eskimo) cordage backed bows. These hunters of the North put the same craftsmanship into their bows that went into all their hunting weapons. It was part of their way of showing respect for the animals which they killed for survival. Someday I'll make a cordage backed bow. Someday just never got here until one day I read the article in "Bowmen's Bulletin" by Errett Callahan (1). He made a "real" cordage backed bow, copying a museum specimen as closely as possible. That was the nudge, the inspiration that I needed to get busy. My objectives were, I believe, somewhat different from Callahan's. Callahan was trying to make a museum piece which looked exactly like the real thing and could also be demonstrated by shooting. I wanted to see if a cordage backing would act as a cheap insurance policy against bow breakage for stick bows; quickly made, imperfect green wood etc., the sort of thing you learn to make in an outdoor survival class. Furthermore I wanted to learn some of the physical properties of cordage backed bows. I also didn't want to make or buy the 72 feet of sinew string Callahan used. My objective was not to make as authentic a replica as possible of some aboriginal hunting weapon. I wanted to learn something about cordage backed bows, stimulate others to try making cordage backed bows and give people something to argue about.

Historical Background:

The Inuit used cordage backing for 2 reasons. Very little good bow wood was available so it was imperative that whatever material they used for their bows be backed with sinew. Furthermore it was very difficult to make hide glue under Arctic circle conditions. You have to take hide, hooves, gristle, etc. and boil and boil and boil to make glue. If you have a very limited fuel supply and no big container to boil it in then no glue. As a consequence of circumstances such as this the Inuit became masters (mistresses also) of tying things together. The Inuit bows which I have seen in museums and in photographs are marvels of knotcraft.

In the South West several Apache bands made cordage backed bows. The habitat was obviously different so why did they do it? One remote connection is that they are all part of the Athabaskan language group. From there it gets a little fuzzy. Let the anthropologists and archaeologists worry about it.

Mason (2) has some fairly detailed drawings of Inuit bows showing the methods used to attach the cordage backing. The main feature to observe is that they had many ways of doing it. Some made the nocks of the bow very deep and then passed the cord back and forth between the nocks. Other examples used "half hitches" about an inch below the nocks. The cord was secured to the bow limbs at several places between the nocks and handle section. Several being from 1 to 20. The one universal

factor in all designs, I presume, is that the sinew cordage was tightened to be under great tension when the bow was in use. Typically this was done by inserting some sort of little toggle into the cord and twisting until it was tight. The cord was then bound in place and the toggle removed. After shooting the binding was removed to relieve the tension on the cord. Mason's book shows an ivory toggle which looks very much like the lever used to remove bicycle tires.

What I did

The wood came from a black locust tree cut in early July, about 2 inches diameter at the top end, split in half with a combination of sawing and wedge. The log was peeled, laid on the floor so that the curvature was in the plane of the floor, and marked on both sides with a felt tipped pen. Lacking a bandsaw I used a small pruning saw and a wedge to split it into two staves. The wood was roughly shaped while green and tied to a 2x4 to dry for all of three weeks. The final dimensions were: 51 inches between the knocks, handle: 1.32" x .57", midlimb: 1.17' x .53", tips: .78" x .40". The cross sections were flattened ovals (semi-ellipses) with the belly side considerably flatter than the back. Absolutely nothing was done to the back except bark removal and light sanding. The bow is about 90% sapwood. I did the initial drying between tillerings by sticking the bow in the back window of my car in the direct July sun, an idea suggested by Paul Comstock (3). It dried very quickly that way. The first attempt broke while being strung, maybe because I tried stringing it while it was still very warm from the back window. The second half of the log was successfully tillered at about half draw before putting the cordage backing on. I didn't go to full draw before adding the cordage back because I thought it might break. It now draws 24 pounds at 20 inches before the cordage is cinched up and 29 pounds at 20 inches after cinch-up. At full draw, 25 in. it pulls 42 pounds. A cardinal rule of the traditional American/European bowyer which I broke was to make the bow from essentially green wood.

Often Native American bows were made from green wood, probably a holdover from the days when they had to use stone tools for bowmaking. Greenwood is a lot softer than dry seasoned wood and consequently easier to cut with a stone tool. I would also like to have had more heartwood on the belly of the bow but the tree just wasn't big enough. It was meant to be a stick bow anyway.

Putting on a cordage backing

The cord I used was yellow nylon chalk line, about .05 inches in diameter, three strand twisted. My choice was based on what I had at the time plus the fact that nylon has elastic properties similar to sinew. Other sizes or materials could be substituted. Looking at (a) on Figure 3, first tie one end of the cord temporarily near the end of one limb. Next pull the cord to the other end of the bow and tie a knot as shown in (b). Different knots to use are shown in Figure 2. Pull the cord as tight as you can while you do this. Then bring the cord around the nock, pull tight and tie a knot at the other end of the bow (c). Continue doing this until you have six strands on each side.

The ends of the cord can be fastened together as in Figure 3 :
a. Untie the timber hitch fastening the first end and tie a bowline or a figure of eight loop in it.
b. Pass the finish end of the cord through the loop and cinch it as tight as possible.
c. Secure the finish end with a sheet bend or couple of half hitches. The net result when all the strands from both sides are bunched together is a bundle about .2 inches in diameter. As a point of reference Callahan's bow was copied from an Inuit bow backed with a .25 inch diameter sinew cord bundle.

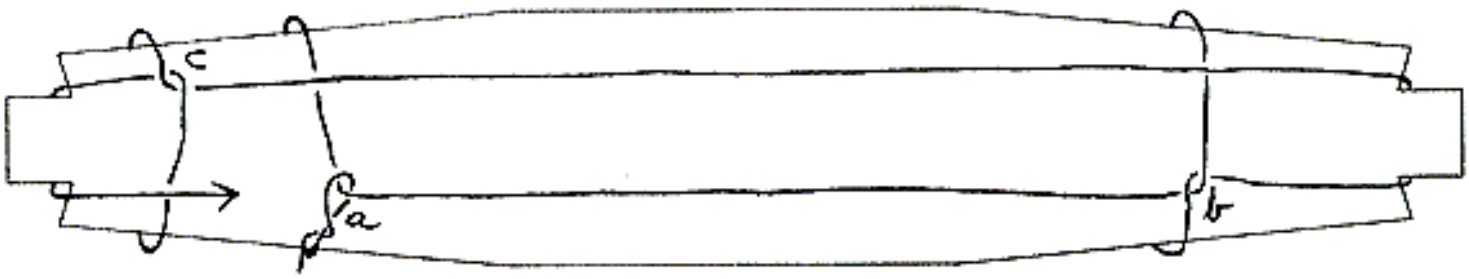
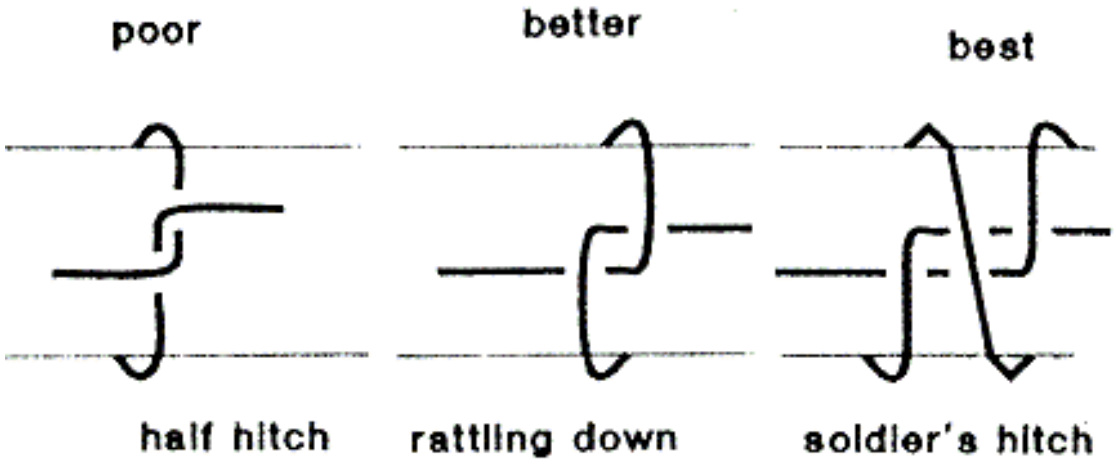
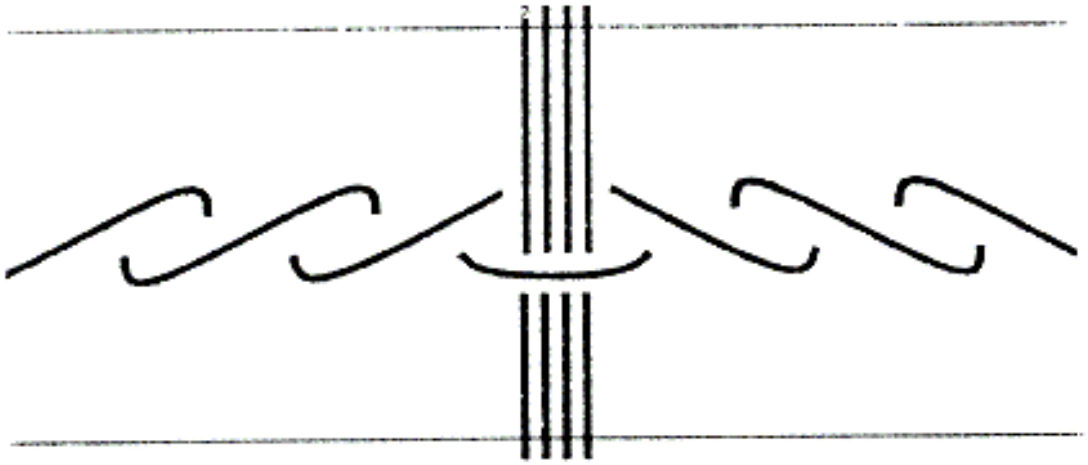


Figure 3





Securing the twist after the toggle is removed

Things to look out for

If the nocks aren't deep enough the cord will slip off. This can be remedied by tying the bundle of cord together near each nock, making sure the nocks are deep enough and tying "half hitches" near each end. You don't want any constraint on the cord in the middle 2/3 of the bow so you can twist the cord to make it tight. This puts it at risk from sliding off the back of the bow when it is at full draw. This can be prevented by providing an additional binding around the handle after the cord has been twisted tight. Pass a fairly heavy cord through the gap where the toggle is located several times and tie it around the handle. Then pull the toggle out. The cord should stay twisted and not move from the center of the handle section.

How much cord is enough?

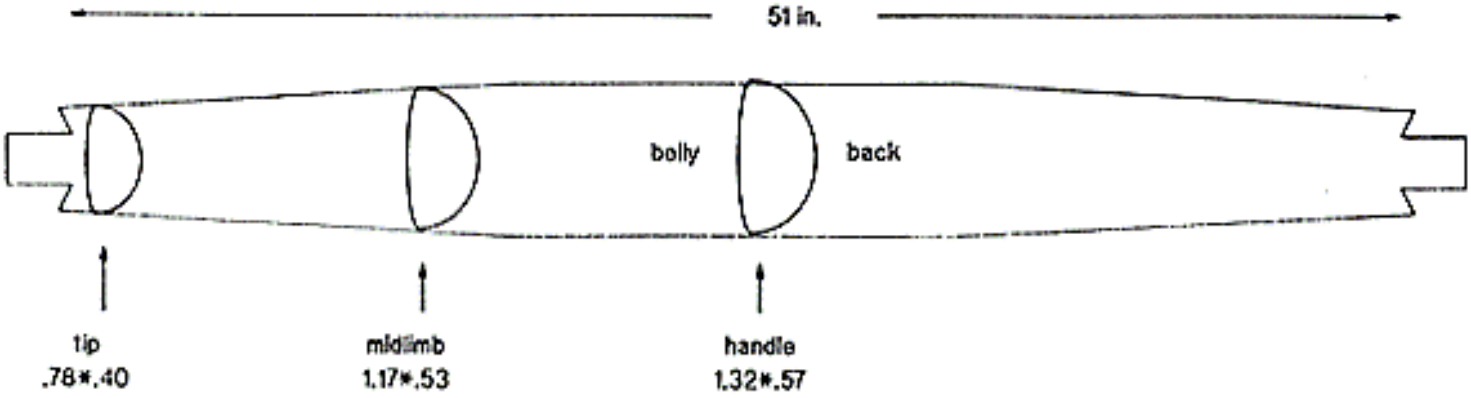
The obvious answer to this question is to see what the Inuit did and do it that way. That attitude must be modified for two reasons: a. We are not using the same materials they are: nylon instead of sinew and different woods instead of the antler, bone or driftwood they were forced to use. Furthermore we don't have a thousand years of tradition to help us. A few engineering calculations ought to tell us a lot about what should work.

Technical details:

The cordage back does several things when tightened. It increases the stiffness of the limbs so it takes more moment to bend them the same amount. It changes the shape of the bow in that it reflexes the bow (the tips are bent opposite to the direction they move when drawing the bow. It also reduces the tensile forces on the wood fibers in the back of the bow. Each of these features can be analyzed separately. According to the calculations outlined in the Appendix the cord stiffens the limbs by about 18% and reflexes the tips by about .4 inch. This should make the full draw weight about 18% higher. Experimentally the increase is 21%.

One of the most common modes of failure of self bows which are made from imperfect wood is rupture of the fibers on the back of the bow. Hence the ancient admonition not to cut through wood fibers on the back of a bow. That rule can be broken if you are going to glue a sinew backing onto a bow. Pope (5), schooled in the ways of traditional American and British bowyers was surprised to see Ishi virtually ignore that rule when making his short (42 in.) sinew backed juniper bows.

Anything which reduces the tensile stresses on the wood fibers on the back of a bow will work. The backing doesn't have to be glued on to reduce the tensile stress. The Inuit knew that a thousand years ago.



Increasing the effectiveness of cordage backing.

This was just one experiment. Other materials could be used instead of nylon. Dacron, hemp, silk and linen would all work. The amount of nylon and the tension I used was probably correct for this particular piece of wood since the bow is starting to show crisaling on the belly, evidence that the limbs can't stand any more compressive force. Since the effectiveness of a given cordage backing depends on its distance from the neutral plane it would be interesting to put little spacers on the back to keep the cord as far away as possible. The idea of spacing the cord as far away as possible was carried to the ultimate in a bow I saw during the mid 60's at some of the field archery tournaments in central California. It consisted of a rigid handle section very similar to what one saw on fiber glass recurved bows of the day, two limbs hinged to the handle extremities and a loop of gum rubber tubing connected between the two limbs. Drawing the bow stretched the gum rubber tubing. As I remember the bow shot fairly well. It was around for a couple of years and then disappeared. My guess is that the gum rubber would be rather fragile and need to be replaced frequently.

Materials

Lacking the desire to make enough sinew cord to do a cordage backed bow I searched for a material which behaved like sinew but was easier to obtain. It should have elastic modulus, density and tensile strength similar to sinew.

Measurements that I had made on sinew several years earlier showed that it had an elastic modulus of about 400,000 pounds per square inch and could be stretched about 5% before breaking. Hardy (4) claims an elastic modulus of 180,000 pounds per square inch and elongation of 4.1%. Nylon is clearly a good choice for imitation sinew in that its elastic modulus is about the same and it can be stretched even farther. As a side issue, one of the key features of sinew which makes it so superior as a glued

bow backing is the fact that when glued to the back of a bow in the wet state it is elongated and as it dries it shrinks, putting it under considerable tension.

Table 1: Material Properties

Material	density lb/in^3	elastic modulus lb/sq.in.	permissible strain
spring steel (4)	0.275	30,000,000	.75%
Gordon fiber-glass (7)	0.070 (est.)	6,000,000	2.8%
graphite (9)	0.069	52,307,692	.65%
sinew (8)	0.047	400,000	4.7%
yew (8)	0.023	1,100,000	1.16%
black locust (9)	0.025 (est.)	2,100,000	1.0%
osage (8)	0.031	2,280,000	1.0% (est.)
nylon (9)	0.041	690,000	16%
dacron (9)	0.050	1,115,000	10%
silk (9)	0.045	780,000	20%
hemp (9)	0.053	5,700,000	2%

Appendix

The following stuff is here because I like to I analyze and do engineering. I'd rather spend some time with my friendly computer figuring out what should happen instead of building a bow which is doomed to failure because I've ignored some basic fact. I have seen a lot of good bows that were made through trial and error but I want to let people know that there are sound mechanical principals which govern bow design.

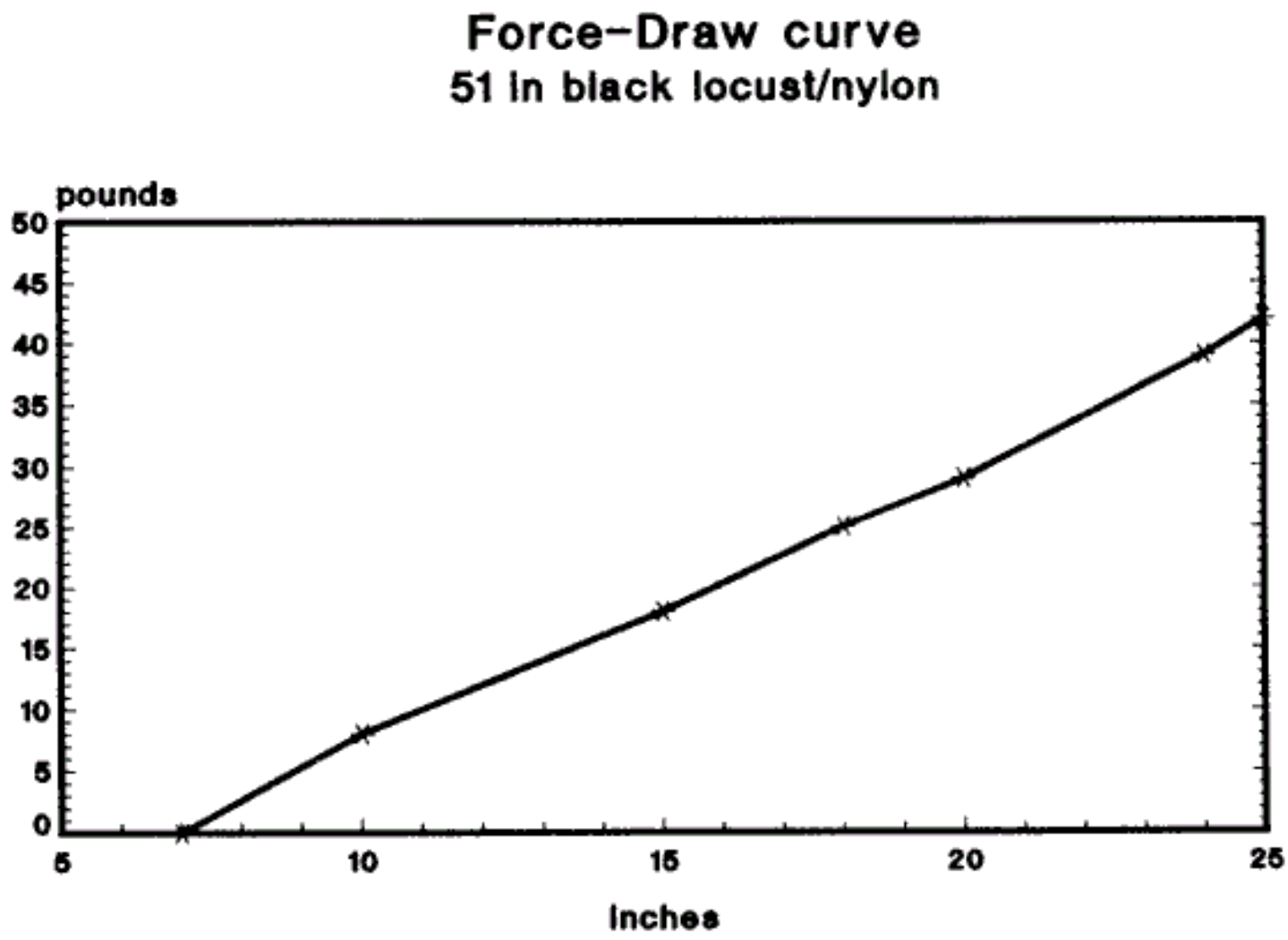
How much does the added cord increase the stiffness? The physical principals involved are all well known and can be found in just about any mechanical engineering handbook. The factors that matter are the stiffness of the bow limb, the normalized spring constant of the cord and the distance between the center of the cord and the neutral plane of the bow limb. Additional complicating factors are the tapering of the limbs and varying spacing between the cord and neutral plane. The purpose of the calculations is to make sure there are no surprises, everything is as suspected and nothing is being overstressed. Therefore we can just use average values. Now let's make some definitions.

The stiffness of the bow limb = cross-sectional moment of inertia. This is the quality of a limb which causes it to resist bending. In order to compute it one needs to know the dimensions and elastic modulus of the material. I use a somewhat backward approach. Namely, measure the draw weight of the bow, measure the width and thickness of the bow limbs so I know the relative stiffness of each of part of the bow limb and then feed that data into my computer which tells me exactly what the stiffness of each part of the limb has to be in order to achieve the measured full draw weight. (The computer is lgor's friend.) The reason for doing it that way is accuracy. It is easy to measure full draw weight and it is easy to compute relative stiffness of each segment of the limb by measuring thickness, width and shape. It's much harder to measure the elastic modulus of the wood.

The spring constant of the cord is easy to measure. Simply tie a loop in each end of a piece of the cord, secure one end, hang a weight on it and see how much it stretches. The normalized spring constant is: applied force * length of cord/change in length. For the nylon cord which I used, k' = normalized spring constant = 4.4 pounds *63 in./.5 in = 554 pounds/in./in. for a bundle of 12 strands, k' = 12 * 554 = 6648 pounds/in./in.

According to the computer the stiffness of the midlimb section of a bow with a draw weight of 24 lb at 20 inches, without a rigid handle section is 8,000 pound inch^2. The added stiffness due to the cord which is spaced.36 inch from the neutral plane is 6648 pounds * (.36+.1)^2 = 1407.
The predicted fractional increase in draw weight is 1407/8000 = 17.6%.
The measured increase in draw weight at 20 inches is (29-24) lb/24 lb = 20.83%
That's fairly close agreement. We still have not yet included the reflexing done by the cordage backing.

How does the tension affect the shape of the bow limb?



The above computation neglects the effects of tension in the cord. Tension in the cord will add a reflex to the bow limbs. The amount of reflex produced by the tension depends on the tension in the cord * its distance from the neutral plane divided by the stiffness of the limb. The tension is constant but the stiffness and distance vary. After tightening the cord the tips curve up 0.37 inches. A shot in the dark (just trust the calculus) is to assume constant stiffness equal to that in the handle section:

y'' = the amount of curvature in the bow limbs caused by the cord tension.

y'' = tension*distance from neutral plane/ stiffness.

tension = y''*stiffness/distance from neutral plane.

dy = tip reflex = 1/2*y''*(limb length)^2

y'' = 2*tip reflex/(limb length)^2

y'' = 2*.37/(25.5)^2 = 0.00114 per inch

Solving for the tension:

tension=.00114*14,500/(.36+.1) = 40 pounds

In other words cinching up on the cord to a tension of 40 pounds makes the ends curl up by about .37 inch. You can say that a tensioned cord backing increases the stiffness of the bow and it also changes its shape by adding more reflex. Both of those features increase the draw weight and stored energy of the bow. The only way I can think of to calculate the total improvement is with the computer, the subject of a subsequent article. My guess is that .37 inch of reflex on the tips doesn't make much increase in the draw weight and most of the increase is due to the increased stiffness.

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Making an Asiatic Composite Bow

by Markus Klek

What is an Asiatic composite bow?
It is the most sophisticated and technologically advanced type of bow, being made entirely of natural materials like wood, horn, sinew, and hide or fish glues. These type of bows have been developed in multiple styles all over Asia and were in use until slowly replaced by firearms. Several of these bows are still being made by professionals today.

This is the first bow of this type I have made and it was more of a learning process than anything else. I was able to make a bow that shoots and did not break, but it was a far cry from a masterpiece.

After having made a number of selfbows and sinew backed recurves, this king of bows was always in the back of my mind. Over the years, I collected materials and read articles and books on the subject and it seemed harder and harder to actually make one. Then suddenly, while my lovely wife was on a trip to India, the time was right.

I did not replicate a certain bow or any specific style of bow, but opted to make a bow that would be on the safe side, that would not break or warp and be reliable to use.

This article will be on the work process only and not on composite bows in general.

Getting started:

The Horn Strips

The length and width of the bow were pretty much determined by the pieces of horn I could cut from the gemsbok horns (Africa) that I had ordered.
The horn was split down the center into two halves with a hacksaw, while being held in a vise. The solid tips and the somewhat thin and frizzy ends were cut off, so that I ended up with two pieces, 19 inches long. Then the rippled outside was worked smooth with a coarse file and the inside was shaved down with a homemade tool held at a 90 degree angle, in order to achieve an even thickness of ca. 3/16 inch.

Finish strip, unworked horn and horn shavings

This was many hours of work already, but now the fun starts.
Bending those pieces into nice flat strips that actually end up looking like store bought pieces of fiberglass. What an amazing transformation!!!
By boiling the horn and clamping it down flat, it will stay in that shape once cooled. I used a big square aluminum foil dish and put it over two flames on our kitchen gas stove. In my case, the horn is being clamped between two solid flat surfaces like a block of wood and a metal strip.
If you put your C-clamps right on the horn, you will get some deep dents. Now place the whole assembly under boiling water with only the C-clamps sticking out so you can gradually tighten them while the horn softens. I boiled the hell out of the horn and it was not damaged! Refill your pan with hot water when necessary . It took a while of fiddling with those clamps while steam was fogging up my glasses. I burned my fingers on the hot pan and almost got boiling water on my feet. Imagine the workshops back then, where they were working on batches of 500 bows at a time.
Once I got those pieces 90% flat, I took a knife or file and filed them into nice rectangular strips. I then shaved the horn strips to their final thickness of 2/16 inches. The final dimensions were: 19 inches long, 2/16 inches thick, and tapering from 1 inch to 1 5/8 inches wide
Hey, look at those two neat strips!!!.

The Wood Core

I used rock maple for the core. Moreover, as with a piece of wood for bow making, the grain should run straight. I did cut it with a table saw into a rectangular strip of 2/16-inch thickness. That's it!!

The Handle

The handle will be glued to the back of the bow and not to the belly as with self-bows.
Some bows have an extreme reset in the handle, but I settled on ca. 20 degrees because more reset would stress the limb-handle connection more and make the bow unstable.
The question of how thick, how wide and how long of a handle to make takes some playing with those variables. I tend to make them fairly chunky because weight in the handle does not slow down the arrow. I feel it adds weight to the bow where it is permissible and so adds stability (any comments?).
I make bows symmetrical, meaning no long and no short limb and I shoot from the center just holding the bow lower in the handle. Why? I don't know. The handle ended up to be ca. 6 1/2 inches long, 1 1/8 inches wide and 1 1/2 inches deep. I steamed the wooden core and clamped it to the handle. After it cooled and dried, I glued the pieces together with epoxy.

Gluing Horn to Core

Epoxy sounded like one more safety feature. I did not have the nerve to play with fish glue!
I made the horn reach ca. 1 inch into the handle and filled the space between the two horn strips with a piece of sheet brass. Again to add weight to the bow. I used metal straps as support for an even gluing and 8 clamps on each limb. After that, cut the excess wood to match the horn. At this point, I used rawhide to bind the handle-core-horn connection, as this area will undergo a lot of stress.

The Ears

Spruce is recommended for its lightness and stiffness, so I opted for 6 inches long ears coming of at an angle of 45 degrees. I made them out of two parts, to leave the limbs as long as possible and to get an extra glue line. Next time, I will use a less complicated way of making them. However, at this point I did not want any part to break off or separate when I string that bow up.
The grain ran nice and parallel with the ears and they ended up being just under 1 inch thick and tapering from 1 inch to 1/2 inch at the tips. I also bound that ear limb connection with rawhide strips.


Spruce ears being clamped on. Finished ears after shaping.

Sinewing

I used roughly 8 deer backstraps and 7 leg tendons. I sinewed the bow the same way I would sinew any other bow. Two layers were put down. Then I waited 7 days and put on another two layers. My hide glue was rabbit skin glue from the art store. Before putting down the sinew, I pulled the bow into more of a reflex and secured it with a string between the tips. In addition, I bound the handle and ear areas some more to hold down the sinew. I took a 4 week break while everything was drying!

After removing the string between the tips, the bow measured 18 inches of reflex between handle and ears. On one side of the handle, an air bubble had developed between sinew and wood core. The sinew probably pulled up while shrinking, even with it being bound down. After some debating of what to do, I did not touch it at all and oddly enough, the bubble seemed to have disappeared.

The misalignment of the limbs that occurred and seemed to come out of the handle area might have something to do with that flaw, but unfortunately, I did not mark if it was left or right of the handle. So my advice is, always mark the areas where some irregularities appear, so that you might learn something if that area later ends up being a weak spot.

Shredded sinew and the bow ready to be sinewed.

The Covering

I did not sand the sinew smooth but covered both limbs with thin homemade goat rawhide that I had dyed brown with black walnut husks. I slightly soaked the hide and then just laid it on, overlapping onto the horn. No binding was necessary. The handle area is covered with a dehaired road kill squirrel skin (finally, I found some use for that tiny hide).

The Bridges

They were made of two oval pieces of thick leather each. I soaked the parts in hide glue and then clamped them together to dry. This makes a nice hard fileable leather. I concaved one side to receive the string and the other side was ground to fit the knee of the ears. Elmers glue held them in place. They are 1 1/8 by 1 13/16 and 1/2 inch thick more than I needed actually.

The Nocks

For the string nocks, I cut a square section out of the ears, a little less than half way through and glued in a piece of horn with a groove just deep and wide enough to hold the string. This is another area that receives a lot of stress. Cutting the nocks any deeper was somewhat scary.

The whole bow got three coatings of homemade varnish, made from finely ground pine pitch dissolved in alcohol. It looked great and had a wilderness smell.

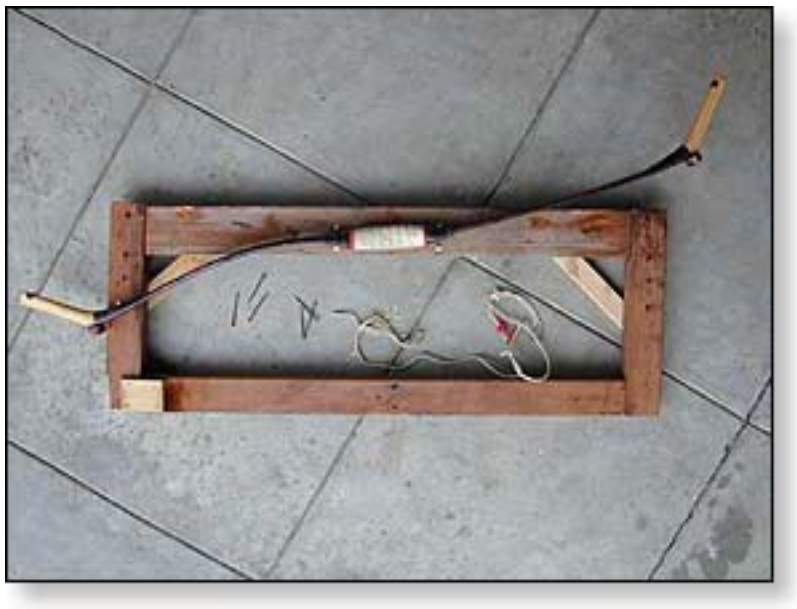
And now, I'm finally done!!!

Nevertheless, the worst part is stringing that thing. I had tremendous respect for the weapon I created after I had read how powerful these tools can be and what a procedure it was to string

them.

Stringing the Bow

So far, I have not spent much time on the bowstring. I replicated a Korean bowstring made out of separate pieces for the loops, tied onto the main string. But the knots for tying seem to stretch out, so I will have to wait for some advice from the pros.
I nailed together a crude stringing jig, put the bow on it, got all breakable things out of the way, locked the dog up, put on full body armor, and strung the thing up. I gradually pulled it over a couple of days. Everything was fine, no cracking, no nothing.
BUT! The limbs are not perfectly aligned and the bow only draws about 40 pounds at 32 inches. (I have no problems with finger pinch with the bow being 55 inches measured along the belly) Therefore, it seems to be a fairly slow shooter. In addition, the reflex came down from 18 to 10 inches after a while. How those guys get the tips to touch is still a mystery to me.



The bow in the stringing jig, with one limb bent.

Heat Treating

To align a composite bow, it needs to be heated and clamped into the desired shape. Taking horn off the belly is the last thing you want to do. So, what I tried was a localized heat box. Meaning, I put a piece of wood and C-clamp in place (limb seemed to come off at a wrong angle from the handle) and encased the whole area with cardboard and tape. I left an opening for a hair dryer.

Also, the top of the C-clamp was sticking out. While the heat inside build up, I gradually tightened the clamp. After a cooling down period overnight, I restrung the bow and it looked pretty good. However, after a day of shooting, the problem came back. I need help from the pros!!!

All in all, this bow is a beautiful piece of work and I marvel at the combination of materials, each doing its share and fitting into the whole. Nature at its finest, once more showing me again that everything is connected and all things work together as one.

With this, I will leave it.

My thanks to the three volumes of the Bowyer's Bible and Tim Baker for his telephone counseling. Check out these web sites for more infomation on composite bows:
- www.student.utwente.nl/~sagi/artikel/
- www.atarn.org

Contact "Markus Klek" at his home phone in Germany: 011-49 7657933259

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Making a Bow From a Sapling

by Jon Jeffer

I had a letter in connection with my fletching article, from a young man in the United Kingdom who was struggling with his first bowyering project. A bow from a sapling. My reply more or less reconstituted a bow building project that I undertook back when I first became interested in primitive technology. An archeologist, primitive technologist and bowyer, from Germany, Thomas Rudhardt, walked me through my first successful primitive bow making project via a mail list serve, The Primitive Skills Group. Since this is a project that a lot of people are interested in periodically, I have pulled my thoughts together on this. A bow from a sapling can be as potent a weapon as you could hope for and will take big game, and can be made successfully with a minimum of tools.

The Staff

For your sapling bow projects: Try to find a straight sapling of some hardwood about 2" thick where the handle will be. If you can find or borrow a saw, that will help you cut the bow staves and will work out better than chopping and breaking them off at the base.

Most hardwoods are good bow woods. If you avoid conifers, poplars and willows you should be in good shape. The Maples, the Oaks, Beech, Black Locust (Robina Pseudoscacia) or Honey Locust all work, and many other. Out on the West Coast of the United States, people have reported good luck with Juniper and Bay Laurel. The premium bow woods Osage Orange and Yew require special preparation and I am not considering them here.

Cut the staff, let it be as long as you are tall (at least nose height), free of knots and with no spiral twist up the trunk. Split it in half lengthwise. From the end it should look like a "D". The bark side will be the back of the bow. Strip the bark off, but

otherwise don't touch it and don't cut into the outer growth ring.

You may be thinking that you could actually get two staves out of this sapling. You can in theory. In practice, I have found it difficult to achieve this by splitting the staff. You might have better luck with a saw. Usually I end up with one staff and some kindling.

Rough Tillering and Seasoning

After splitting, reduce the staff on the belly side (flat side - former inside of the tree) so that the staff is a bit over an inch thick. Do that quickly with a big kitchen knife. You can do this right after cutting the sapling. If in doubt leave it a bit thicker. Reducing the thickness and strength of the staff is the process known as Tillering. This rough tillering will allow the staff to dry or season fairly quickly.

Seal the ends by spreading some glue on or rubber banding some plastic wrap over the ends. The reason this is done is to prevent cracks or checks developing in the ends of the staff as it dries.

Bring it inside and tie the ends to a pipe, your bed frame, a beam, 2 x 4, or something similar. Tie it belly side facing outwards. Take a couple of chunks of wood and slide them between the bow staff and the thing it's tied to, and slide them out toward the ends. This will reflex the tips of your limbs a bit. Tie the middle of the bow to the pipe, post, or bed frame. Let it sit like that for at least two weeks. Longer is better, but a month should be fine.

After a couple of weeks or so you will have a more or less seasoned piece of wood. Green wood, wood with a high moisture content, will "take a set" or "follow the string" with use. This means that the bow will take a permanent bend in the direction it is pulled. This indicates weakened fibers and also will lower the early draw weight of the bow and rob it of cast. Bows that are stressed while the wood is green tend to to last very long.

Laying Out the Bow

Next step is laying out. Use a straight edge ruler and a pencil. With the pencil and straight edge lay out the outline of the bow as it would be seen looking at the back or

belly. Make the limbs the same more or less. Keep them wide to within about 8 inches of the ends. Then taper them in to a width of about a half inch. The handle should be about 4" long and between 1" and 1 1/2" wide, depending on your hand (and figure on about 2 inches of fades where the handle transitions into the limbs). Draw all this onto the belly of the bow. A straight edge will help.

Shaping the Profile

This is where you will shape the bow down to the outline that you just drew. Try to get hold of the largest, most aggressive rasp you can find, get a large sharp kitchen knife (if it's dull, you can sharpen it on the bottom of a ceramic coffee mug), and get a few sheets of the coarsest sandpaper you can find. Cut and rasp the bow shape to the lines you have laid out. Rasp out the handle shape. Look at the shape with your eye and try to make the lines elegant and the two limbs of the bow as close to each other in profile as you can. Be careful in reducing the width of the handle section. This should remain more or less rigid, or at most take a very slight flexing. If in doubt leave it beefy until later on in the shaping process.

Tillering

Tillering refers to the process of making the staff into a bow. To do this, start at the area of the fades (adjacent to the handle), and start to incrementally remove wood from the belly of the limbs. I like a rasp for this, but for my first primitive bows, I used a kitchen knife and couple of pocket knives. The rasp works better in my opinion. Other people like other tools. Tying or clamping the staff to something helps. A vice is ideal.

To use the rasp: rasp back and forth across the limb starting at the handle fades and moving out to the end of the limb.

To use the knife: hold the knife at right angles to the staff, start at the fades, and use it to scrape/plane long thing shavings off.

You can eventually also work back from the tips to the handle. Just make sure that with rasp or knife, you keep the number of passes about the same until you can judge whether the limbs are not bending evenly.

Every few passes, take the bow staff out of the vice and put one end on the ground, grab the other end in one hand and the handle in the other and test it for flexibility. Take your pencil and mark the parts of the limb that are not flexing, and work on those. When it starts to bend, put an extra long string on it so that you can begin to pull it a bit. Don't pull it too far yet and never pull it to more than its finished draw weight should be.

Basically this is the process of Tillering. You pull a bit, look where it is not bending, and remove a little wood where it is not bending. Eventually you can string it and put on a right sized bowstring and begin to pull it incrementally a few inches more each time. The idea is that you remove wood where the limbs are not bending enough. What you want is to have the whole of the bows limbs bending evenly with no weak spots and no stiff spots, and to have both limbs bending more or less the same.

When it is all bending evenly, you take another pass at both whole limbs. Then pull it a bit and look again.

The key part to this process is being very patient. As you get towards the end, put the rasp and knife down and use the sandpaper to tiller. Bows have been known to break during Tillering. So go slow and be patient. Another thing to keep in mind is where the bow limb will go if it does break. All the energy it takes to pull the bow has got to go somewhere. Eye protection is not a bad idea either.

What you are looking for is to have the whole limb bending, except the handle and the last 6" out to the tips. The rest of the bow should inscribe a parabolic curve - like that of a satellite dish antenna.

Finish Tillering when you are a few inches short of the finished draw length.

Breaking in the Bow

Leave the bow strung overnight to break in the limbs. Then the next day, gently pull it out to its finished draw length. Pull it short 50 times. Check the tiller and adjust with sandpaper. Then pull it out to its finished draw length 50 times. Again adjust the tiller with the sandpaper.

At this point you should be able to take it out and shoot it. After you have shot a couple of hundred arrows through it, you may need to adjust the tiller. You will want to sand it (not too much because that will reduce the draw weight) and put

some kind of finish on it to keep it from absorbing moisture. On my first primitive bows I used fat. Now I tend to use Boiled Linseed Oil or Tung Oil. Most wood finishes that will inhibit moisture penetration are fine.

Adjusting Draw Weight Up

If after shooting and sanding, the bow has lost more draw weight than you would like, you can "spike it" at this point, shortening the limbs by an inch or so - probably no more than 2 inches. Figure roughly 5 pounds of draw weight increase per inch removed from both limbs.

Depending on the wood, you should be able to make a pretty serious hunting weight bow. Store your bow unstrung in a dry but not overly hot place. This way that should last for a good while.

E-mail your comments to "Jon Jeffer" at mudvillejon@yahoo.com

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Fletching By Hand

by Jon Jeffer

I started to make my own arrows just about the time I finished my first primitive bows. This may conjure up an image of a guy with a new bow, looking at it and scratching his head. That was about how that happened. I had the weapon, but I was missing the ammo! It probably happened just like that back in the Stone Age!

Anyway, I knew something about the way that modern arrows are fletched. A jig is used that holds the arrow shaft and the feather, and then with glue applied to both, the jig will hold them together at the right angle until the glue dries.

This system works great, but it has a few disadvantages. First off, I did not have the jig and I didn't want to buy one. My thought process did not get much further than that, but its worth noting that it is not a process that lends itself to fletching in the field, or under primitive conditions.

So I set out to figure out how to fletch arrows by hand.

There are a lot of traditional fletching styles that were done by hand. Some are clearly easier or harder to accomplish. One option for primitive hand fletching is to just do a really lousy job. That was in fact my first approach. My first primitive bow was light, in the 25 pound range, and the arrows were made out of Phragamite reed shafts, with wooden foreshafts sharpened to points. I used goose feathers left at full height, and wrapped three of them on with cotton thread soaked in glue. The first ones were anything but symmetrical, and the process always seemed like I had one hand too few. And some of those fletch jobs were way over on the ugly side of hideous, but they all more or less flew.

My bows went up in weight and quality, and my aspirations as a fletcher was towards more durable, more accurate arrows, and a way to make them that would let me gin up a mess of arrows within some reasonable amount of time. I tried a number of approaches and variations, but finally arrived at a method that worked. As it turns out, it is more or less the method described by John McPherson in his book, "Naked into the Wilderness".

Shafts: I started with straight shafting material. My shafts were 5/8" hardwood dowels from Home Depot. This is not exactly Abo, but it sure saves time working down shoots to homogenous gauge, and straightening them with fire. When you get lumberyard dowels to use as arrow shaft material, it pays to pick through the pile. First, pick shafts as straight as
you can get them. One way to do this is to hold them up and sight down the length of the shaft and rotate it. You'll see how straight the shaft is. You will be cutting them shorter so its okay if the ends take some bend. In fact, you will almost never find perfectly straight shaft material. But some of it is really bendy, and you want to avoid that. If you do a good job getting pieces that are more or less straight, you can usually get away with not doing any subsequent straightening.

The other thing to look at is the grain. Ideally, the grain should run the length of the shaft. If the grain runs off at an sharp angle the arrow will often break at that point if it hits something hard.

To prepare the shafts, I cut them to the proper draw length. If in doubt make the arrows a few inches longer than you think you will need them, and then put one of the finished arrows on the bow and pull it. Have someone else mark the shaft with a pencil while you hold the bow at full draw. Once you know your draw length its easy to cut shafts to that length. Remember that if you are mounting broad heads you'll want the shafts a bit longer

I cut the nock (that's the slot in the back of the arrow that fits onto the bow string) using three (or four) hacksaw blades taped together so that the teeth of the blades face in opposite directions. It is a good idea to clamp the shaft into something while you cut the nock. A vice or some such arrangement is perfect. If you don't have a vice, you can improvise with a C-clamp and a post, or a railing. You can cut a V notch in a small piece of wood that the shaft will fit into, and sandwich the shaft between the block and post and tighten it up with the clamp. The primitive version is to wrap cord around this arrangement and then tighten it up by inserting a stick and twisting the whole thing tight. When you saw the nock, cut across the grain that you will see on the end of the shaft. This will keep your string from splitting the shaft. Go slowly and try to keep the cut as vertical as possible. The tendency is to creep left of right. Just be careful and go slowly. I cut the nocks as deep as the hacksaw blade is wide. This serves as a convenient guide.

Finally, I sand and seal the shafts. I use a home made varnish made of pine pitch dissolved in denatured alcohol. You can use this or commercial varnish, linseed oil, Tung Oil, or you can go totally Abo and just rub in fat and heat the shaft until it absorbs it. The sealing keeps the wood from absorbing moisture and warping.

At this point the shaft is ready for feathers.

Feathers: In the pictures shown, I used Wild Turkey feathers. I found these on the ground in woods near where my mother lives. Those woods are just full of Wild Turkeys and they drop feathers all over the place. If you are not so lucky, you can often find Canada Goose feathers down near parks that have ponds, or at lakes. These feathers are pretty ideal because they are large and fairly stiff and they are also legal to possess in the state I live in. You can also buy prepared fletches from archery suppliers. These are cut (as far as I know) from feathers from Domestic Geese or Turkeys. You can also order Goose and Turkey feathers from some suppliers. More about that later.

If you have natural feathers, the first thing you need to do is split them in half along the quill. The quill is the stiff bit up the middle of the feather. First cut off the thick bottom of the quill where it was stuck in the bird. I do this with scissors or a sharp kitchen knife on a cutting board. Then I use the knife and cutting board to split the quill in half lengthwise. The material inside the quill is a lot like Styrofoam. Once you have the feather split in half, you want to reduce the quill a bit. I trim it with scissors or a knife, and work the bottom down flat and smooth with course sandpaper, a file, or by rubbing it on something abrasive. Getting this very thin is not that important, except for the very front end. At this point you will cut fetches from the feather. I can usually get two fletches out of one large feather half, sometimes three. Make sure they are long enough and allow for the space front and back where they will be bound onto the shaft.

Note that flight feathers only have one half, and tail feathers have two. Each half feather has a natural cup to it that will impart spin to the arrow either clockwise or counter clockwise. Sort the fletches that you are making into sets of threes all with the same spin to them. Don't mix clockwise and counter clockwise feathers on the same arrow shaft.

Sinew: Is my first choice for binding on fletches. Sinew is the material that makes up the connective tissue -- the tendons -- of animals. Your tendons are made out of sinew too. One thing I like about sinew is that it is strong. Hey, its been holding your feet on all these years, right? The other two things I like about sinew are that it is more or less self adhering when its wet (add water, makes its own sauces!), and as it dries it shrinks. Both characteristics are great when you are tying on fletches and only have two hands. It is also really traditional, and you can feel like a real caveman (or cavewoman) using it.

You can get sinew, from large dead critters, at some Asian markets in the form of beef tendon (in which case you need to clean the fat and tissue off it and dry it), or you can order it dry from some businesses that actually specialize in selling dead animal parts (more about that later). Any sinew will do. When I lived in California, I used Emu leg sinew.

To prepare it for use, I pound it with a rock while its dry, and soak it in water over night and peel off the threads. You can use it right then or dry the threads and use it later. Dry, it'll last forever

unless something eats it. Wet it attracts ants and dogs and will start to smell rank in a few days , at which point it will attract even more enthusiastic dogs.

If you can't stand the thought of sinew, you can use cotton thread and dip it in hide glue (or Knox Gelatin mixed about 4 times too thick) as you bind on the fletches.

Tying on fletches with sinew: I soak my sinew threads in water from anything from a few hours to a few days. This makes them soft and pliable. More than a few days and they start to smell. You can still use them. The bacteria making them stink might be a concern. This is animal parts, so take normal precautions and wash your hands after handling it.

Take a shaft, a fletch, and a sinew thread. Put the fletch against the shaft to see where it should be positioned. Remember to leave space for your fingers above the nock. Remember that you will be trimming all the fletches in the set of three to be the same length as the shortest fletch in the set. So its good to start with the shortest fletch. Use the fletch to figure out where the front end of the fletches will be, and at that point wrap the sinew once around the shaft. If you mash the end of the sinew thread a bit it will tend to stay on the shaft and make your life easier. If it does not want to stay put you may not have soaked it long enough, or have mashed the end enough.

Anyway, wrap the sinew around the shaft once. Then lay the front end of the first fletch so that it is 90 degrees to the nock, with its front end laying on the sinew on the bow shaft. Wrap the sinew once or twice over the front bit of the fletch and around the shaft. Add the next fletch at about a third of the way around the shaft and repeat. Then place the last fletch 120 degrees from the two fletches that are already tied on. Wrap the remainder of the sinew thread around the shaft totally covering the front edges of the fletching. You can wet your fingers and smooth it down, and it should all stick to itself. This will come out better if you have really thinned down and tapered this front end of the quill. Add another sinew if you have not covered the fronts of the quill completely. This covering will keep you from getting feather cuts along the top of your hand later on when

shooting.

Look down the arrow from the butt end. You can make sure that the fletches are lined up at 120 degree intervals from each other and that the cock feather is 90 degrees to the nock. If they are not in the right position, with gentle pressure you can still move them. This is the beauty of doing it this way.

I will usually tie the fronts of a full set of arrows, let the sinew dry, and then go and tie the back ends. Again I will start with the shortest fletch. Some people trim the feathers at the back end to leave bare quill to wrap the sinew onto. I just fold the feather fuzz down and wrap it down under the sinew. Both methods were used by various Native Americans and probably elsewhere too. The process is more or less the same as at the front end of the fletch. You wrap the fletches down one at a time. Again you can adjust them for position and get them laid out right. I find that I have enough natural sense of proportion to get this done without resorting to any kind of measuring device and I think most people are just as capable, so my rule of thumb is to eyeball it until it looks right.

As the back ties dry, check them periodically and gently pull the tail ends of the fletches so that they lay as flat as possible against the shaft. When they dry, you can trim off the ends of the fletches that stick out from under the sinew in the back and you can wrap the shaft above the nocks with sinew to reinforce them.

The sinews dry hard. I seal them by painting my pine pitch and alcohol varnish mixture onto them. This makes them translucent and I think, pretty nice to look at. The traditional primitive sealer would be conifer pitch mixed with charcoal, moose dung, or some other combination of goodies. The basic idea is to keep the sinew from sucking up moisture and getting damp and coming undone.

Now if you want you can take them out, stick on the point of your choice, and shoot them.

Gluing down the fletches: If I was making arrows under primitive conditions for immediate use I might skip this step, but given my status as only part-time Neanderthal I usually do it, and so do most of the folks I have run into or corresponded with.

I paint Weldwood contact cement onto the base of the fletch, and onto the shaft just under the fletch with a small paint brush (cleans up with mineral spirits). I do this for all the fletches on all the arrows. Then I go back and just press the fletch down against the shaft and I am done. The operation is more or less the same with hide glue just a lot slower and a lot less convenient. You can put the hide glue in, wait for it to get tacky and then tie the middle of the fletches down with a thread.

Trimming the fletches: I trim the fletches to uniform shape with a sharp pair of large scissors. These can also be burned to shape with a coal from a fire, a cigarette, or a wood burner. Scissors are fast and easy and again I measure by eyeball and it seems good enough.

Remember that like with all things cut or trimmed, its easier to shorten the feathers than to lengthen them again. Higher fletches impart greater stability. Shorter ones offer less air resistance and are faster. Since an arrow shot from a primitive bow has to bend around the bow itself to fly

straight (the Archers Paradox), more stability is usually required than with modern center shot bows.

Spine and accuracy: Spine refers to the stiffness of the arrow shaft. In theory, this should be matched to the weight of the bow as it facilitates straight flight and accuracy. There are devices called spine testers. I don't have one. One way to test is to flex the arrow shafts by hand and make bundles of them that feel about the same as an arrow that you know to be accurate. I have happily forged along up until now ignoring spine. I try to make my arrows in bunches of ten and as close to each other as I can manage. What I notice is that most of my arrows are okay, and every once in awhile I have one or two that fishtail all over the place. I cull these from my first string arrows and set them aside for doing stupid things with.

Getting the stuff you need: Our ancestors just went out and took what they needed from Mother Nature or pulled it off a passing Mammoth. Gathering raw materials nowadays takes creativity as well. Here are some ideas to get you started

Nature: Pine pitch from the knots of pine trees, hardwood suckers, reeds, or bamboo shafting material, sinew, charcoal, feathers.

Hardware Store: Dowels, bamboo garden stakes, Weldwood contact cement, denatured alcohol, mineral spirits, various wood oils, varnishes, hacksaw blades, C-clamps, files, sandpaper, hide glue.

Supermarket: Scissors, Knox Gelatin (instead of hide glue), Twinkies and Beer (to keep the fires burning)

Other places to order stuff that you need from nature, but can't gather (feathers, sinew, etc.):

Moscow Hide and Fur - www.hideandfur.com

Three Rivers Archery - www.3rivers.com

E-mail your comments to "Jon Jeffer" at mudvillejon@yahoo.com

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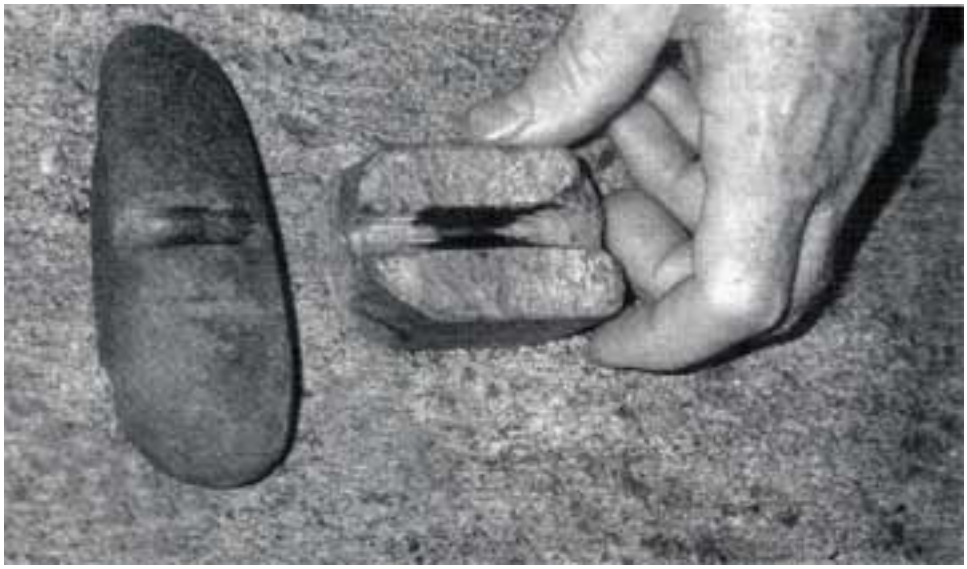
Arrow Straightening

by Dick Baugh

The use of heat for manipulating the shape of wood is a fundamental Stone Age woodworking technique. Heat is and was used initially to straighten spear and arrow shafts and also for periodic maintenance of straightness.

Typically, the shaft material is gathered in the green state, straightened with heat while still green and then tied into a bundle to dry. Some shaft materials will check if they are dried too quickly. To prevent this put wax or pitch on the ends and don't peel the bark until the shafts are dry. Patience! The contemporary primitive technologist can speed up the drying process by placing the bundle of shafts in the interior of a car in summer time.

One can apply heat to the shaft in several ways. For taking out long curves you can apply the heat of a small fire. For removing kinks you need a heat source which is concentrated in a small region of the shaft. The best way to do that is to use a piece of soapstone (steatite) with a semicircular groove. Heat the soapstone until it will fry spit (same criterion used by grandma for the pancake griddle). Use a pair of tongs to remove the straightener from the fire and place it on a slightly raised platform.



Two arrow straighteners

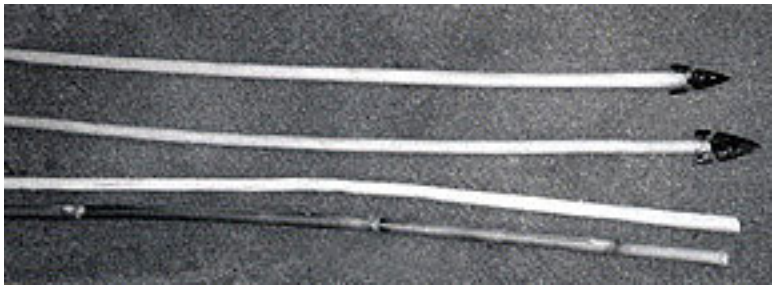
The smaller one was recently made from soapstone. The larger is an authentic artifact, provenance unknown. It would be excellent for removing sharp kinks.

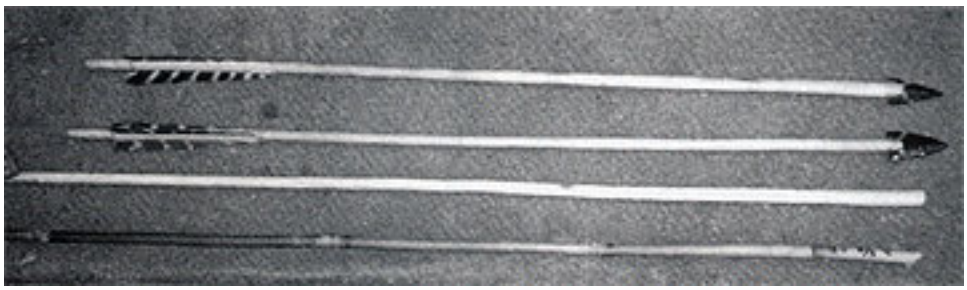
Place the part of the shaft to be straightened in the groove and rotate it. Rotating the shaft accomplishes two tasks. It applies the heat to the entire circumference of the region being straightened and it gives you a "feel" for where the high spot is. When the wood is hot then push down on both sides of the shaft to remove the bend. If you have never done this before then practice with something you don't care about. It's done by feel. This technique is especially valuable for bamboo, river cane, and phragmites which tend to collapse or buckle when bent with too much vigor. Another thing to do with shaft material which tend to buckle is to apply tension. Pulling on the ends of the shaft will reduce the tendency to buckle.

The process of straightening a shaft with a heated arrow straightener.

How hot is too hot? Ishi, a Native Californian and consummate craftsman who lived during the late nineteenth and early twentieth centuries, was disgusted with himself if he scorched an arrow shaft while straightening it. The wood should be heated hot enough to be uncomfortable to the touch but not hot enough to discolor.

Straightening the middle of a shaft is relatively easy because you have a "handle" on both sides but what about the ends of a shaft? Push down on the short end of the shaft with a small stick.





Arrow shafts before and after straightening.

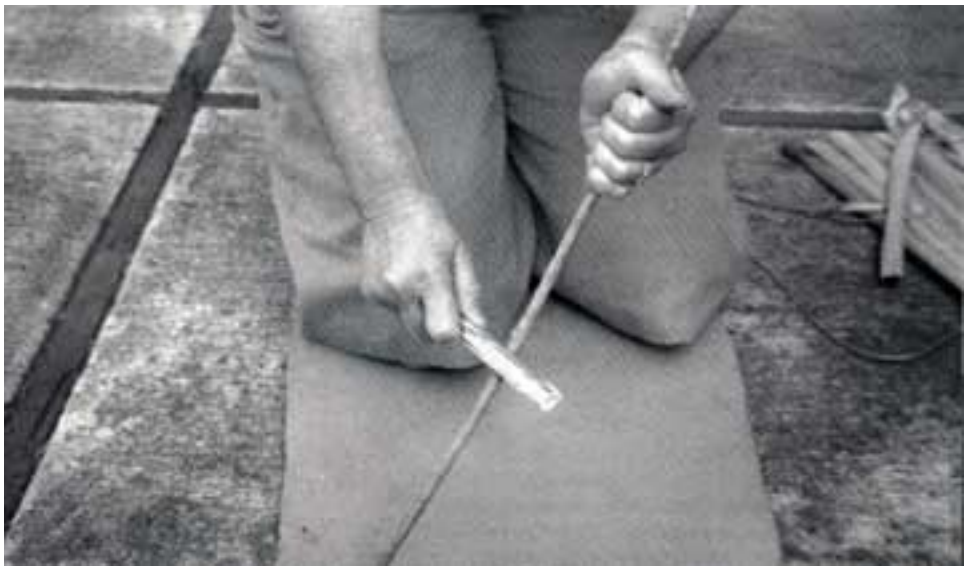
Soapstone is a superior material for arrow straighteners because it possesses three important properties. It doesn't crack or explode when heated, it is easily shaped and it is very soft and smooth so it won't scratch the wooden shaft being straightened. If you don't have soapstone then try the local materials. The first test you should do, even before you cut a groove in the stone, is to see if the stone retains its structural integrity while being heated.

Soapstone arrow straightener

I also use heat to straighten a lot of spindles for starting hand drill fires. The materials I use, in

order of preference are mare's tail (Conyza canadensis), mule fat (Baccharus virrinea) and elderberry (Sambuca spp). Several skeptics have asked me, "If you use heat from a fire to straighten the spindle you use to start a hand-drill fire, isn't that cheating?"

Yes, it is cheating but there is a way around it. One can heat straighten hand-drill spindles by using the heat of friction. Lay the crooked spindle on a log or flat surface with the convex side up. Then take a piece of dry, low density wood (like a hearthboard) and rub vigorously back and forth on the part which needs straightening.



Straightening a hand-drill spindle using friction heat.

Another tool which is useful in heat straightening is the so called "arrow wrench". The arrow wrench is a 1ever about 10 inches (25 cm) long with a hole in one end. The wrench allows you to apply leverage to a small portion of the shaft. It can be made of wood or antler. The sides of the hole should be rounded in order to prevent denting the side of the shaft being straightened.

Antler arrow straightener

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E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Making an Atlatl From a Branch

by Dino Labiste

The atlatl was used for thousands of years almost worldwide. It had the advantage of lengthening the throwing arm of the hunter, thus more leverage to increase the speed of the dart. Despite the worldwide variations in the design of the atlatl, the basic components are still the same. They all incorporate a handle connected to a shaft with a spur.

A simple atlatl can be made from a tree branch. Look for a straight branch with a smaller side branch extending out at an angle. An ideal angle for the smaller side branch would be 40 to 45 degrees from the main branch. Less than 40 degrees would work, but the smaller branch should not be parallel and lay flat to the main branch. The diameter of the smaller branch, which will become the spur, should fit the size of the notch hole on your dart. Also, be sure that the main branch is large and comfortable enough to fit in your hand. Too small of a size will be unstable during the throwing of the dart. The length of your simple atlatl is subjective, although I would not go smaller than 11 inches. Various type of woods may be used for your atlatl. Try not to get a branch that is too soft and too flexible.

This branch from the Toyon tree (also called Christmas Berry) has the potential for becoming an atlatl.

A completed atlatl made from an oak branch. The handle may be wrapped to provide a better grip. The handle of the oak atlatl was wrapped with split pine root. You may also use buckskin or willow bark for the handle wrapping. Experiment with different materials.
Another alternative for the handle, besides wrapping, would be to shave or cut the top side of the

handle flat. Leave the bottom side in its natural rounded shape. The flat surface will provide a better gripping surface than a rounded surface.

The dart ready to be launched using the oak atlatl.

When looking for that atlatl branch, be mindful of the environment and the tree in which you will be harvesting the branch. Will the tree survive the cutting? Is that branch providing shelter for other plants growing nearby. Am I gathering on private property? In the excitement of looking for that perfect branch, don't let our own desires overpower our common sense.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Jiffy Fletching Using Duct Tape

by Dick Baugh

A jiffy fletch for arrows and atlatl darts. Another use for duct tape.

At the 1998 Rabbit Stick Rendezvous (September in Rexberg, ID) Scott Jones and I were engaged in a learned dialog on the virtues of river cane, Arundo donax and Japanese arrow bamboo as shaft material for arrows and atlatl darts and the importance of tuning the oscillation period of the dart to match the thrower. One of us, I don't remember who, casually suggested that it would be easy to make a temporary fletch out of duct tape for a dart. It really works!

Figures:

1. Putting on the first piece of tape.

2, 3. Both pieces of tape on the shaft.

4. Template used to trim to an aerodynamic shape.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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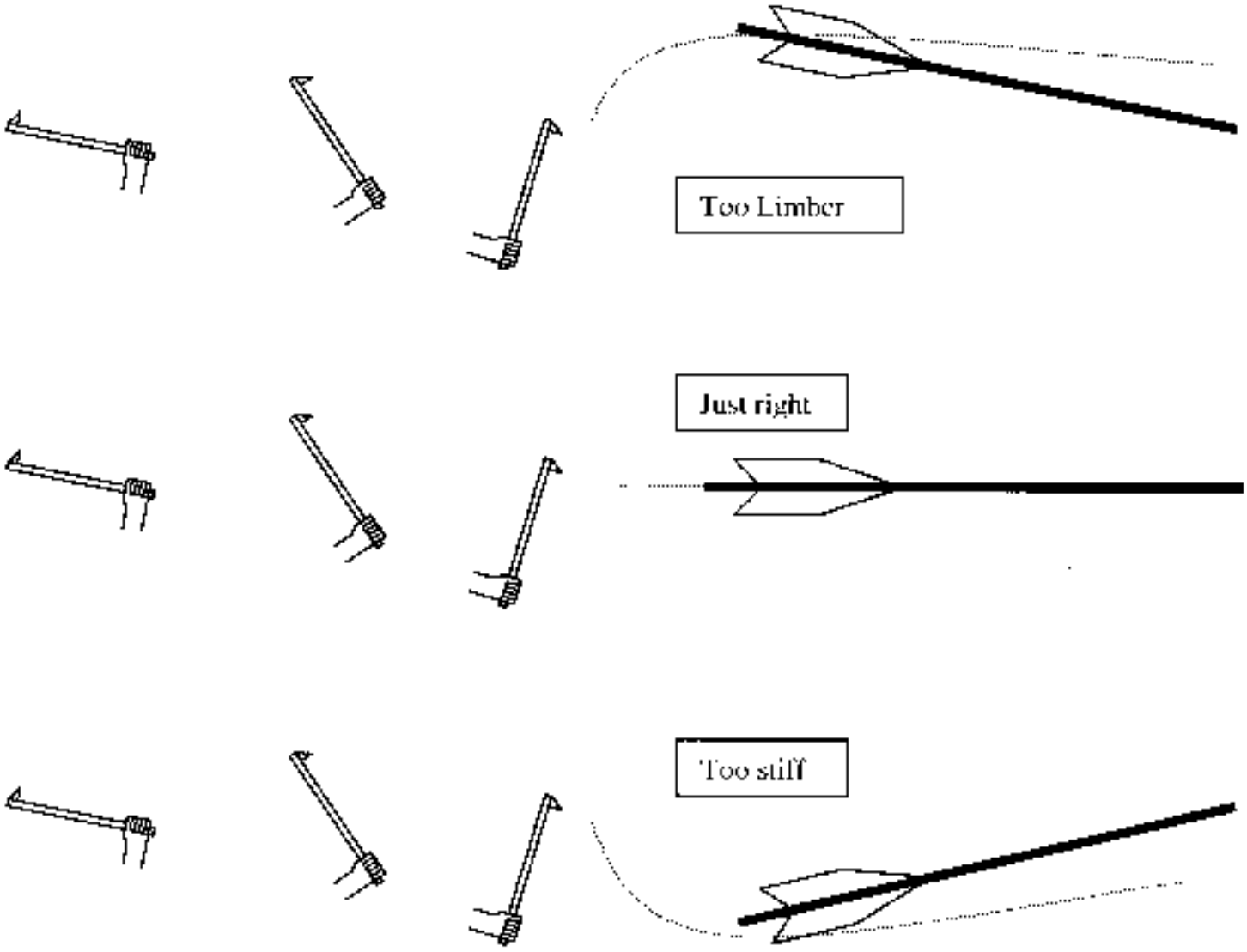
The Tuning of Atlatl Darts

by Dick Baugh

Introduction

How many of us made our first atlatl dart or spear shaft out of some stiff, unyielding piece of wood or bamboo and concluded that spear throwers weren't very effective because the back end of the spear ALWAYS kicked down when we threw it? Enlightenment came later. If you go today to an atlatl throw-in it should be pretty obvious that the "kick-down" problem has been solved and most of the darts or spears have nice straight trajectories. The purposes of this article are to present a systematic procedure for tuning atlatl darts so that they fly with the least up-and-down perturbation and to provide a firm theoretical foundation for why they behave the way they do.



Relationship With Archery

One common feature of shooting arrows and throwing atlatl darts is the fact that the force is not applied in a straight line collinear with the flight of the projectile. A bow string applies a force in a fairly straight line aligned with the centerline of the bow whereas the arrow has to bend around the handle of the bow. This was especially the case with Robin Hood's yew longbow which had a draw weight of 100 pounds and a handle diameter of 1 1/2 inches (3.81 cm) [1]. The arrow had to snake around the handle. Consequently archers are very aware that in order to achieve a clean trajectory with no "wigwag" the arrow shafts must be "spined" to the weight of their bow. People today who sell arrows have charts which specify the appropriate arrow stiffness for a given bow draw weight. There are also spine testers available for people who still enjoy making wood arrows which are spined for a particular bow weight. The same would be appropriate for atlatl darts.

Javelins used in tack and field events are an exception for several reasons. The javelin thrower is able

to exert a force in a fairly straight line along the path of the javelin so the force tending to deflect the xxx is small. The international organization which governs track and field events specifies the dimensions, weight and weight distribution of a competition javelin very rigorously so there is no room for adjustment. Initially the rules allowed javelins to have large diameter and a balance point (center of gravity) behind center of force. This gave an aerodynamic trajectory instead of a ballistic trajectory. In other words the javelin sailed through the air like a glider instead of like a rock. The result was greater distance with a good throw but the possibility that a bad throw would swerve off into the crowd. The newer rules insured that the javelin was more "rocklike" than "gliderlike".

Dart Tuning

We can employ an old archer's technique to adjust atlatl darts. Archers are admonished not to depend on the arrow's fletching (feathers) to insure an un-wavering trajectory. In order to tell if your arrows are matched to your bow shoot them before apply the fletching but after you apply the points. Get close to a target, a few yards (meters) and shoot your fletchless arrows. Do they go straight in or do they go in at an angle? For a right-handed shooter, an arrow which is too stiff will have the back end deflected to the right and conversely for an arrow which is too limber. Arrows can be made less stiff by reducing their diameter. Typically one buys shafts which have already been selected with a spine or stiffness tester.

The same applies to an atlatl dart. Throw it before you apply the feathers. Use the same throwing effort you normally use. If the back end kicks down the dart is too stiff. If the back end kicks up it is too limber. Enough said. The atlatlist has a couple of choices for fixing a dart with an errant trajectory. If the dart is too stiff get out your wood working tools and reduce the diameter. If the dart is too flexible you can either shorten it or make a new one out of stiffer or larger diameter material. After it flys well you can add feathers to the back end. Figure 1 shows the three possible conditions.

How carefully do you need to tune your atlatl darts? It isn't that critical. Remember, a very hard, fast throw should require a fairly stiff dart whereas a slow gentle throw should require a more flexible dart with a longer vibration period. You can test your darts by throwing very hard, with a moderate effort and with an easy toss. My observation has been that a well tuned dart works well for a hard to moderate effort but almost always kicks down for an easy toss.

Theory

A flexible shaft such as an arrow or atlatl dart will have a natural vibration frequency analogous to a bell or a guitar string. The period or amount of time needed for a complete cycle of vibration is independent of the amplitude of the vibration. The trick in tuning atlatl darts (or arrows) is to adjust their vibration period to match, in some way, the time needed to complete the throw. Because of the complicated nature of the throwing motion it is impossible to give a simple relationship between vibration period and time required to complete a throw. You simply use the theoretical relationship between period and throwing time, test a featherless dart and adjust its vibration period according to the way it flies.

Strictly speaking, a flexible shaft has a large number of different vibration periods, depending on how it is excited and whether or not it is held at one or both ends. The exact details are not important. The only features we take advantage of are the facts that the vibration period gets shorter if the shaft is shortened and it gets longer if it is made thinner or additional weight is added. Reducing the diameter of a wood shaft makes it lighter and less stiff at the same time but the stiffness is reduced more than the mass so the net effect is an increase in the vibration period.

Extravagant claims have been made about the efficacy of making the atlatl flexible so the vibration period of the atlatl matches the vibration period of the dart. The claim is that this "resonance" causes a "tremendous" increase in the dart's velocity. Horsefeathers! When the dart and atlatl flex during the throw energy is stored in the flexure the same way that energy is stored in the bending of a bow limb. That"s where the similarity ends. a bow is very cleverly designed to transfer its stored energy to the arrow with high efficiency. [2] This is a doubly minor effect in atlatl dart flexure. First, the amount of energy stored in the dart flexure is very small compared with kinetic energy of the dart (4.3 %). [3] Secondly, very little of the energy stored in the dart flexure is available for increasing the dart velocity. The simplest analogy is to think of a kid bouncing up and down on a bicycle seat. All that up and down motion contributes absolutely nothing to making the bicycle go forward. In order to test this set your atatl on the ground, spur up and hold it in place with your foot. Hold your favorite atlatl dart vertically, point up. Place the butt end on the atlatl spur and flex the dart as much as it would normally flex when being thrown. Now suddenly let go and see how far it springs into the air. The vertical distance it jumps is a measure of how much energy was added by dart flexure to its forward motion. Hardly any height at all! Energy added by dart flexure is a small fraction of a small fraction of the total.
Flexure in the atlatl is a different story. Again, the added energy is small, 6.7 %, compared with the total kinetic energy of the dart [3] but it is available for increasing the dart velocity.

Conclusions

In order to have a good trajectory an altatl dart muse have sufficient flexibility to compensate for the fact that the throwing force is not applied in a straght line colinear with the dart. There is a fairly wide range of flexibility which is acceptable.

[1] W.F. Paterson, "Mary Rose" - a second report, Journal of the Society of Archer Antiquaries, 1981, pp 4-6
[2] C.N. Hickman, "Archery, the Technical Side", various articles.
[3] Baugh, Richard, "Atlatl Dynamics", Lithic Technology, Volume 23, no. 1, pp31-41.
These reference articles are available from the author at cost.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Atlatl Flexibility Analysis via Computer Modeling

by Dick Baugh

Extravagant claims have been made regarding the increased dart velocity achieved with a flexible atlatl. This report quantifies the increase in projectile velocity or kinetic energy caused by allowing the atlatl to flex. It is a summary of detailed mathematical analysis on flexing atlatls. The model for the human effort involved in throwing the dart with an atlatl was derived from experimental data cited in "Atlatl Dynamics" by Richard Baugh, published in Lithic Technology, Spring, 1998. The human effort (force and torque versus hand position) involved in throwing is assumed to be constant. It does not depend on the masses or dimensions of the atlatl and projectile. The model for the flexing atlatl, shown in Figure 1, consists of a rigid atlatl coupled to the dart via a lossless spring. The dart mass and atlatl length and mass are similar to those of BPS equipment. The dart velocity was computed for various values of spring stiffness. A perfectly rigid atlatl would be represented by very large spring stiffness. It is convenient to characterize the atlatl stiffness by the distance that the tip deflects during the act of throwing. Remember, the human effort remains the same so increased flexing is due to increased compliance (flexibility) in the atlatl. The results are summarized in Figures 2 and 3. These plots shows the kinetic energy and velocity of the projectile as function of the amount that the spur deflects. In order to achieve an 11 % increase in kinetic energy the tip of the atlatl would have to deflect approximately 0.1 meters. These results are for a specific thrower, atlatl and projectile. It is difficult to generalize the results however one can say that the increase in projectile kinetic energy can be no more than the potential energy stored in the flexing of the atlatl,

stored energy = (1/2)*applied torque*angular deflection of atlatl.

The deflection angle in radians = (distance the atlatl tip deflects)/(atlatl length).

A copy of Atlatl Dynamics can be obtained from the author for a $2.00 handling fee.

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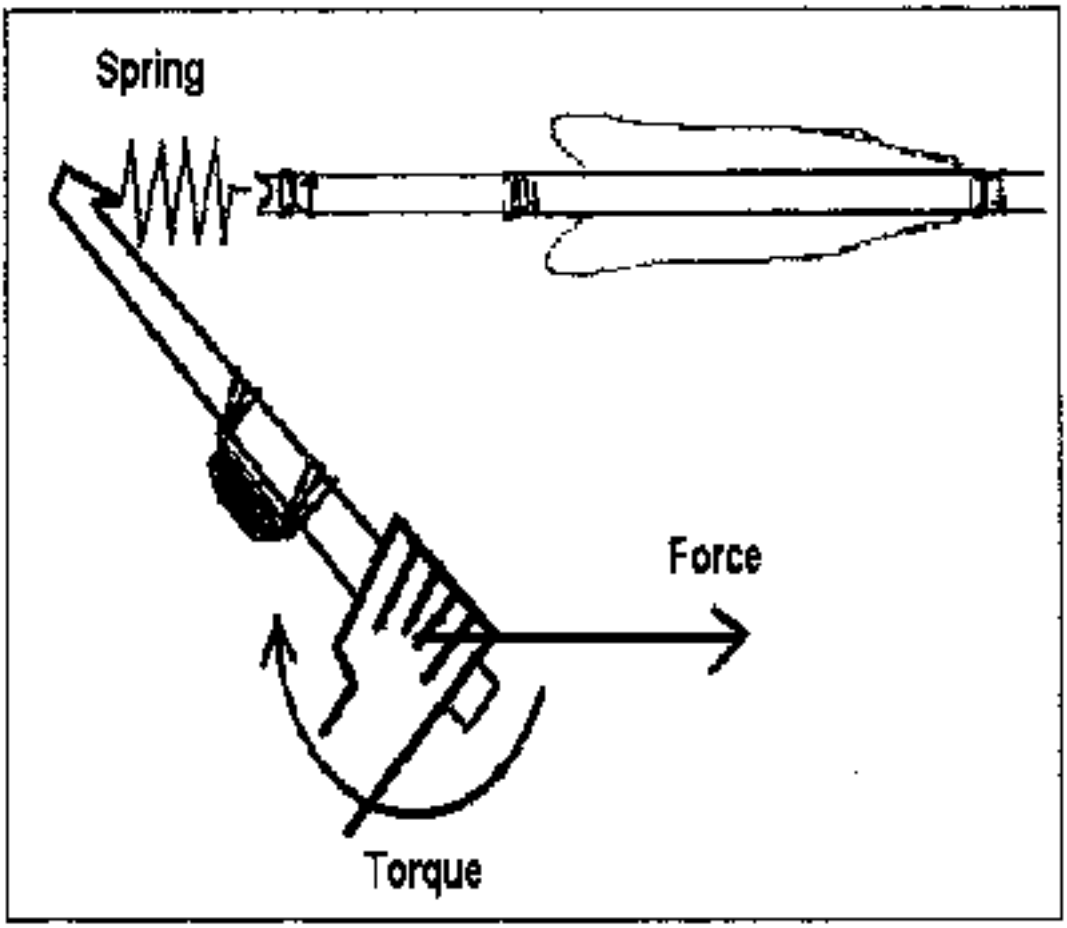

Figure 1. Force and torque applied to a flexing atlatl.

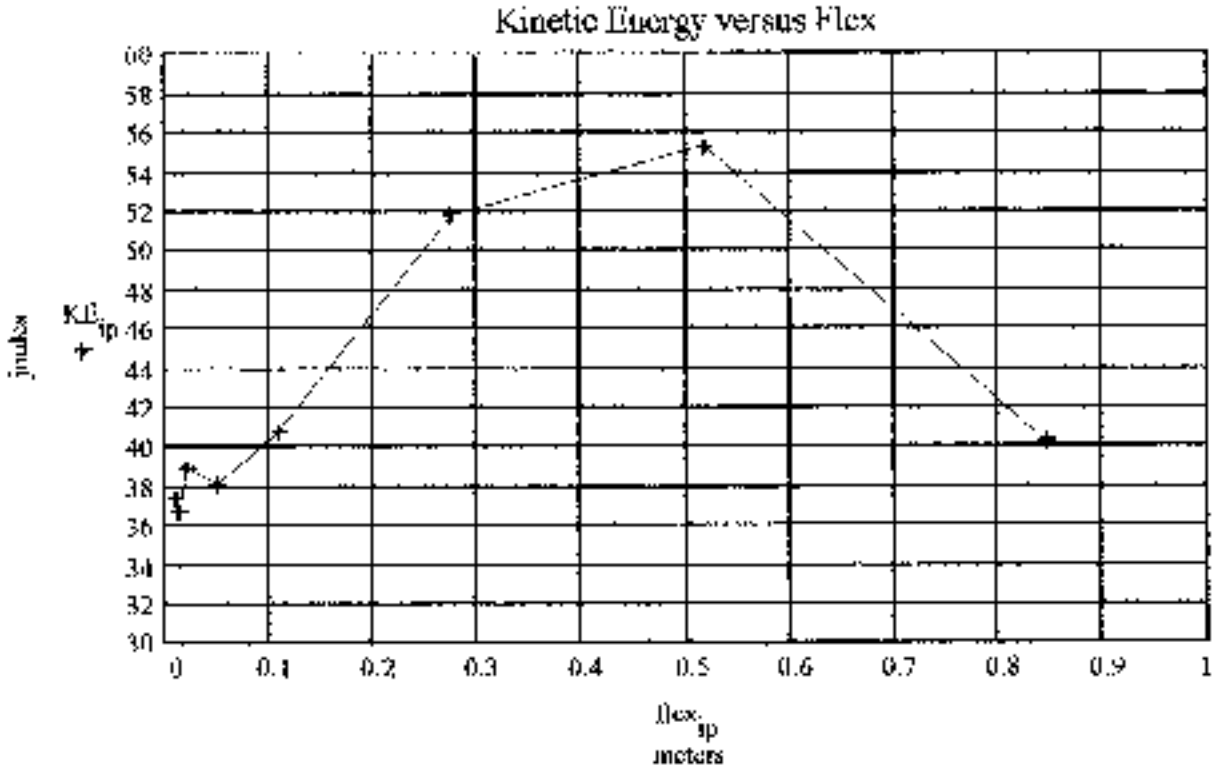

Figure 2. Kinetic energy of the dart as a function of spur deflection in the atlatl.

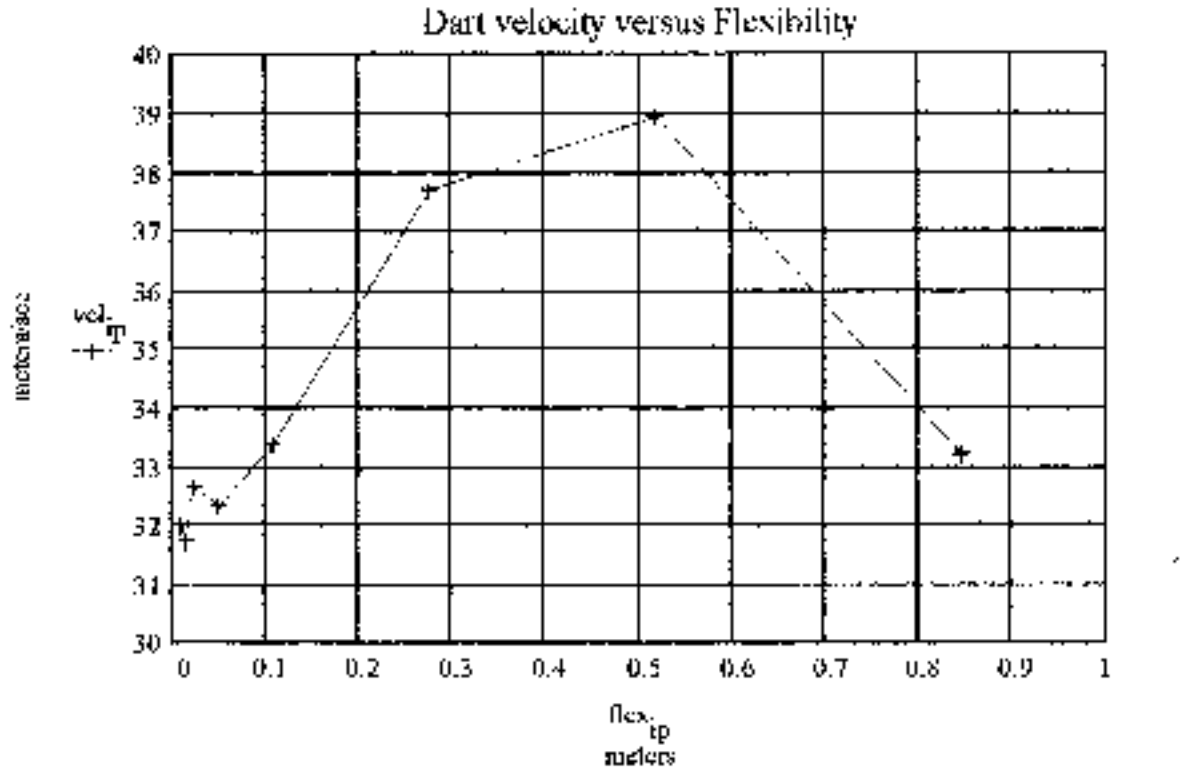

Figure 3. Velocity of the dart as a function of spur deflection in the atlatl.

Figure 3. Velocity of the dart as a function of spur deflection in the atlatl.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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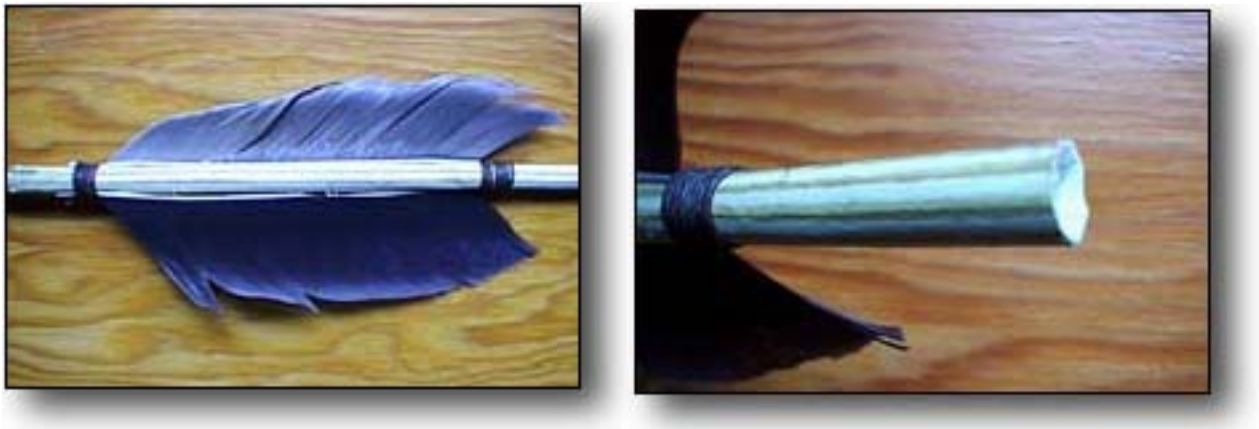
Simple Atlatl

by Bob Gillis

To throw your dart using the atlatl, insert the hollowed out end of the dart (near the fletching) onto the tip of the atlatl. Hold the atlatl in the palm of your hand and the dart with your fingertips.

Three different styles of atlatls.

Both ends of the atlatl are made from a split willow. Note carved point that fits into the hollow end of the dart, on the above, left hand photo. The above, right hand photo is the handle in which the thumb and fingers are inserted into the leather loops.



Split feathers are lashed to one end of the dart. The two feathers are from the same wing of a bird.

The end tip is hollowed out.

For more information on the atlatl, look at the Jiffy Fletching and the Atlatl Flexibility Analysis via Computer Modeling.

E-mail your comments to "Bob Gillis" at shelter@best.com

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The Atlatl as Depicted in Ancient Rock Art

by Chuck Kritzon

The history of atlatls in the new world has been recorded in stone thanks to generations of native artists who have set down images of this important hunting device in the rock art record.

Only three locations of rock art are know depicting atlatls. In West Texas, along the lower Pecos River there can be found several sites depicting atlatls. Two rock art sites are recorded in the San Juan River drainage of southeastern Utah. In both of these sites the atlatls depicted do not show weights attached to the weapon. The third and by far most prolific collection of rock art showing atlatls is in the desert ranges of southeastern California and Southern Nevada.

The largest concentration of these sites occur in the Coso Mountain Range where the greatest number and earliest drawings can be found. Images of both hunters with atlatls and atlatls drawn by themselves are present. More than 300 individual drawings have been recorded.

How long have atlatls been present in this area? Atlatl dart fragments from the Leonard Rock Shelter in Nevada give a radio carbon date of 7038 +/- 350 years ago. Other dry cave sites have yielded similar results.

The most intriguing aspect of the atlatl images is the depiction of highly stylized and greatly exaggerated stone weights attached to the atlatls. These weights have been found across the United States, and for many years there use were unknown. Called 'Boat stones' or 'Banner Stones' because of there shapes, they were usually well made and often polished. The function of these stones is a matter of great discussion and some contention. Many theories expound around the purpose of the stones: balance weights, sound silencers, performance enhancers, and charmstones. When looking at the rock art record, the extreme disproportion of the size of the stone in relation to the atlatl leads this writer to the conclusion that the primary reason for the attachment of theses stones was as a charmstone, to bring luck to the hunter. Marginal improvement to the performance of an atlatl/dart system can be measured but taking into consideration the prolific use of charmstones of all shapes and sizes by most of the native peoples of the world, and especially well documented examples and oral histories in California and the Southwest, the charmstone conclusion appears to be the most valid. We will never truly know.

The images of the atlatls by themselves show the complex variety of styles and combinations of finger grips, hooks and weights that have been used or at least illustrated during the 3000 year old rock art record by the ancient peoples of the area. The images of the hunters also reflect the changes in rock art styles from the simple early drawings to the later more detailed images including depictions of complex headdresses in the later part of these atlatl hunters history.

The three patterned body anthropomorphs shown appear to be holding atlatls and darts. Although

these images post date the introduction of the bow and arrow by many hundreds, perhaps thousands of years, some theorize that the atlatl was kept alive in the culture in a symbolic form. The rock art record supports this, as other instances of atlatl images can be found in later post bow and arrow images.

Regardless of the actual meanings of the vast numbers of atlatl images drawn by these ancient peoples, an unbreakable connection to the past is created, so that every time modern atlatl practitioners heave a dart, these stone images, for an instant, are alive again.

REFERENCES:

Rock Drawings of the Coso Range, James Campbell Grant, W. Baird, J. Kenneth Pringle

Handbook of North American Indians, Vol. II, Smithsonian Institution

Rock Art of the American Indian, Grant Campbell

A Field Guide to Rock Art Symbols of the Greater Southwest, Alex Patterson

Tours of the Coso Range petroglyphs are given by the Maturango Museum in Ridgecrest California. They may be contacted through their website at : http://www1.ridgecrest.ca.us/~matmus/. They also have many books and resources available for those interested in the rock art presented here.

More information about the Atlatl: http://www.atlatl.com/archeology.html

Article from *World Atlatl Magazine* (WAM) submitted by Charles W. Kritzon of Petroglyphics

E-mail your comments to "Chuck Kritzon" at chuckk@petroglyphics.com

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Clay Thrower Made from Bamboo

by Ken Peek and Dino Labiste

Tiny droplets of rain sprinkled onto the glass panes as Ken and I stepped into his greenhouse on a wet and overcast Monday. The day was not the ideal time to photograph knapping techniques for the website. It was cold and damp, but it was a holiday and we had the free time to make the best of it. Lying on the ground were stalks of bamboo that Ken pushed aside to clear the area. "Do you need any bamboo?," he asked. "Not particularly. I can't think of any future projects right now," I replied.

That was the beginning that inspired this article. As Ken picked up one of the bamboo, he began to relate to me a simple clay throwing, bamboo implement that he had seen on television concerning the plight of some African villagers.

Here is Ken's story:
Last year's excellent PBS(Public Broadcasting Service) series on Africa offered up some wonderful insights into that amazing land and its cultural history. One of the shows had a fascinating segment dealing with a family of poor rice farmers trying to deal with marauding hippopotamuses. It seems the hippos knew just when the crops were at their tastiest stage of development before they trampled through the fields. To counter this onslaught, the family had developed a simple, yet ingenious, low-tech solution. The mother and kids first gathered a local clay to fashion an arsenal of perfectly round, 1-inch diameter balls. Once these had dried and hardened in the sun, a 2 1/2 foot length of 1 to 1 1/2 inch diameter bamboo was split lengthwise about 2/3 of its length. On one of the split halves, the end 1/3 was cut away. In a matter of minutes, a highly effective projectile-throwing device had been produced. When the hippos attacked the fields, each family member would take their throwing device, pinch a hardened clay ball in the split, and fire away at the ravenous grazers. A few, at least, were effectively driven from the rice fields by this low-tech but effective device.

Try one out with any large, straight pieces of bamboo you may have laying about. Below is a smaller version of the bamboo clay thrower used by the African villagers.

Constructing a bamboo clay or stone thrower:

Find a bamboo or reed that is longer that 20 inches and approximately 1 inch in diameter. If you are using a bamboo, cut one end of the bamboo below the node. The node will reinforce the bottom end of the bamboo. When the bamboo is split in half in the next step, the node will keep the split from continuing further. If you are using a reed that has no nodes, you can wrap and bind the lower end to keep the split from advancing.

Measure out approximately 20 inches in length and cut off the other end. It is not required to have a node at the other end.

Take a knife and a wooden mallet (or branch) and carefully split the bamboo in half down to the node. Stop the split about 1 1/2 inches from the node. If you have bond the end, then stop the split 1 1/2 inches from the binding.

Next, measure 8 inches from the beginning end of the split and saw off one side of the split.
NOTE: There should be no nodes or obstructions in the uncut section of the 8 inches. Your ammunition will travel down this channel.

Now, you have a bamboo clay/stone thrower -- simple as that .

You can use round shaped stones or round clay (or mud) balls as your ammunition. To load your ammunition, open the split and wedge the stone or clay ball between the bamboo split. One half of the stone or clay ball should be sticking out of the split. Do not shove your ammunition completely into the split.
NOTE: Your rounded stones or round clay balls will travel down the bamboo channel when it gets thrown. Your ammunition should not be so large or irregular in shape that it will get stuck in the channel.
To make the clay balls, find a clay deposit or clay-like mud. Roll pieces of clay into a ball between the palms of your hands. You can also insert a stone into the center of the clay to add extra weight.

Using the bamboo clay/stone thrower is like throwing a baseball. The cut half should be facing upwards at the beginning of your throw. Cast the stone with the bamboo thrower at your target and follow through by pointing the tip of your bamboo thrower at your target. At the end of the throw, the cut half of your thrower will now be facing downward.

Now, go out and chase those hippos, or rather deer, out of your garden.

E-mail your comments to "Ken Peek" at kspeek123@earthlink.net or "Dino Labiste" at dlabiste@yahoo.com

Spears, Weirs and Traps

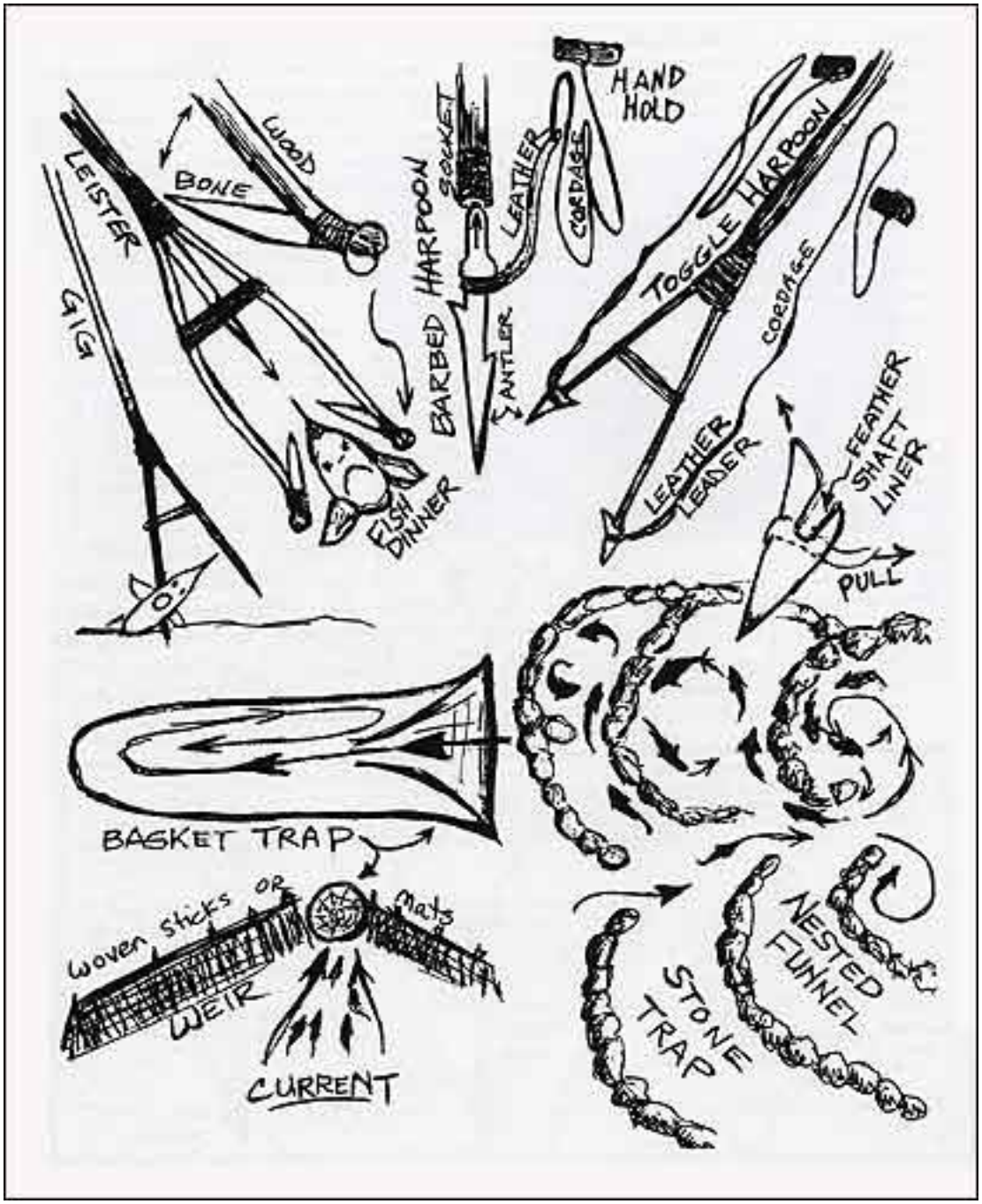
by Norm Kidder

The type of gear used to create a fish dinner is totally determined by the type of fish, its habits, its size and the place you're catching it. Deepwater fishing is very different than shallow water. Size matters a lot. Spears function in at least three different ways -- stab 'em, grab 'em and pin 'em down. Harpoons stab into fish (or other creatures) and have barbs to keep them from pulling out. With a toggle harpoon, the end comes off and turns sideways inside the animal's body, and is attached to the fisherman by a strong cord. Harpoons are best suited for large animals, up to whales and fish, like salmon.

A specialized spear grabs medium size fish of the trout / steelhead size between a top point and two upwards angled points which slip past the fishes body on flexible wood pieces and then lock the fish in. This is called a Leister in England, but is found all over (a set of bone pieces for one came out of a bayside Indian village site in California). Once set up, this spear will only work on one size of fish.

The third type of spear works by pinning the fish to the bottom in shallow water. This is what Tom Hanks appears to be using in the movie "Cast Away", although he somehow makes it defy physics when he throws it 30 feet and impales a fish. Multi-pointed gigs are also popular for taking bullfrogs.

One of the big challenges with spears (and arrows) when fish are underwater is refraction - the bending of light. The fish isn't where it appears. To compensate, many spears and harpoons have two or more points, so if one misses, then another might hit. A second technique is to wait for a large fish to come to the surface before harpooning it. Many people use torches at night to attract large ones to the surface. A third approach is to keep the spear underwater and watch the "bent" looking end to guide the thrust.



Most fishing in the "good old days" was done during runs, or migrations when there were great numbers of fish to catch. During these events, weirs were often set up to direct the fish to the spear. A weir is a fence across a stream with one way through. Weirs were also used to direct fish into traps or nets.

Traps work on basic fish psychology. Fish migrating upstream will go upstream no matter what. Fish look for a way out of a trap by following the edge. A fish at the end of a trap will turn along the trap, be forced back around, but won't usually turn the sharp corner to get back out. Shoreline traps made by stacking stones in the shallows use this feature, and often use nested funnels to

insure the fish stay put. A limitation for weirs and traps is the speed of the water, which can rip them apart. So learn your stream and think like a fish.

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E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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Hoko Knife

by Dick Baugh

The Hoko knife (year 2000 version)

This is a simple and practical stone bladed tool. The original Hoko knife was found at an archaeological site in western Washington near the Hoko River where a native village was snuffed out by a landslide about 2700 years ago, well before any contact with Europeans. Among the artifacts found there was a very simple knife consisting of a very small, sharp stone flake hafted in a split cedar handle which was tied together with spruce root.

Pictures of the original can be seen in "Exploring Washington Archaeology", Ruth Kirk with Richard Daugherty, ISBN 0-295-95610-0.

Over several years of making and teaching people from 9 years old to adult how to make Hoko knives I have developed several variations. First, cedar and spruce root aren,t available where we live (San Francisco Bay area) so consequently we have used green willow (Salix sp.), coastal live oak (Quercus agrifolia) or California bay (Umbellularia California) for the handle and green willow bark or two-ply twined cordage made from dogbane (Apocynum sp.), shredded cattail leaf (Typha sp.), rawhide or anything else you can twine for binding the handle.

Material for the stone cutting blade does not need to be very elegant. Something rough and strong such as basalt is the best for cutting wood. Try to use flakes which have a long, straight cutting edge and are not curved. A curved flake is more easily broken when the handle clamps down on it.

There are several variations on the original. If the handle is held together with only one binding then it makes it easy to change blades. Holding the handle on the side which is not bound makes the flake very secure.

Using the Hoko knife:

The original Hoko knives were quite small and delicate. The handles were 5 inches (13 cm.) long and the blades were only thumbnail size. The archaeologists who found them think that they were primarily used for cutting fish since the replicas which were tried out for cutting basketry willow gave poor results. My opinion is that the concept is sound but a larger knife is more optimal for wood working. Think of the Hoko knife as a saw or slicing tool.

This project provides valuable additional experience to students in the following ways:

a. It provides a specific application for a piece of cordage. It is difficult to teach people to make neat, strong cordage unless they have a specific application in mind for the cordage.

b. Another previously made Hoko knife can be used to cut the wood used for the handle, demonstrating the usefulness of the tool.

A possible teaching sequence for a class in stone age survival skills/technology might be:

1. Entire class helps twirl up a fire with a hand drill.

2. Hoko knife is shown to the students. Tell them that they will make their own Hoko knives and

use them to cut the notch in the hearth board.

3. Students use sharp rocks to cut wood for handles.

4. Students make twined cordage for binding the handle.

5. Students knock off small flakes from a core to use as blades.

6. Knife is assembled.

7 Student uses knife to saw notch in fire-by-friction hearth board.

Figures:

The original archaeological find.

The Hoko knife (year 2000 version)

Splitting the handle. Apply more bending moment to the thicker half to keep the split running down the middle of the handle.

Beginning the tie. One end of the tie (wolf willow bark) is inserted in the split.

A vey simple stone bladed tool

Finishing the tie. Tie one or more half hitches around one half of the handle.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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The Stone Saw

by Norm Kidder

Most people are familiar with stone axes and celts for cutting down trees. In central California neither of these tools are found in the archeological record, and most of the houses built were framed with relatively small diameter trees (1 - 3 inches). My experience of trying to cut down springy willows with a stone axe led me to believe there must be a better way.

After asking local archaeologists to no avail, I called Craig Bates, Curator of the Indian Museum in Yosemite, who told me about the historic use of a stone slab as a crosscut saw. Later I found documentation describing a group of four Indian men cutting down a tree. Two men used their carrying nets hooked together to catch and bend down the tree, the other two used a stone slab as a saw to cut the tree in about a minute. Working alone, I found it took me three to five minutes to cut down a willow 1.5 - 2 inches thick, bending it over with one hand and cutting with the other.

Over the past two summers I have undertaken the construction of a thatched central California Indian-style house using all stone age tools and materials. Using a straight 6 inch-long flake of metabasalt I had been given by a knapper friend, I created a stone saw. It was used to cut a one inch thick oak branch and split it part way. I inserted the flake into the split, creating a large "Hoko knife". (see photo)

The entire tool kit used to create the shelter frame:
Abalone shell, basalt flakes, obsidian chopper, wooden maul, and hafted saw.

Then, with a group of volunteers, I set out to cut down a dozen 2 inch diameter willows for house poles. Using the hafted saw, we could cut down a tree in just over a minute with four people as in the ethnographic account. Other members of the group created some crude edged tools that we also tried. These took about three minutes or so, because of the difficulty in holding onto them. Some trees took longer simply because of their position, and the difficulty of getting them properly bent over. The largest size that would be practical to cut seems to be about 3 to 4 inches in diameter, at which size an axe begins to work more efficiently.

The stone saw works only on green wood, and only when the tree is bent over sharply. This allows the saw to cut without side friction and jamming. It cuts about an eighth of an inch per motion. If proper pressure is not applied to the base of the tree, a series of splits will form in the end of the piece. Pushing down on the end above the cut moves the splits down to the stump, or eliminates them altogether. When the position of the tree permits, it can be cut half way through and then bent back the other way for a final cut. Where the second bend was not practical, I found I could cut most of the way through and then simply stomp down above the cut and peel it away from the stump, or pull up on the pole and peel it away. Smaller poles for binding on the thatch took about 30 seconds to cut. The saw's efficiency was quite gratifying to all of us, as we got our poles cut and carried them back to the building site in about two hours, less than the time it would take me with a steel saw working alone (hauling would take longer).

The severe bend in the trunk facilitates a better cut with the simple flake saw.

This exercise was the first of many in which the importance of the community became apparent. It would be very unlikely for a lone person to be building a house, and would indeed be very hard. The presence of a community provides a broader knowledge base as well as work force when needed. The additional time needed for the four person crew was made up for by the time saved in carrying and cleaning the poles, and in constructing the frame. As we got better at using the stone saws (and the bone saws for cutting the tule thatch), it became apparent that the use of stone tools within the context of a knowledgeable group was highly practical and did not add significantly to the time involved in house construction.

The completed frame.

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E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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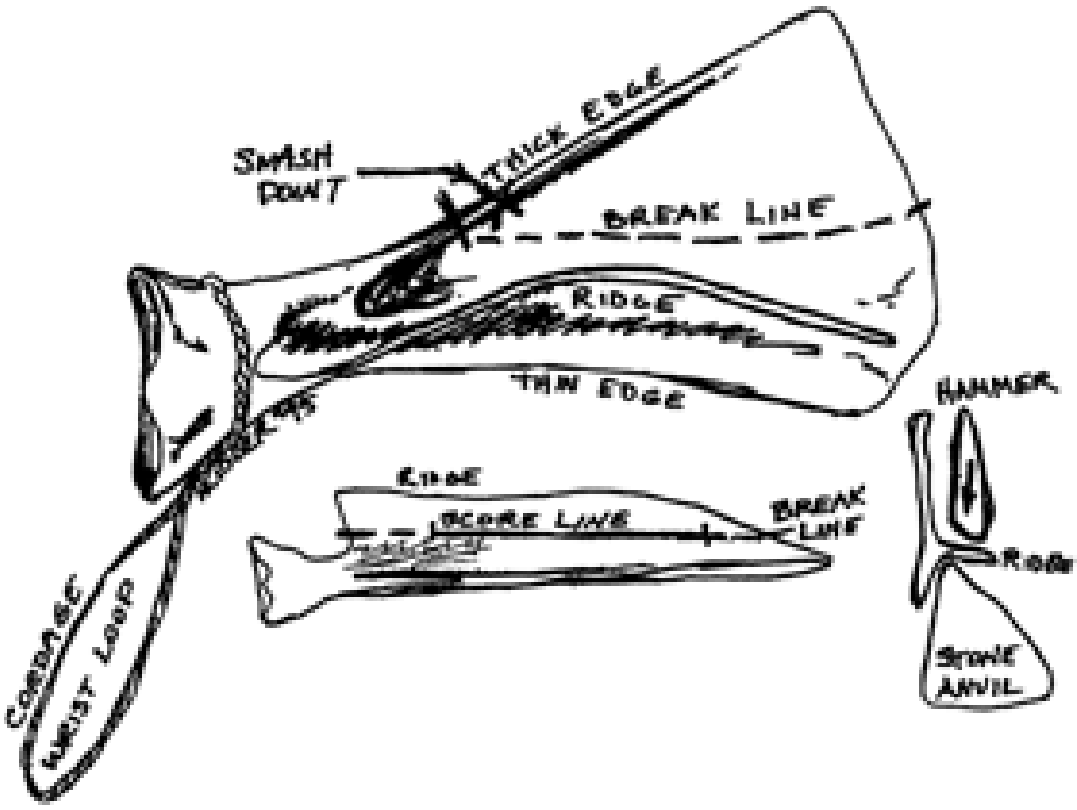
The Scapular Saw

by Norm Kidder

Over the years, my job has involved me in efforts to bring a local stone-age culture into the reality of 21st Century youth and adults. Letting people see, feel and use the tools from this time has proven the single most affective teaching technique. The first of these efforts at replication involved a common tool type at our sites called, by archaeologists, a scapular saw. The scapula is more simply known as the shoulder blade, in this case from a deer, elk or antelope. It has been modified to expose a thin area, which is notched to produce a saw-like cutting edge. The first saws were made using power tools, but looked like such. Tools made using hacksaws and files were better, but not yet authentic looking, and gave no information on efficient manufacturing techniques. They did however allow us to test the tools for possible uses. Archaeologists did not list their uses, since that would be speculation, but trying them on wood, meat, grass, weeds, tules and cattails; as hair combs, fish scalers and everything else we could think of left one easy conclusion. The only thing they cut really well is tules and other soft plants, and they cut them more efficiently than any other known tool from that area. The wear and polish patterns on the artifacts also match the replicas. The fact that local Indians built their houses, boats, mats, duck decoys and beds out of tules makes for overwhelming logic for calling them tule saws.



The final step in this Level II effort (see Callahan in the Primitive Technology Newsletter, Summer '95) was to find the most efficient way to make the tool with the kit available to our ancient craftsmen. The tasks to be performed included: removal of unwanted bone; smoothing of modified surfaces;and filing notches in the cutting edge. The tool kit that was known from the digs included many unmodified flakes of chert and quartzite, and various pieces of fine hard sandstone, much of it fire broken. There were relatively few specialized tools. The specific steps involved removing a fin-like ridge from one surface of the bone, and a triangular shaped section of the main piece (see illustrations). Initially I worked at removing these sections by scoring or engraving lines at the desired break points using burin-like edges on the unmodified chert flakes. This was tedious work, and did not always guarantee that the bone would break as planned. Attempting to make a saw as quickly as possible, I abandoned the engraving step and went to crude bashing with hammer stones. After breaking a few in half, I found that I could use a carefully selected anvil stone, and break the bone a safe distance from the final shape, then grind and 'nibble' it to shape. This took much less time and effort, and produced a replica that compared favorably to the originals. If the bone is fresh and soft, engraving in a few problem spots can help avoid disasters. Once shaped, all rough surfaces were smoothed on a sandstone abrader.

The final notching step took similar experimentation until I settled on using any thin, abrasive stone edge from hard quartzite to soft sandstone to file at a fairly flat angle on each side. This last step took the most time, about 20 minutes. Using these methods it now takes 30 to 40 minutes to make a finished tool that will last for years of cutting tules. Over time, teeth break, but can be refiled, giving the tool a more scythe-like appearance found in many of the old specimens.

When demonstrating tule crafts, the saw is perfect as it demonstrates an authentic tool, and is also the best tool bar none at splitting tule stems, as it tears rather than cuts (also a good safety feature when working with kids).

When making the tool, it also demonstrates the importance of unmodified 'found' tools, which are rarely collected by archaeologists or displayed in museums, but which did much of the work in prehistory.

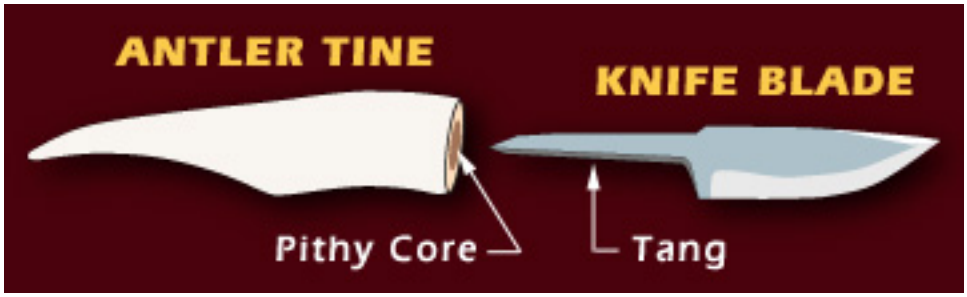
This article was first published in The Bulletin of Primitive Technology (Fall 1995, #10)
E-mail your comments to "Norm Kidder " at atlatl1@aol.com

Antler Handle Knife

by Dino Labiste

Question: How do you affix a knife blade with a tang to an antler tine without using any adhesives?
Answer: Using the natural parts of the antler tine as the bonding agent.

The pithy core of an antler tine can be softened and allowed to reharden to form a tight bond to the knife tang. The procedure is simple, but the time from beginning to end is long. If you're patient, you'll be pleasantly satisfied with the results.



Start by taking an antler tine that will fit the size of your knife blade. Submerge the antler into a bucket of creek or rain water. Now begins the waiting period. Soak the antler until the pithy core softens. I had to leave my antler in rain water for about a month before I could begin to mount the blade. Test the pithy core every now and then by pushing your fingernail into the core. If the pithy core indents from the pressure, then the antler tine is ready for the next step. A word of advise: It's best to soak the antler longer than necessary to be sure the pithy core has softened throughout the antler.

When the core is ready, you may notice an odor coming from the antler. Submerged in water for so long, bacteria has begun to work on the antler. The antler is still good. The smell may be unpleasant for some. If it bothers you, work outdoors or in a ventilated area. Drying out the antler after you've completed your work will get rid of the odor.

Next, cut the tang of the blade with a hack saw into a wedge shape to help facilitate the insertion of the antler tine. Tape the blade and point with enough duck tape to keep from accidentally cutting yourself on the sharp blade. Clamp the blade in a steel vise with the tang sticking up. The clamp should come all the way up to the blade, just before the tang begins. This will keep from bending or breaking your knife during the insertion process. Also it would help to place a soft material, like cloth, between the clamps and knife, to keep the blade from getting scratched. Wear leather gloves for added protection. The vise will keep the blade steady for the next step. Position the antler tine over the tip of the tang and push the antler into the tang. Use your whole body weight as leverage and gently push the antler into the tang. With a bit of elbow grease and patience you'll eventually push the antler tine all the way down to the hilt of the blade. Occasionally check the vise to see that the blade is not moving or loose. Take your time and do a good job.

Another word of advise: Do not restart the procedure after you have started by pulling the tang out of the antler for whatever reason (example: the blade is going in crooked). The pithy core is not like rubber. The hole will not close up after you pull out the tang. Starting over will only widen the hole and will give you a loose bond. Think about what you are going to do ahead of time so you won't make a mistake during the procedure.

After you've inserted the tang, let the antler tine dry out completely until the odor disappears. The bond is just as good as using epoxy. It's natural and strong.

Another alternative to soaking the antler for a long period of time, is to boil the antler in water. As the antler is boiling, check the pithy core every now and then to see if it has softened. When it's ready, remove the antler and continue with the mounting process. Is boiling better than the soaking method? I haven't done any comparison tests with a boiled antler and a soaked antler, but my guess is that boiling the antler too long will tend to make the antler brittle. If you just boil the antler until the core has immediately softened, it will make a good knife handle. It's just a matter of how patient you are with this project.

If you are looking for knife blades for this project, check out the website below. They sell Swedish knife blades.

http://www.ragweedforge.com/BladeCatalog.html#blades

For antler pieces, check out the website below. The company is called Moscow Hide and Fur. They are located in Moscow, Idaho in the United States.

http://www.hideandfur.com

Making a Leather Knife Sheath

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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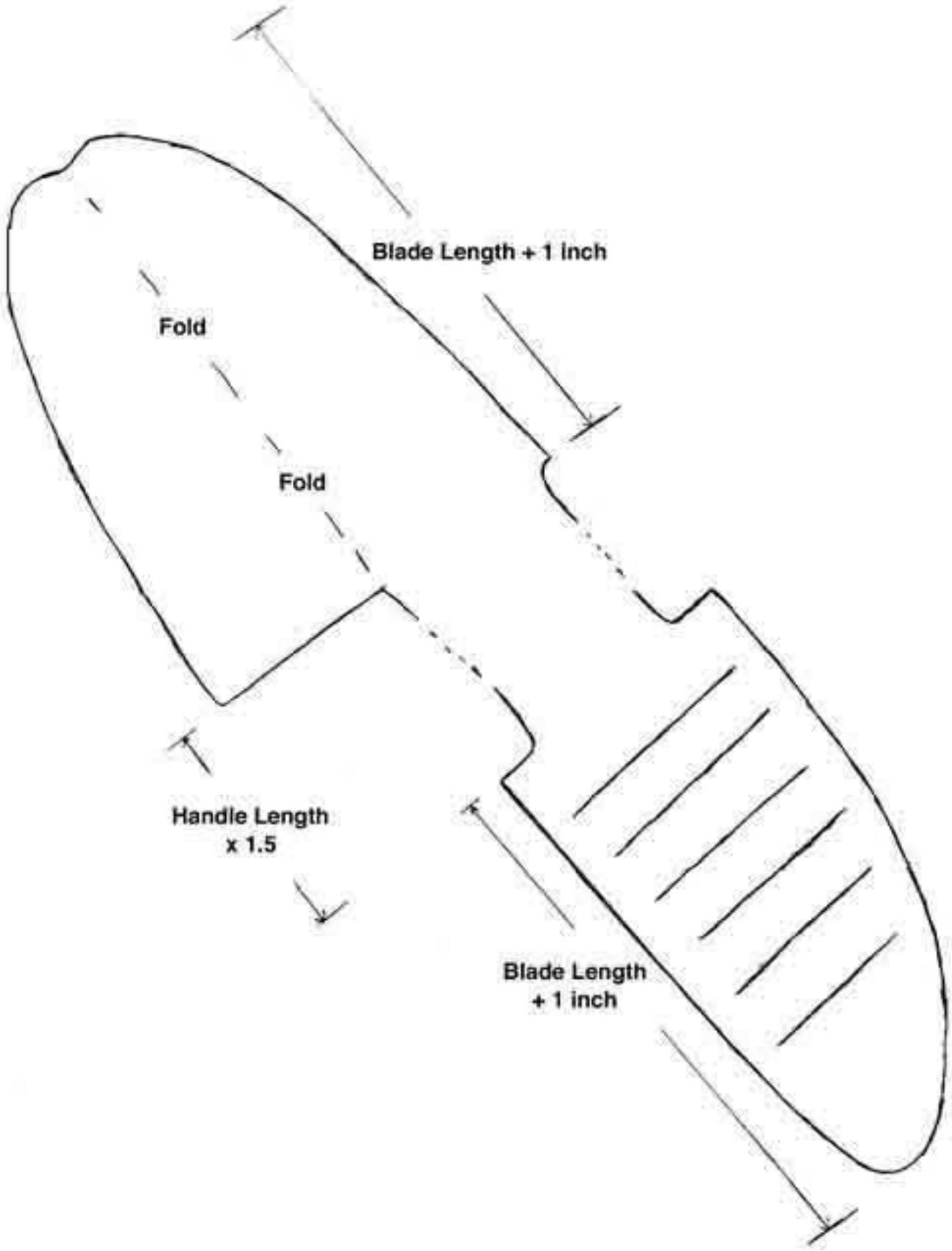
Making a Leather Knife Sheath

by Bill Scherer

Fast, Easy, and Good-lookin' Knife Sheath

At the Rattlesnake Rendezvous (a primitive skills campout), I met a fellow by the name of Ken Peek. Ken was wearing a really nice looking knife case. He was kind enough to let me have a close look at it. The thing that really caught my eye was the simplicity of the design. The sheath required absolutely NO STITCHING. It was made of a single strip of leather, cut to fold over onto itself once on the blade and then again on the handle. Then it was woven in and out of the slits to hold the whole thing together. About a month ago I was mounting a deer bone handle to a knife blade and decided to try my own version of the sheath. This is what I came up with (see photo). It took about an hour to do, and most of that time was cutting the slits to just the right size. The dimensions in the photo are for a 4 inch blade. The handle length of the sheath should be doubled, since it will fold over. If desired, add a leather thong to hang the sheath around your neck.

"See Ya in the woods!"


Blade Length + 1 inch
Fold
Fold
Handle Length
x 1.5
Blade Length
+ 1 inch

Birch Bark Sheath

The big difference between the bark sheath and the leather sheath is the big wide slots on the bark sheath instead of the narrow slits on the leather sheath. This is because the birch bark is more fragile and prone to spitting if there is too much stress on it. A disadvantage of the bark is that there is no way to unfold it and clean out the inside of the sheath.

E-mail your comments to "Bill Scherer" at scherer_william@hotmail.com

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The Versatile Molcajete and Scallop Baking Shells

By Chuck Kritzon

Like many of us, when practicing primitive skills, I like to use natural tools and materials whenever possible.

I had always had the problem of trying to have a natural heat source at locations that were not designed for an open fire. At the same time, finding a primitive small container for holding, heating or mixing liquids had been a problem. Several years ago I discovered new uses for a couple of readily available cooking implements and have been using them successfully ever since: the molcajete and the scallop baking shell.

The molcajete can be found in almost every Hispanic kitchen. It is used for grinding chilies and making and serving sauces. It is a nahuatl word passed down from the Aztecs that means "stone

mortar". They are made by hand in Mexico out of a porous lava stone. They are bowl shaped with 3 legs on the bottom making it very stable. They range in sizes from 6 inches to 10 inches in diameter.

The lava stone is ideal for several reasons. First, the microscopic air bubbles that make the stone porous, creates an self sharpening grinding surface. As the pestle slowly pulverizes the inside of the bowl, it is constantly exposing the new sharp edges of the bubbles below. I have used my molcajete to grind mineral pigments, charcoal for pitch and well as grains and seeds. These bubbles of air are also a great heat insulator which makes it ideal as a small brazier. The molcajete can be full of red hot glowing charcoal and it's legs will still be cool to the touch. I have used these in classes where they have been placed on picnic tables and easily moved when required. At gatherings where there isn't a central fire to get a shovel full of coals, commercial, self starting briquettes can be used. I have used the molcajete as a heat source for straightening arrow shafts, heating and melting pitch and keeping hide glue hot when painting with pigments. Molcajetes can be purchased at most stores that sell Mexican food supplies and at some Mexican import shops. They range in price from $10.00 to $18.00 and can also be found on the internet. They all come with a pestle made form the same lava stone.

Scallop shells are great containers for holding any kind of liquid They are light weight, thin, rugged, very heat stable and easy to clean. I use the scallop shells that are sold for baking purposes. They are about 5 inches in diameter. They are not coated with anything and are safe to use with foodstuffs. They can be found at most restaurant supply stores and are priced around $10.00 for a set of 5. Be careful if you use other similar shells from other sources. They may have been coated or treated with unsafe chemicals, or may release natural materials that may be

dangerous. I have used my shells for holding different colors of pigments, heating pine sap to make pitch, and keeping hide glue warm. I have never had one break, even when used repeatedly in the coals of a fire. A stick that is slightly split at the end makes an excellent handle.

I enjoy using these tools. They are readily available, sturdy and natural.

E-mail your comments to "Chuck Kritzon" at chuckk@petroglyphics.com

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Bone Flutes

by Bob Gillis

The top flute is made from the wing bone of a large bird such as a turkey. The bottom is from a lamb leg bone.

This photo show the details of the slanting cut in the mouth end of the flute. Blow by pressing the lower edge of the mouth end of the flute against your lower lip. Blow across the slanting cut as if you were trying to get a sound out of blowing across the mouth of a bottle.

E-mail your comments to "Bob Gillis" at shelter@best.com

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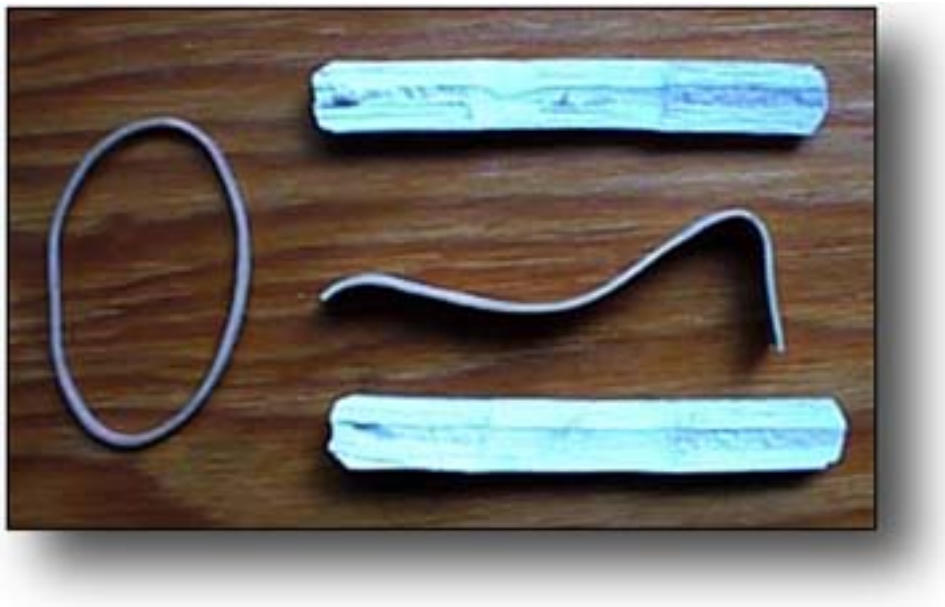
Quail Call

by Bob Gillis

Primitive hand made quail call using rubber bands (cordage and grass can also be used). Cover hole with your mouth and blow. Pull on rubber band or grass blade to change notes.



E-mail your comments to " Bob Gillis" at shelter@best.com

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Reed Flute

by Bob Gillis

The Reed Flute below is made of a section of a hollow reed (bamboo or any hollow reed works well). The finger holes begin 5 1/2" from the node and the holes are 1 1/4" from each other. Cut a mouth hole 3/8" in diameter about 2" from the node that closes the end of the reed. The mouth hole should be a clean cut with the edges of where the hole meets the surface of the reed, not rounded. The other end of the reed should be open. The flute is quick to make, sounds good, and is a lot of fun to play.

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Sycamore Membranophone

by Dino Labiste

The smooth, mottled brown and white bark and coarse, light green foliage were distinctive features of the large trees that grew along the wet soil of the stream banks. Their barrel-shaped trunks averaged around 2 to 4 feet in diameter, sometimes much larger. Their spreading branches reached heights of 40 to 80 feet. These trees with the massive, stout trunks were Platanus racemosa. Commonly known as California Sycamore.

A young sycamore trunk sat on the grass in the primitive campground near the stream. The stump measured a foot in diameter and stood 12 inches high. An ideal substitute for a primitive chair. The stump's relatives towered only a few yards away. The young sycamore never got a chance to realize its full potential like its older, sycamore siblings. A casualty of a roadside clearing, the sycamore trunk eventually became a comfortable seat for a weary hiker. In the interconnectedness of life, the stump also became the home of burrowing larvas and a colony of termites.

When I came upon the stump, the termites had vacated their sycamore home and left a labyrinth of holes and decaying wood that was once the core. I rescued the young sycamore trunk from its unfortunate fate and decided to breath life into the stump by transforming it into a drum. I thought of returning someday to the same spot with the sycamore drum so that it could sing to its towering siblings.

How to Make a Two-Headed Drum

Find a tree trunk and hollow out the core.
If you can find a trunk that has been naturally bored through by bugs or decay, it'll make your work easier. Otherwise, you'll have to either carve out the center with a chisel or burn out the core with hot coals.
The air chamber of the drum body greatly influences the sound of the struck membrane. The deeper the chamber, the greater the resonance.

The top and bottom rim were ground smooth by abrading the stump against a flat, concrete pavement. The flatter the rim, the tighter the fit of the hide. Also slightly beveling the outer edges of the top and bottom rim will make the rawhide drumhead fit tightly.

As it dried, the sycamore stump, over time, developed fissures along the inside of the termite eaten core. I applied pine pitch sap, that was liquified with alcohol, to the cracks. The sap solution was reapplied and allowed to dry before continuing to the next procedure.

Deer rawhide was used for the two membranes and coconut coir was utilized for the lashings.

Soak the rawhide in a barrel of water for one hour or until pliable. Cut a circle of membrane that extends at least 2 inches beyond the edge of one opening. Cut out another membrane for the other opening.

Place the 2 membranes back to back and punch through both simultaneously. Holes were punched with an awl around the edge of the membranes at 2 inch intervals and 1 inch from the edge.

Center the bottom end of the drum body on top of its matching membrane and place the other membrane on top of the top rim of the drum. Align the holes of both membranes. Lace the rawhide drumhead. After lacing all the holes, the cordage is then pulled tight and tied.

A drumstick was made from a wild rose stalk. A groove was carved 1 inch down on the beater end. The stalk was fitted with a head of brain tanned buckskin and stuffed with buffalo hair. A buckskin thong lashed the leather head to the notched end of the wild rose stalk.

Double-headed drums entirely enclose the air chamber, but the flexibility of the second head affects the vibrating air within the chamber. A hole in the side of a double-headed drum is often made to allow air flow and therefore greater sound transmission (this is optional. If your drum sounds good, then a hole is not necessary).

The sycamore stump had a natural hole in its side that came from a knot in the trunk.

Humidity changes the resonance of drums of rawhide. A damp day lowers the sound. It is not unusual for a drumhead to be heated briefly over a fire to bring it to proper pitch.
I avoided this procedure whenever the dampness and humidity caused the membranes of the sycamore drum to soften. The cracks of the drum body were filled with pine pitch. Placing the sycamore drum next to fire would have melted the pitch, makng a sticky mess. When the drumhead softened from humidity, the sycamore drum was put away until the rawhide dried.

The new drum was brought to its original home. As the night enveloped the primitive campground, the sycamore drum made its appearance at the campfire. Aside from the crackling sounds of the fire, the night air was quiet and still, like the opening night at the opera. The drumstick baton was raised and the first beat of the sycamore drum echoed in the night. Its rhythm gave it a life of its own, as if to say, "I am alive again. Hear my voice! Hear me sing!"

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Puniu - Hawaiian Knee Drum

by Dino Labiste

The traditional Hawaiian hula was performed for religious purposes to honor gods, ruling chiefs and their family history. The hula involved dances accompanied by mele (music, song, prayers and poetical chants) and a variety of sound-producing instruments, some of which were musical. Others were used to beat time for hula dancers. Poetry, vocal production, sounding of percussion instruments, dance movement and sculptured drums were combined into an aesthetic production that in its totality was greater than the sum of its parts.

The musical instruments used by the ho'opa'a (drummer and chanter) were the pahu hula (dance drum), the pa ipu (double calabash drum that was cemented with breadfruit gum) and the puniu (coconut shell knee drum). The latter instrument was made from a coconut (niu), hence the name puniu. The coconut shell was prepared by cutting the stem end off level above its middle, or

greatest diameter, and a piece of shark skin membrane was lashed over the opening. The skin of the Kala (Acanthurus unicornis) fish was also used as the drumhead. The knee drum was tied above the knee with braided cords. A drum beater was made from a thick two-ply cord of coir fiber. This secondary drum was considered an extension of the pahu hula and the pa ipu. Eventually the puniu became an important object with distinctive sounds and conventions in its own right. The puniu was a percussion instrument endemic only to Hawai'i throughout Polynesia.

All 27 known ancient punius that are not of recent manufacture are in museum collections. Only one kilu puniu known in the museum collections was made of gourd. The rest of the puniu were made of coconut shell.

I will attempt to describe the methods of producing a puniu from a coconut shell. A more extensive description of the manufacture of the knee drum can be found in the Bishop Museum's publication entitled, "Arts and Crafts of Hawaii - Musical Instruments (ISBN 0-910240-42-6).

Use a round shaped coconut (niu wai) and husk it from its outer fibers. Save the fibers for plying into cordage for the lower ring (traditionally, the husk from the nui lelo was used for cordage material. This variety of coconut had a long, angular fruit in which the proportion of husk was almost 70% of the weight of the fruit.)

Materials for cleaning and sanding the coconut (left to right) - lava rock, pohaku 'anai (basalt stone abrader), 'opihi (limpet) shell and shark skin.

Scrape as much of the outer fibers clinging to the coconut shell as possible with the 'opihi shell.

Abrade and remove the remaining husk fibers with the lava rock and the basalt stone abrader. Also a pumice stone was used for rough sanding.

Cut the top area off the coconut (the section that has the eyes).
Abrading and sanding is done with the shark skin. Dry or green 'ohe (Hawaiian bamboo) leaves and yellowed 'ulu (breadfruit) leaves were used for the final polishing.

Kukui nuts for oiling the shell to a dark luster.
The kernal of the kukui nut is about 50% oil and is of the same class of drying oils as linseed oil.

Continued

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Puniu - Hawaiian Knee Drum

Applying the kukui nut oil to the coconut shell. Further polishing to produce a glossy sheen can be done by applying a few drops of kukui nut oil to a tapa cloth and rubbing vigorously over the outer surface of the coconut shell.

Materials for the lower ring (left to right) - tapa bark cloth from the wauke (paper mulberry) plant, sample of hau fibers, two-ply coconut fiber cordage wound into a donut shape 4 times and lashed

with hau cordage, sample of coconut husk fibers.

Traditionally, the lashings for the membrane were made from the olona plant.
Due to the unavailability of olona cordage ('aha), I substituted dogbane cordage for the lashing material.

Plying the dogbane cordage.

Wrapping the tapa bark cloth around the coconut fiber ring.
Hau cordage was wound around the coconut cordage to hold the shape of the ring.

Punching holes in the shark skin membrane for the dogbane lashings with a kui iwi (bone awl).

The shark skin membrane was lashed to the lower ring onto the coconut shell with the dogbane cordage.

The finished puniu minus the braided cords and the drum beater.

A version of the gourd puniu, showing the braided cords and the drum beater. Contemporary materials were used for the cordage and goat skin was used as the membrane.

Back to the beginning

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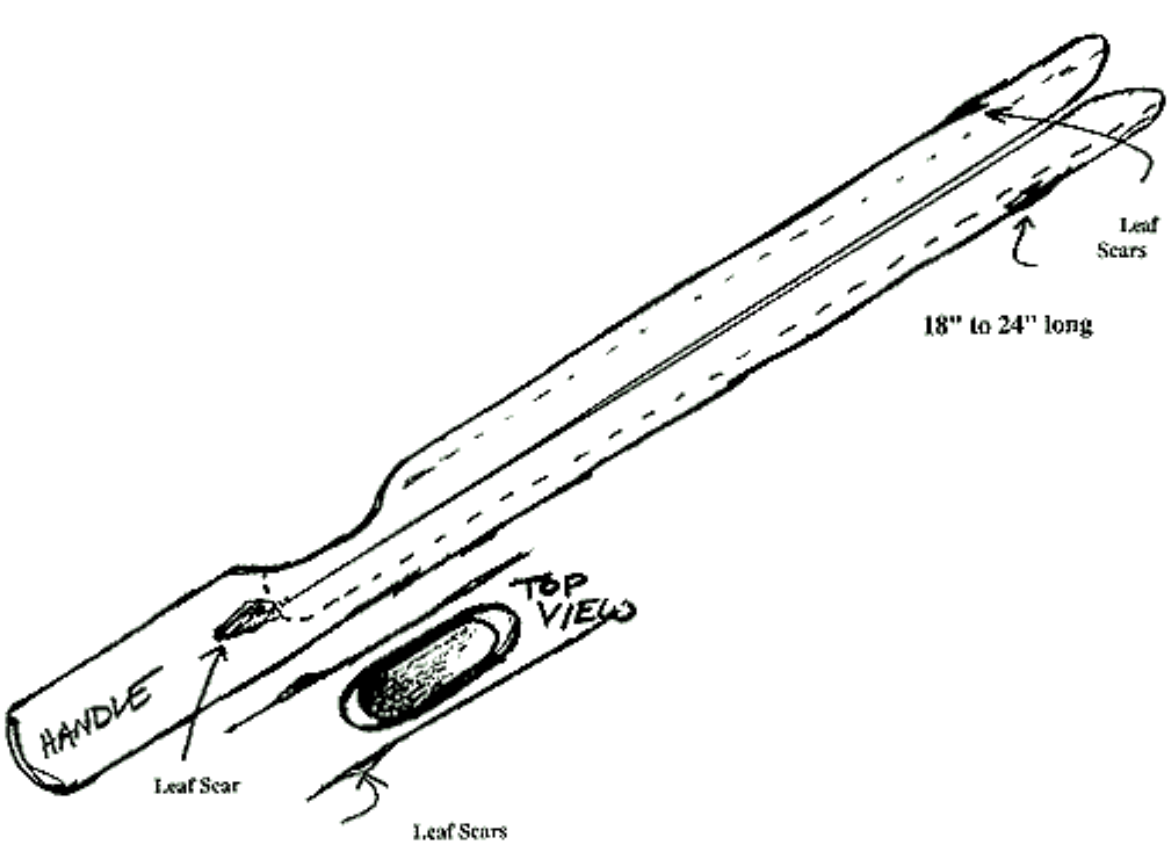
Musical Instruments of Central California

by Norm Kidder

Throughout Central California and beyond, music and dance were the media of communication with the world of 'spirits'. Songs were received from this realm during dreams or trances, and had associated powers enjoyed by the owner of the song. Songs were employed in hunting to 'charm' the spirit of the animal, during food preparation to guarantee proper results, in gambling to draw on the help of supernatural powers, in courtship to bring divine assistance to the cause of love, in ceremonies to communicate with the creative forces to restore or maintain harmony in the world, or simply to build your relationship with power (which is often called medicine). Songs were sung to greet the sun each morning, thanking it for returning to maintain its regular habits. In a world totally controlled by unseen forces, song and its visible representation, dance, were the means of maintaining the perfection of creation. The dances of the Northwest coast of California are called World Renewal dances, in Australia, men followed maps, called songlines, to periodically re-sing the world into existence, or else it might fade. In much of 'pre-contact' society, music and dance were anything but mere amusement.

The instrument most often associated with Indian dances in America today is the drum. The steady rhythm of the drum is likened to the heartbeat of the earth. In some parts of north central California, a section of hollow log was placed over a trench and pounded with feet or poles to produce a drum-like sound, but the skin covered drum was unknown until the arrival of Europeans. In it's place, various types of rattles took over the role of rhythm instrument.

The most common, and widely used rattle form was the split stick rattle, or clap-stick. The simplest was a piece of elderberry, bay or other straight grained wood (now also bamboo) about 2 feet long which was split length-wise, leaving an unsplit handle. Any pithy center was removed, and the stick was struck against the opposite hand to produce a clacking sound. If the split was controlled to approach one side, it produced a looser half which could be made to clap against its partner by snapping the arm with a stiff wrist in the air, creating a sound that has been compared to castanets. The same effect was achieved by carving away wood at the base end of one side (then the top) to make it limber enough to snap in the air. These rattles were used by the members of the chorus which accompanied ceremonial dances, and sometimes during gambling and doctoring. Today, these instruments, often made of bamboo and called batons, or just bats, are used by singers to establish the rhythms of the dances. One singer in particular, known as the rock, is responsible for controlling the movements of the dance while the others concentrate on the song.



Weakening hole allows one side (top) to flap against the bottom (optional).

Rattles may show up during other kinds of singing as well. Doctors of many specialties use rattles made of deer toes, large moth cocoons, or the split sticks to accompany their power songs as they call upon spirits to help cure an illness, bad weather, or other disharmony which needs 'fixing'.

Whistles also served as rhythm instruments, and were used mainly by the dancers (it would be hard for the singers to blow them). They were made either of elderberry, cane, or hollow bones, had a single hole cut near the middle with a plug of pitch or asphaltum to aim the air flow against the edge of the central hole. The combination of clap sticks, voices, whistles and movement create a rich tapestry that is certainly enthralling to the audience of people, and I assume to the spirits as well.

Two other instruments are known from our area which were used in more personal contexts. The musical bow was sometimes made for the purpose, although a hunting bow might also be used. One end of the bow wood is held against the teeth, and the string plucked or hit with an arrow or stick. Varying tension on the string can produce a range of tones. The sound is only clearly heard inside the head of the musician, making this a private experience. The last musical instrument known from the 'old days' was the flute.

Except for the Mohave peoples of southern California who used a typical plains type flageolet (the love flute still popular today) the remainder of groups used a simple open ended flute. This was made from a hollowed elderberry tube, with the ends beveled, and four holes burned or drilled in line along the center of the tube. It is played by blowing across the open end at an angle that will produce the flute-like note. The four holes change the note, but are not standardized into a specific scale. Each flute produces it's own music. Some flutes were played from either end, producing two different scales. At times the players added complexity to the sound by humming as they blew, creating a type of harmony. These flutes were used in courtship of both future wives and possible spirit helpers. The flute is simple to make but takes considerable practice to master. Receiving a powerful song with the aid of the flute however, would provide lasting benefit to the musician. (Songs were owned, and only worked for the original

receiver, although others might sing them.)

To make any of these instruments you must first find an appropriate piece of elderberry (Sambucus sp). If possible, harvest in the winter from a tree growing in a canyon where it gets enough sun light to grow strong, but not so much that it doesn't have to grow straight. If possible, let the piece dry completely (stripping the bark speeds this process), as it will be easier to work and won't warp later. **Also, elderberry juice is poisonous, so don't put green elderberry in your mouth. (Some people react to elderberry juice and get a skin rash.)**

For a flute, cut a piece about an inch or inch and a quarter in diameter, and 9-12 inches long, cutting through a node at each end if possible. Check to see how much of the cross section is wood, and how much is soft and pithy. The ideal for a flute is a minimum of 1/8 inch thick ring of wood, to a maximum of 3/16 of an inch. After the piece has dried, gouge out the pithy center using a hard stick with the end cut to a chisel edge. Smooth and polish the inside. Cut or grind the edges of the tube to a bevel from the outside (see illustration). Draw a line down the length of the tube and mark four points along it for the holes. Placement of the holes is determined by ease of fingering. Often holes were paired, with two fingers of each hand covering a set of holes. If the holes are not centered down the length of the tube, a different scale is produced by blowing each end. I use a piece of coat hanger wire heated red hot on a stove to burn in the holes.

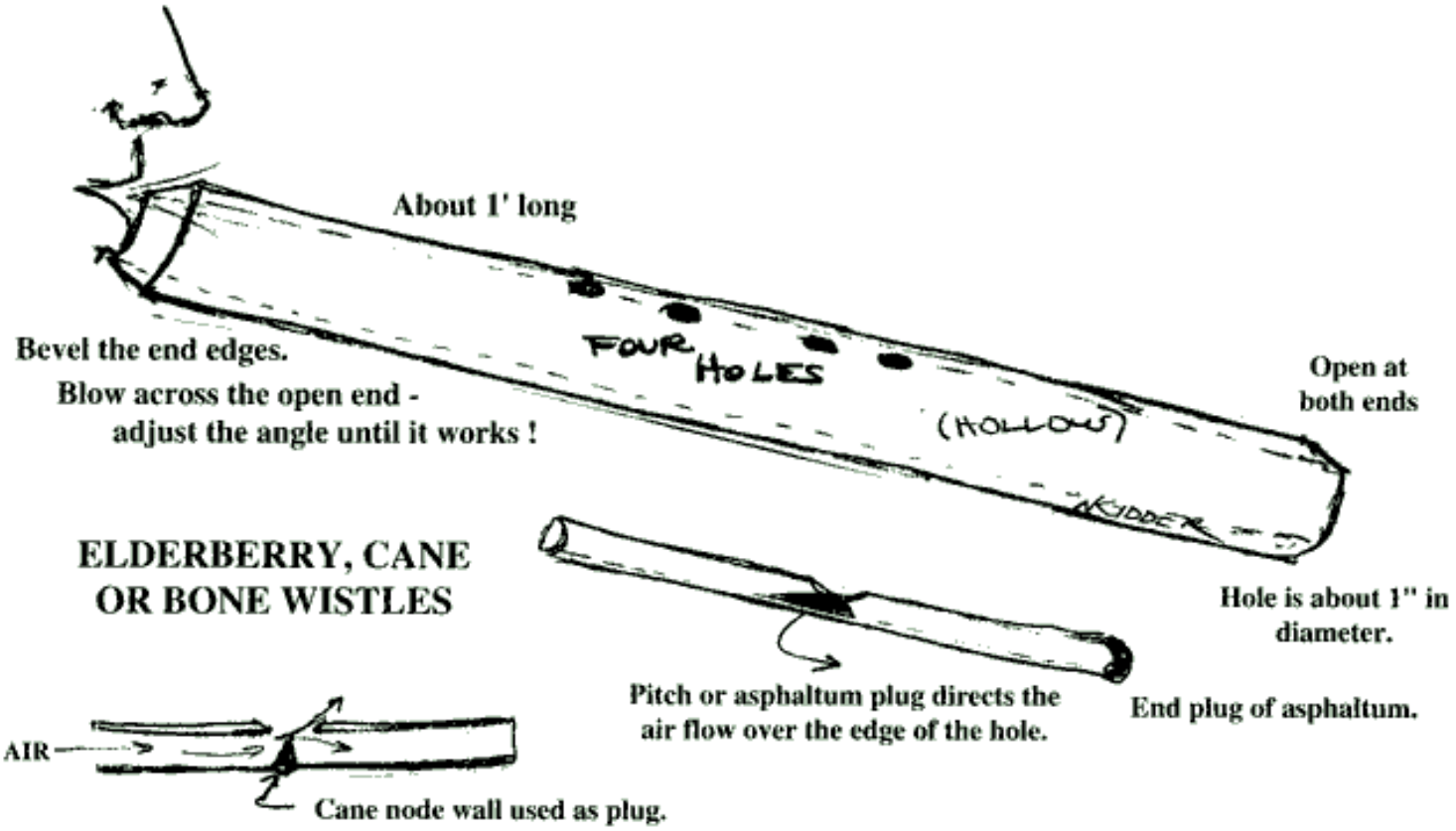
To play the flute, cover the holes and get comfortable, it could take a while. Hold the end of the flute to your lower lip, which should cover almost all of the opening. Tip the tube down at about a 45 degree angle, and blow across the upper edge of the flute, changing the angles until a flute-like sound is made. I find I'm almost whistling at the point where it works. Then uncover the holes to get notes.

It took me a long time to get a sound, and holding the angle requires real concentration.

To make a clap stick, find an elderberry branch between 1 and 1 1/2 inches thick, and 1 1/2 and 2 feet long. If possible, cut it so that there is a natural handle formed at one end by a leaf node. The wood thickness should be greater than for a flute, with 1/4 inch thick sides ideal. Strip off the bark and dry. Split the end away from the handle by first picking a line that will split between any leaf scars present on the 'working' end, and ending at the leaf scars forming the handle. Set a wedge or knife blade on your line and carefully split the stick down to just short of the handle. Its better to split too short than too long. If the split was successful, carefully pull the two sides just far enough apart to slip a knife between them and cut away some of the pity core. Once you have created an open channel down the center of the stick use a long hard reamer to push out and break up the remaining pith down to the handle. At this point, hitting the clapper against your hand or leg should produce the clapping sound. If not, slip a thin piece of bark, buckskin, or such down to the bottom of the split to spread it slightly. To make the instrument more responsive, pick the half of the clapper that seems the looser, and make it progressively more so by cutting away wood just above the handle (see illustration) until it flaps easily, but doesn't break.

Playing the clapper is done by slapping against anything, or by snapping in the air while keeping the wrist stiff. If you round the ends as in the drawing, the dapper can be played by rolling down the fingers on the way to the leg, creating even more rhythmic possibilities.

The Elderberry Flute of Central America



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E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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Random Thoughts on Tradition vs. Technology

by Norm Kidder

Objects, possessions (pride in having), materialism, Western Culture vs. process (pride in doing), relationships, results, Indigenous cultures. Primitive technology used whatever was available to get the result, but the result wasn't in making something to have and put on display, it was to provide food, water, shelter, family, fun and/or the future. Pride in workmanship often went beyond making things that were pleasing to look at, but also that would impress the spirits who controlled the world. Doing your best and following traditions were a way of showing respect both to your elders (teachers) and to the materials you depended on for the object.

Our Society has both kinds, those that collect artifacts and/or make them for show and sale; and those who learn to make things to use. Both have value and can help broaden the inquiry, but the pursuit of primitive technology implies also the pursuit of the values and purposes behind the technologies. Often this means doing the job at hand with the simplest tools, often unmodified objects, as most hunter-gatherers didn't have pickups to haul around all their stuff. An exhibit in the California Academy of Science in San Francisco explained the apparent lack of artifacts in an exhibit on the Australian Aborigines with the idea that the apparent simplicity of the tool kit belied the knowledge of materials that allowed the hunter to use what he found to accomplish the task. The tool kit is in the head, not the hand.

Maybe we need a labeling system which classifies "replicas" as High, Medium, or Low tech, with low tech reserved for objects made with all stone age materials and tools; medium would allow metal hand tools like adzes and knives, copper knappers, etc.; high tech would allow power tools, cut slabs, or anything else. Personally I'd like to know how to do things at all three levels. There is something almost mystical about making and using a tool completely with things you've made yourself from 'the wild'. It helps you put yourself in perspective, as part of the place you inhabit, and builds your relationship with the earth. It also gives you greater respect for our ancestors who functioned at this level normally. At the same time there is something strange about not using the best or easiest tool to do a job. A group of people, including local Indians while rebuilding a dance house, commented they were glad no archaeologists were involved or they couldn't have used

chain saws to cut the timbers. To them traditional meant the task and the group effort and feelings, not the specific tools. Everything depends on the intent and feelings of the practitioner.

From my observations, we each go through our own evolution. We begin wherever we get inspired. Someone turns us on, and they may be functioning at any technological level. At first we are inspired to produce something, which then becomes an object of pride. Once the skill is mastered just doing it isn't enough, and the process must be shared in some way, by giving away the product or teaching the skill. Eventually we need to explore the edges of the envelope, in at least one direction (high or low tech), or maybe both. The need is to make the technology relevant to 21st century life. Some of us attempt to "go bush" and live the skills. This is personally gratifying but not a practical choice for large numbers of folk. Possibly we commercialize the pursuit and produce for sale, or teach for money, treating the skills as a commodity. A few of us even make our living this way. Most of us would probably consider our endeavors as a hobby, with no purpose but satisfying our curiosity. Many folk I've talked with have at least a mild fear that these skills may again be the dominant survival strategy in a few years.

The challenge I feel while sitting at my computer is to use what I learn from the 'old ways' and apply it to my 'now ways'. The most obvious for me is in being a maker of useful things. I get a deep sense of reality when I produce my own food, build my own structure, or make my own everyday tools. Recycling and composting contribute to a sense of being part of the cycle. This gets extended whenever I buy handmade things to use, when possible from the maker, to encourage this kind of direct involvement in the world. When shopping I may look to buy the least processed foods, so I have the maximum involvement with food I don't grow.

One of the most important aspects of old ways was the sense of community, and cooperation. Where I live these are hard to find. Sharing tools and time with a few neighbors is all that's left. The sharing that goes on in the Society of Primitive Technology takes on aspects of a community. Primitive technology by its nature tends to be communal. As population grows we spend less time dealing with people and more with stuff. The flickering light and story telling of the campfire has given way to the flickering light and storytelling of the television. No more gathering of women to wash their clothes at the well, now each sits alone with a work saving machine.

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E-mail your comments to "Norm Kidder " at atlatl1@aol.com

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Primitive Crystal Light!

by Bob Gillis

"Quartz crystals light up!" when rubbed together with pressure in the dark.

Choose crystals large enough to get a hand on and that each have at least one flat side.

The physics of crystals and mechanical stress.

E-mail your comments to "Bob Gillis" at shelter@best.com

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The Scientific Explanation

The mysterious light that is created when you forcefully rub two quartz crystals together is a known property of certain crystals called the piezoelectric effect (see definition below). Electric current and light are produced by some crystals and ceramic materials when they are subjected to mechanical pressure. You can also produce the piezoelectric effect by chewing on Wint O Green Lifesavers (the only kind that works) in the dark. Try it in a dark bathroom in front of the mirror and chew with your mouth open (or try placing the lifesaver between your front teeth and snapping it in half with your teeth and fingers). Talk about a bright smile!

Piezoelectric Effect:

Voltage produced between surfaces of a solid dielectric (nonconducting substance) when a mechanical stress is applied to it. A small current may be produced as well. The effect, discovered by Pierre Curie in 1883, is exhibited by certain crystals, e.g., quartz and Rochelle salt, and ceramic materials. When a voltage is applied across certain surfaces of a solid that exhibits the piezoelectric effect, the solid undergoes a mechanical distortion. Piezoelectric materials are used in transducers , e.g., phonograph cartridges, microphones, and strain gauges, which produce an electrical output from a mechanical input, and in earphones and ultrasonic radiators, which produce a mechanical output from an electrical input. Piezoelectric solids typically resonate within narrowly defined frequency ranges; when suitably mounted they can be used in electric circuits as components of highly selective filters or as frequency-control devices for very stable oscillators.

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Weaving a Lauhala Mat

by Shirley Albright


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Part Three: *Begin the Weaving*

Bring the strip up and cut it off. Continue to make points on the two end sides of the mat and trim all the ends.

Part Three: *Begin the Weaving*

Cut off the excess strip by laying a sharp knife next to the last under weave.

Part Three: *Begin the Weaving*

After folding your points, weave the ends of the point into the weaving to make them secure. Here, I have cut the end of the strip at an angle to make it easier to thread through the weaving.

Part Three: *Begin the Weaving*

Thread the strip through several weaves.

Part Three: *Begin the Weaving*

When you are ready to finish the mat, you will need to make points on each end too. Because the rows here are single rows (remember, you laid out the strips under the masking tape) you will have extra strips hanging out and visible under the points already made in the picture. After you have made all your points, just trim these extra ends off.

Part Three: *Begin the Weaving*

If you want to take a break, or cannot finish in one day, cover your weaving with very damp towels to keep the lauhala pliable.

Part Three: *Begin the Weaving*

The lengthwise strips can also run out. Just double up with a new strip for several weaves, then cut off the old one. The clothespins are holding new strips in. You can also put just a dab of wood glue to hold the new strips in, but it isn't really necessary.

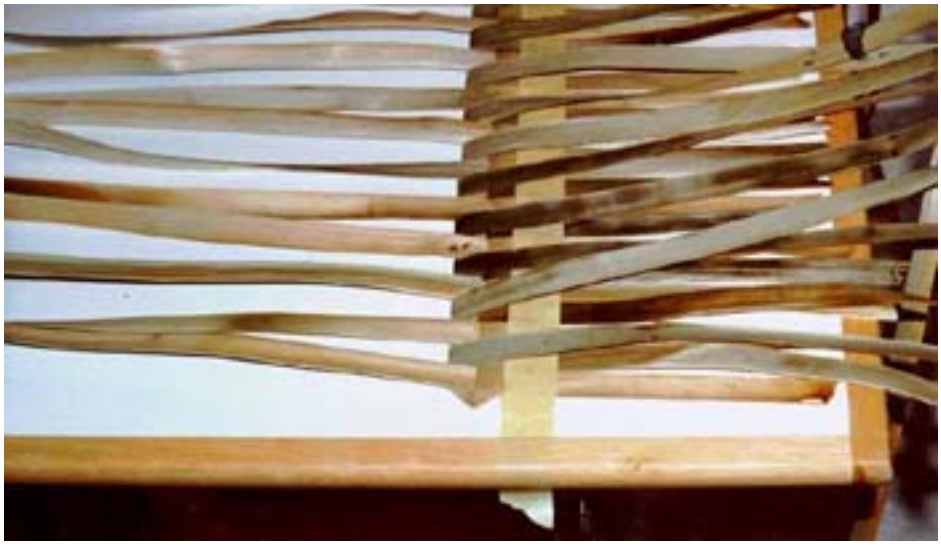
Part Three: *Begin the Weaving*

Having a helper makes the weaving go really fast. Still, even with the two of us, it took over ten hours to make a three by four foot mat.

Part Three: *Begin the Weaving*

Continue weaving as directed. Note here, there is a slight bulge in the middle of the mat. I will have to tighten my weaving in the middle to compensate. As you can see, I will also have to patch a strip in the middle, as these two ends are too short.

Part Three: *Begin the Weaving*



The completed double row of weaving, and ready for the next koana to be woven in. Remember to alternate butt and tip ends.

Part Three: *Begin the Weaving*

Here, I have patched in a new strip. I am completing the point at the other side of the mat. I will overlap the two strips for four or five weaves, then cut off the excess. Always trim so that the ends are hidden under a weave.

Part Three: *Begin the Weaving*

Now fold the same strip over itself to go back south. The strip will now begin the next strip to be woven in, and also completes the point. Thus, there is one complete point at either side for each two woven rows. Sometimes the strip of lauhala is long enough to make two full lines of weaving. In this case, you can see that the strip is too short. It will be necessary to "patch" with another strip. To patch, just lay another strip right on top of the short strip, and weave with the double strip. You want to make sure that the strips overlap several weaves to keep everything secure.

Part Three: *Begin the Weaving*

This is a better picture, and you can see how the strip was folded under. Crease the fold.

Part Three: *Begin the Weaving*

Here, you can see the finished strip, all woven and locked in. It is necessary to lock the ends of each strip, so that they will not "unweave" themselves. You will be making a folded point on each end of each strip. Taking the end of the newly woven in strip, fold it under itself to form an "L" (if the strip was previously running north-south, you have just folded it west.).

Part Three: *Begin the Weaving*

The next strip, the seventh from the bottom, on top of the tape, is lifted over the new strip. Next, the sixth strip from the bottom on the left, will be folded back over the new strip and so on.

Part Three: *Begin the Weaving*

Now you begin to weave by folding back each unfolded strip and folding the folded strips over the new strip. Confused? The process is a simple over one, under one weave. Because lauhala allows you to fold back and crease the strips, the weaving is easier, and the folding back and creasing actually locks the new strips in as they are woven. While it may be confusing at first, this keeps the weaving nice and tight. Continue to weave in the new strip. In the picture, I am lifting a previously unfolded strip back over the new strip (weaving toward the bottom of the picture).

Part Three: *Begin the Weaving*

Lay the new strip next to the masking tape, and on top of the unfolded strips on the table. In this picture, you can see a new strip on top of the unfolded strips under it and the previously folded back strips are on the right. Butt the new strip right next to the masking tape.

Part Three: *Begin the Weaving*

Weaving lauhala is unlike any other material you can weave. Here, you are going to lift every other strip and fold it back over the masking tape. Crease each fold with a fingertip. When you have every other strip folded back and creased, pick up a new strip of lauhala and find the good side.

Part Three: *Begin the Weaving*

Here, all the strips have been laid out, good side up, and the ends alternated. Now you begin to weave!

Part Three: *Begin the Weaving*

Lay a strip of masking tape on the side of your weaving area about a foot wider than you want your mat. If this is your first mat, I would advise you to start small, maybe two feet by three feet. In this case, your masking tape would be three feet long. Check each strip of lauhala to determine which is the "good" side. Begin to lay out your lauhala, good side up, with about six inches of each strip sticking to the left of the strip of tape (if you are right-handed, then the rest of the strip to the right of the masking tape. If you are left-handed, put the tape on your right , and reverse all directions from now on.) Make sure that the strips are butted up right next to each other. In this picture, the bottom six strips are correctly aligned, but the seventh strip has slid under the eighth. Adjust this before you begin weaving. Also alternate each strip, (keeping the good side up) so that you have butt, then tip, then butt. This will keep your mat even, and equally strong.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

Run the stripper down the leaf, trying to keep the edge of the leaf aligned with the third needle. You will end up with two usable strips and one smaller one on the midrib side.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

You may also use your cardboard stripper to cut the strips of lauhala. Line up the side of a leaf with one of the needles. Here, I have lined up the side of the leaf with the third needle from the left.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

The leaf (previously split in half down the midrib) is run through the blades using the raised board at the bottom of the stripper as a guide to keep the strip straight. If you would like the plans to construct a stripper of your own, please e-mail me at basketmaker@hotmail.com.

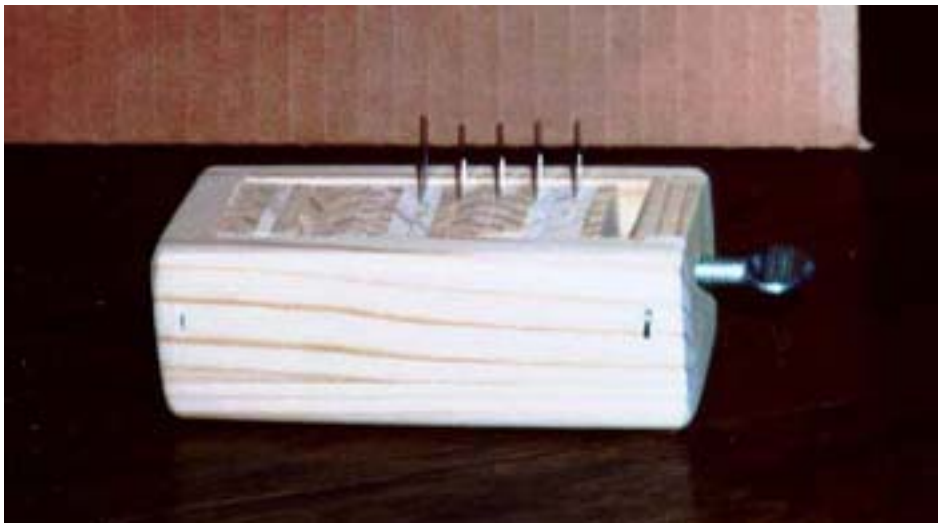
Part Two: *The Next Morning, Preparing the Lauhala Weaving*

Here, I have set my stripper to cut half-inch strips.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

This is my stripper, which I have used for eleven years. This one clamps to a table, which is very helpful. It also holds all its own components in the sliding box on top.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*



This is a hand held stripper from the Big Island of Hawaii. It uses razor blades, held by tension in between small squares of particle board. By varying the number of boards, you vary the width of the strips you will cut.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

Now strengthen the leaf by running it under something hard. You can use the back of a dull knife, or in this case, a piece of thin board. Push down on the board into a damp cloth, while pulling the leaf between the cloth and board. This makes the leaves stronger and more flexible. This step is not required, but does result in a better mat.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

Split the leaf down the middle. You can do this with your thumbnail. The leaves come apart at the midrib very easily. Examine each strip. Note that there is a butt end, which is thicker, and a tip end, which is flimsy and may be weak. Also note that there is a "good" side of the leaf, which is shiny, glossy and smooth, as well as a "bad" side, which is dull, darker, and has visible lengthwise lines running along the leaf. You will be weaving with the good side up, and alternating butts and tips.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

Lauhala should be cleaned and strengthened prior to weaving. Wipe each leaf with a damp cloth as you take it out to strip. Here, I am wiping off dirt from Samoa, as that is where this lauhala originated.

Part Two: *The Next Morning, Preparing the Lauhala Weaving*

The pile must stay damp to mellow the lauhala.

Part One: *The Night Before Weaving*

If you are not going to get started the first thing in the morning, give the pile an additional wetting.

Part One: *The Night Before Weaving*

Your pile should look something like this. Now saturate the pile with water. You want this wet, but with no standing water. If you are leaving this outside in dry weather, be sure to cover it with plastic or a tarp to keep the moisture in.

Part One: *The Night Before Weaving*

Fold over the sides of the towels, and add extra towels where needed to completely cover the leaves. Move the weights to the outside of the towels to hold the leaves down.

Part One: *The Night Before Weaving*

Using weights where needed, put all the lauhala needed onto the towels.

Part One: *The Night Before Weaving*

Gradually build your pile of lauhala.

Part One: *The Night Before Weaving*

This can get frustrating. Use boards to hold the lau down.

Part One: *The Night Before Weaving*

Cut open the koka'a of lauhala and pull leaves off. You will need about a half to two-thirds of your roll, depending on the size of your mat. Using a board to hold the lauhala down, begin to stretch out the strips.

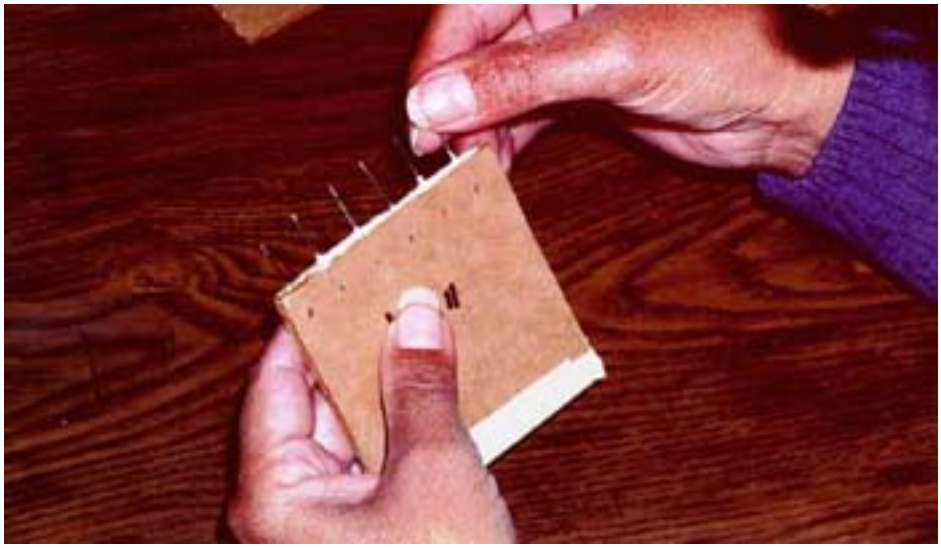
Part One: *The Night Before Weaving*

In a spot that will not be harmed by water, lay out your towels to form a rectangle about seven feet long. I used my parent's patio.

Part One: *The Night Before Weaving*

Check to make sure your needles are aligned and even. Adjust and reglue, if necessary.

Part One: *The Night Before Weaving*



When the glue is tacky, stick needles into the square cardboard, lining up the needles with the marks you have made every half-inch. Occasionally as the glue dries, adjust the needle to make sure it stays at the marked point. Let it dry until hard, preferably overnight. Because the glue is now tacky, the square can dry lying down on its side.

Part One: *The Night Before Weaving*

In between fillings, prop the cardboard against something so the glue will flow in the proper direction, and not out onto your table.

Part One: *The Night Before Weaving*

You may need to refill the end several times, as the glue drips down into the cardboard.

Part One: *The Night Before Weaving*

Mark the square where the needles will go. While you'll be using half-inch spaces for this mat, the Polynesians made mats with as fine as a sixteenth of an inch koana. Baskets may use a one or two inch koana, while bracelets might use an eighth or sixteenth-inch strips.

Part One: *The Night Before Weaving*

A piece of masking tape on the opposite end keeps the glue from leaking out.

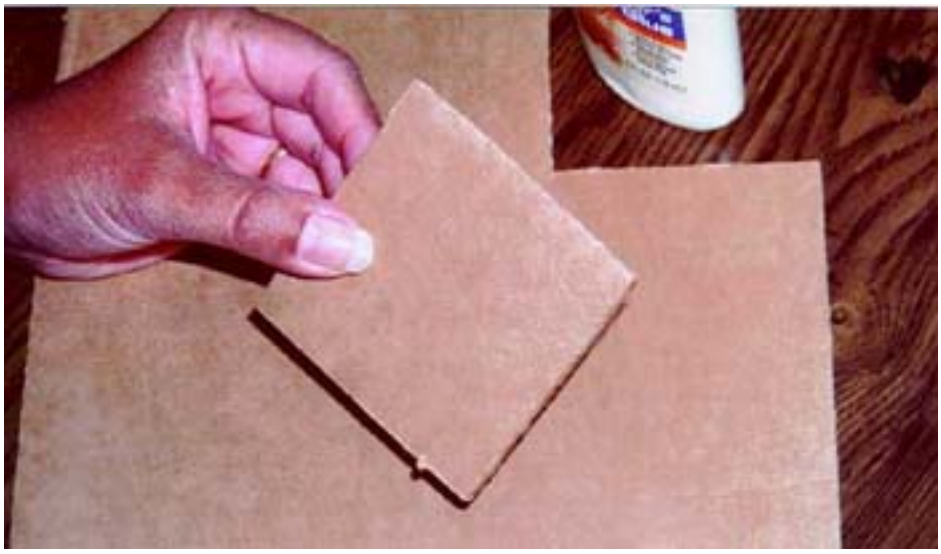
Part One: *The Night Before Weaving*

While the glue is setting up, measure and mark where the needles will go, about a half inch in from the glued end. For the mat, you will need to mark half-inch intervals.

Part One: *The Night Before Weaving*

Fill one end of the cardboard with wood glue, squeezing the bottle to force the glue into the holes.

Part One: *The Night Before Weaving*



To prepare the koana, or usable strips of lauhala, you will need to make a stripper. This makes uniform strips that are easily weavable. Start with a four or five inch square of cardboard.

Part One: *The Night Before Weaving*

Lauhala is sold in rolls of fifty to a hundred leaves. The lauhala roll is called a koka'a or kuka'a. The rolls are usually tied with strips of the lau to keep the roll together.

Lauahala Mat Weaving: Introduction and Materials

These are instructions for weaving a mat from lauhala, the long flexible leaves (lau) of the hala tree. The variety found in Hawaii is Pandanus odoratissimus. On the continental United States, Hala is called pandanus and also grows in Florida. It is also called screwpine, because the long leaves grow in a screw pattern up the truck of the tree. The hala that grows in Florida has three sets of vicious thorns which grow along the sides and midrib of the leaf, and must be removed before weaving. The lauhala we will be using is purchased, and is a thornless variety. Lauhala is available from The Caning Shop in Berkeley, California at www.caning.com.

You will need the following tools and materials:

1) Several large towels
2) Sharp paring knife
3) Table knife
4) Cardboard
5) Wood glue
6) Masking tape

7) Needles, preferably Sharps, all the same size
8) Boards or bricks to weight down the lauhala
9) A source of water
10) A flat place to weave, such as a waterproof table
11) Scissors

Part Three: *Begin the Weaving*

Your finished mat. Again, the right side is not as dry as the left. It will dry to a beautiful light tan, and the wonderful smell will last for a year or two.

Some helpful books:

The Craft of Hawaiian Lauhala Weaving, by Adren J. Bird, et. aL, University of Hawaii Press, 1982 (ISBN # 0-8248-0814-2), available through The Caning Shop (this is the best book for the novice).

Kupuna Maunakea's Lauhala Preparation and Simple Weaving, by Kupuna Katherine Karrialukukui Maunakea, privately published, Nanakuli, Hawaii, 1986.

The Story of Lauhala, by Edna Williamson Stall, Petroglyph Press, 2000 (ISBN# 0-912180-52-8) (no instructions, just a history and illustrations of uses).

Fun with Flax, 50 Projects for Beginners, by Mick Prendergast, Reed Books, 1987 (ISBN3 0-7900-0053-9) (anything that can be woven with flax can be woven with lauhala. Instructional book with toys, braids and headbands to weave).

E-mail your comments to "Shirley Albright" at basketmaker@hotmail.com

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Processing Shark Skin into Rawhide

by Dino Labiste

If you live near the ocean, there is bound to be a fishing port somewhere along the coast. Where there are fishing boats, there are fish markets nearby to sell the marine catches from the fishermen. Some of these fish markets will have shark meat to sell for public consumption. Most of the shark meat sold will have the skin attached. You may either buy the whole meat with the skin or talk to the owners to see if they will give you only the shark skin.

To begin the process of turning your shark skin into rawhide, start by separating the skin from the meat with a knife. Be careful not to cut into the skin. You'll find bits of meat and stringy membrane still attached to the underside of the skin. With a butter knife, placed at 90 degrees to the underside of the skin, scrape off as much of the remaining meat and membrane as possible.

You may or may not use the next procedure. This involves soaking the shark skin in a jar of urine for a day or two. Some indigenous cultures have used this process to dissolve any fatty tissue or loose meat from animal hides, thus making the cleaning process a lot easier. For additional information on urine tanning, read Lotta Rahme's book, entitled "Leather: Preparation and Tanning by Traditional Methods".

I have used the urine solution on salmon skin, since the salmon skin is greasy. The photo above shows a finished, processed salmon skin glued to a piece of leather that I used for a shoulder pad on my quiver strap.

Soaking the shark skin in urine didn't do much for the cleaning process, since the skin was not fatty to begin with. The urine bath did soften thin layers of meat still clinging to the skin, thus making it easier to scrape off. I thoroughly rinsed the shark skin in fresh water to get rid of any urine odor after soaking in the urine solution for 2 days. I also squirted some antibacterial soap into the water to rinse out any further urine smell. I then took a butter knife and did a final scraping of the underside of the skin.

You'll notice from the photo that not very much membrane was scraped off. If you do a good job at the beginning of scraping the underside of the skin, you don't have to do the urine bath.

Squeeze out as much of the water from the shark skin. Stretch out the skin and tack it to a cardboard to dry. The cardboard will help to absorb some of the excess water.

As the shark skin dries, it will shrink on the cardboard and may pull the tacks loose. Inspect the skin every now and then and remount any loose tacks.

After the skin has totally dried, you will need to thin out the skin. With some kind of scraping implement (I used my hide scraper), scrape the underside of the shark skin. If you don't have a hide scraper, use your knife (not the butter knife, but a sharp knife) at a 90 degree angle. Be careful not to cut into the skin.

Further abrading can be done with a pumice stone or sand paper.

Thin the shark skin according to what you will be using the rawhide for.

Shark skin rawhide.

Historically, shark skin has been used as an abrasive and, in Asia, to decorate sword hilts and sheaths. Dried but untanned skin, called shagreen, was once used like fine sandpaper for polishing wood. Shagreen was also used for the membranes on drums in the South Pacific.

The most chacteristic feature of shark skin is its roughness, resulting from the placoid scales, or denticles, embedded in the skin. It was not until World War I, however, that a way of tanning the skins of large shark was found. The breakthrough was made when a chemical process that could remove the denticles without affecting the tanning process of the hides was developed.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

Brain Tanned Buffalo Hides

by Markus Klek

Markus Klek wrapped in one of his hides.

With this article, I am picking out one small element of the complex interrelationship of native people and their environment and what can be learned from it today. I would like to honor the Buffalo Nation and all our non-human relatives, whose lives we take to sustain ourselves, and maybe help to reevaluate the way we use our resources, especially when a life has been spent for them. The buffalo is one good example of this tragic process; a creature that has been exploited to its almost complete destruction. Even today this tragedy is continuing to a certain degree in Yellowstone National Park, home of the last wild and

unfenced buffalo herd in the USA. For information check www.wildrockies.org/Buffalo.

Image to the left: Dakota Sioux pictograph of a buffalo.
Image to the right: Petroglyph from Saskatchewan, Canada.

The article will describe the art of tanning raw bison hides into robe size hides with the hair left intact; similar to the way as practiced by the women of many Native American tribes on a large scale, until the end of the 19th century. It will be a step by step description of the work process and also the use of bison hides, including quotations and observations made by early travelers and pioneers amongst native tribes of the 18th and 19th century.

I still remember a drawing I made when I was a kid back in Germany. It was a self-portrait of me dressed in leather with a fur cap on my head and a rifle in my hand. I presented it in school and explained that I wanted to be a trapper when I grew up. The teacher laughed and said that all little boys liked cowboys and Indians and that those feelings would disappear, as we grew older. I was very angry with her. The underlying fascination of the powerful buffalo, that shaggy beast, that in our modern world looks like a relict of times long gone by, stayed with me for all those years.

My first encounter with live buffalo was a rather unimpressive one. In my early twenties, I traveled to New York and went to visit a friend in Buffalo, NY. After arriving at the train station at night, he drove me to the local zoo to see the namesakes of his town. There they were, in a small enclosure, sadly staring from the dark into the headlights of our truck. Today I live in San Francisco and am fortunate to have a small herd of bison close by. They live in Golden Gate Park in the middle of the city (for info check the site: www.bwfly.com/watchbison). I got my first real piece of buffalo from those animals in the form of shed winter hair that I collected when I was volunteering to help clean up the paddock. Then one day I ran across the address of Jim Miller of Michigan, the first man I heard of, who was brain-tanning buffalo hides and teaching classes too. When I called him, he said I need not apply for class until I had tanned at least a half dozen deerskins and a bunch of pelts. Therefore, a few years later after I had accomplished that, I traveled to Michigan in January and was fortunate enough to have a one on one class with him. (call Jim at "Willow Winds" 515 736 3487 for information on his classes or a copy of his booklet "Braintanned Buffalo Robes, Skins and Pelts")

Buffalo herd in Golden Gate Park (photo by Jesse Leake)

About Braintanned Buffalo Robes

Braintanning is not a strictly Native American art, but was practiced in many parts of the world throughout human history. For example, the Iceman from Italy wore braintanned skins. ("Der Mann aus dem Eis "by Angelika Flechinger and Hubert Steiner, also "Leather" by Lotha Rahme on European tanning tradition)
Unlike modern day commercial tanning, braintanning is an environmentally safe way of tanning that does not use or produce any toxins or chemicals.
These tanned buffalo hides had a multitude of uses for native people. They were used as bedding, for example among the Kiowa as described by J.J. Methvin: "When a boy or girl grows up to sufficient size or age, a Pa-lo-tle-ton is set apart for his or her exclusive use. This is a buffalo robe, neatly dressed, made of a full skin, with the head fastened by the lips to the heads of their lounge- like, willow beds. The On-ta-koi is the ordinary robe for the bed. It is only a half robe, and cut off also at the neck. The hide of the Pa-lo-tle-ton is carefully taken off, with all the skill of the taxidermist, so as to preserve its full covering of the head, with even the horns and eyes and ears and lips, and also the legs down to the hoofs, and sometimes even the hoofs are retained."

Black Eagle (Assiniboin), 1908
As the last wild buffalo herds got wiped out in the early 1880s, we can assume that the robe, worn by the man in this photo, was at least 25 to 30 years old at the time his picture was taken.
Photo courtesy of AZUSA Publishing

Bison robes were also worn by both sexes instead of overcoats to give protection against the elements. As Marquis writes about the Crow: "Often such an article served as a substitute for an entire suit of clothing with only the ever-present Indian breechcloth underneath". Jesuit Joseph F. Lafitau writes in the 18th century: "they drape themselves in robes, holding the skins closed with their hands unless they were traveling, in which case they would tie them with a belt towards the middle of their bodies". Boller also observed among the Mandan, that women getting firewood in winter were: ".belting their robes around them in such a manner that, while affording a complete protection of their bodies, the free use of the arms was not interfered with." The robes also doubled as canvases for representing belief systems or experiences of individuals or the society as a whole. The female symbol language used for painting hides, varied from the artistic language of men. The decoration of hides could be a very organized undertaking that was highly esteemed in the society. (See Grinnell's description of women's privileged Quilling societies among the Cheyenne or Virginia Bergmann Peters statement of Mandan women wearing rings and bracelets to show the number of robes decorated) The third use of hides was as trade items in intertribal trade and especially as a major trade item in trade with non-natives, to procure the highly valued European made goods. James A. Teit for example states of intertribal trade in "The Salishan Tribes of the Western Plateaus": "The Crow robes were most highly valued. Often a horse and, in addition, a well made leather shirt, was paid for one of the best robes." On the other hand, James W. Schultz relates an episode on a trading transaction in 1879, between a white trader and the Blackfoot man Bear Head, who paid 10 "head and tail" (full uncut skins) buffalo robes for a 44 caliber Henry repeating rifle including 300 rounds of ammunition. (As stated below, one woman was able to prepare approximately 10 robes a season) Of course, prices varied over time and region and so did the quality of the prepared robes amongst the tribes.

Swiss artist Rudolf Kurz observed the following in the middle of the 19th century: "The Absaroke (Crow) are famous for their robes, in no other nation are the dressed skins so soft and pliable." Whereas Verendrye writes a century earlier that the Mandan dress skins more skillfully than any other tribe.

Another area where tanned robes found use was in various religious ceremonies that required representation of the Bison or its significance to the people. Participants would wear or use the robe to represent or call upon these properties.

Black Elk, the Lakota holy man, has described the use for robes in almost all of the sacred rites of his tribe. These robes were tanned in a ritual manner, but I have not found any reference to a description of

such a ritual. The hair of the buffalo was believed to contain the soul of the animal. Especially skins from albino bison were highly valued by most tribes. These white hides found use for example in the buffalo-calling ceremony of the White Buffalo Cow society among the Mandan.
Joseph Epes Brown says in his book on Black Elk: "The buffalo was to the Sioux the most important of all four-legged animals, for it supplied their food, their clothing, and even their houses, which were made from the tanned hides. Because the buffalo contained all these things within himself he was a natural symbol of the universe, the totality of all manifested forms. Everything is symbolically contained within this animal". A complete investigation of the complex role the buffalo played and still plays for many North American tribes is more than can be accomplished in the framework of this article.
Virginia Bergman Peters' book, "Women of the Earth Lodges" cites a lot of miscellaneous uses for tanned and untanned bison hides. It includes making them into sleds in winter, using them as scare crows in corn fields, or making hides into "trampolines" by holding onto the edges and tossing people into the air. The list is endless, further products made of buffalo skins include tipi covers, clothes, shields, boats, bags etc. A buffalo hide is a very versatile article.

Comanche leaders (1863.) wearing traditional buffalo robes over European style clothing. This interesting photo is a very good source for studying the degree of pliability and softness achieved in buffalo robes. Additionaly two staking/lacing holes can be seen on the bottom of the left robe .
Photo courtesy of British Museum (negative # MM034564-25)

Continued

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The Work Process:

Getting hides

Most hides tanned into robes by native women, were the skins of young cows killed at a certain time in the winter for the best fur (starting November, according to James W. Schultz, who lived with the Blackfeet). In addition, Bulls of a young age were good for robes. On the other hand, Shepard Krech theorizes in his book "The Economical Indian", that: "cow robes with the hair on were lusher than the thin haired bulls."
Unfortunately, most of what is available for tanning today are bull hides. Most of these animals are killed at an age of 18 months, and they make nice robes. In general, the older the animal, the harder the skin is to tan.
Tanning is an art form. To choose the right animal for the right hide at the right time of the year for a given project was something native people learned to master.
I tried contacting local sources for hides, so that I could actually go to the ranch and look at the quality of the skins and 'meet' the buffalo but it worked out best for me to order them via UPS from the North American Bison Cooperative in North Dakota (701 947 2505). Currently they charge $135 plus $25 for shipping . I also recommend checking the web site www.bisoncentral.com for ranchers near you.
These are salted hides, which are semi dry. The best time for getting them is wintertime to be sure they haven't been stored for too long as that might affect the quality of the skin (the hair might start to slip). Some people do not like salted hides, but they work fine for me.

Soaking

After getting a hide, it has to be rehydrated and washed to remove the salt. Running water would be the best choice for this but a 40-gallon trash can works also. Tap water has the advantage of containing chlorine, which kills bacteria and so prevents premature hair slippage. Sometimes I wear rubber gloves to prevent infection, especially when my hands are bruised or cut.
I soak my hides between 12 and 24 hours and change the water as often as possible.
I wash the hair side of my skin with soap or shampoo to further clean the fur. A lot of dirt will also drop out of the hide while I work it. In addition, if the water does not taste salty anymore that might be an indicator that I have washed out as much salt as possible.
I make sure the hide is thoroughly soaked and limber.
The edges especially tend to curl up and stay dry, as well as areas with big chunks of meat on tend to absorb the water slower.
An unfleshed and soaked hide is not a lovely sight but it makes you realize the miracle of transformation that will take place through the work of your hands and natures masterplan. A heavy cold and stinky piece of flesh turns into a less stinky, durable, warm and soft robe.

Markus standing next to a huge buffalo bull hide at Willow Winds in Michigan.

Racking

To be worked on, hides were either stacked out flat on the ground or put in a rack. I use a rack as I work in my basement that has a concrete floor.

The rack is a square of 8 by 8 feet. I use 2 by 4-inch lumber with smaller pieces to be put across the corners for added stability. I check the lumber for cracks, as it will undergo quite some stress and if not reinforced, might start to break. A soaked hide might not look that big but once it is being worked on, it will stretch quite a bit.

This 8 by 8 -size frame means I have to cut the hide in order to fit it, which is fine, as the hide is usually too big to be used as a robe when left whole. Of course, I could use a bigger frame if I wished to leave the hide untrimmed.

If the skin is trimmed, the front leg and neck scraps can be collected and the hair be twined into strong ropes. Marquis writes about the Crow: "The choice lariat (to round up horses) was one made of spun and plaited buffalo hair". .

After trimming the hide, I cut holes all around the edge, maybe 5 inches apart, and lace it evenly into the frame. The hide is tough to cut so I use a board to support the skin and then push the knife through.

It is not unlikely that I might have to clean some meat and fat away around the edges before being able to cut the holes.

So after the hide has been framed, I support it on all four corners with chairs, bucket, or something to hold it high enough of the ground, to be able to hop onto it without touching the ground, as I will do later in the process.

Various fleshing and thinning tools.

Fleshing

Native people had a variety of fleshing and scraping tools that were very highly valued and passed on from one generation to the next.

Grinnel writes :"One of the fleshers was given me by the wife of White bull, When she was 65 or 70 years of age . Its first known owner was Magpie Woman, when she grew old she gave it to her daughter, Sun Woman, when Sun Woman grew old she gave it to her daughter, Hole in the Nose, but Hole in the Nose fell sick and died, and Sun Woman kept it, and when she died it came to Bull Wool Woman, the wife of Frog. From her it passed to her daughter White Bull's wife. Bull Woman had been dead nearly 50 years when the implement came into my hands, when it was perhaps 140 to 150 years old ".

Sometimes the women would also cut a groove into the handle of their tool for each hide tanned.

The other day, one of these implements, a completely intact elk horn handle flesher was auctioned off on Ebay for $1950!

I use one tool for fleshing and thinning which has a steel blade as sharp as I can get it. To flesh the skin, I hop onto the hide and start removing meat and fat. Beginning at the edges, I work my way towards the center. Sometimes I switch to a knife, especially in the hump area, that usually contains a lot of fat and meat . The big fat chunks can be saved and rendered, for use in the tanning process or other projects like soap making or for fat lamp fuel.

The fleshing is a lot of work and should be done before the hide starts drying out, best in one sitting but the hide can be covered overnight with wet towels and finished the next day.

As the hide stretches, I go around and retighten it. It is worked the best when kept taut.

This working step is about getting all meat and fat off, adhering bits off tissue and membrane will be cleared off in the following thinning process anyway. Also, I will not be able to clean and thin (as described below) the hide nicely around the lacing holes, which is OK because the whole edge will be cut of later.

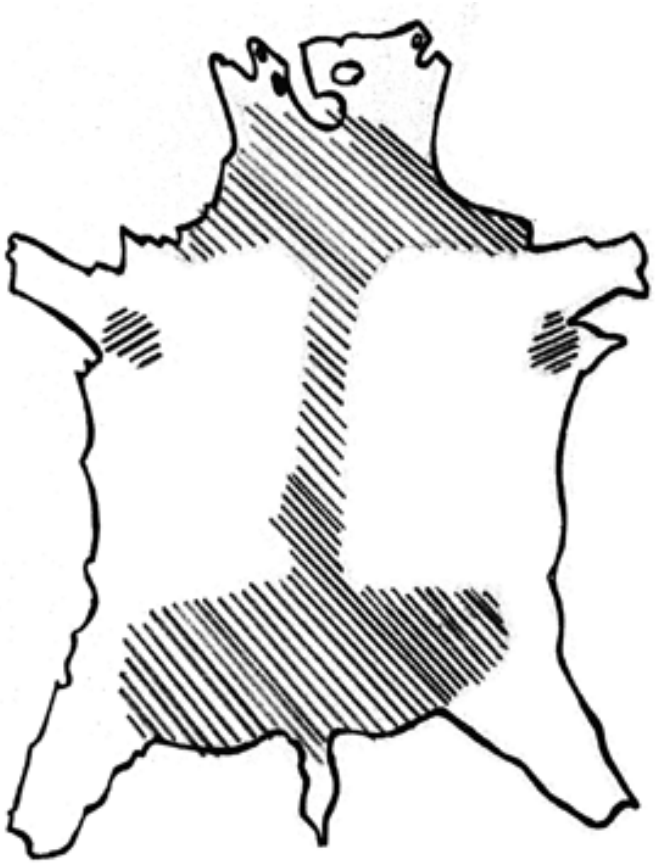
Thinning

As a buffalo is a mighty beast, its hide is too thick in many places to be able to tan soft without prior thinning. This means removing skin by shaving it off.

James W. Schulz writes about the Blackfeet: ".standing upon the hide, smooth side up, the tanner, with an elk horn-handled, steel-bladed instrument the shape of a hoe, chipped it to about one half of its original thickness"

A razor sharp blade is what I need now for thinning. When I hop on and off my hide to thin it, I try to keep it clean as dirt and sand will dull my blade faster.

I try to shave the hide to an even thickness so I end up with a uniform product.



The highlighted areas in the drawing need the most attention, as they are the thickest.
The little areas under the arms have a very tight skin structure and will probably never turn out soft anyway.
Take your time and make sure that the skin is as thin as you can get it without compromising its integrity. You will save yourself a lot of work later as a thin skin is much easier to tan than one that is left too thick.
In general, if you see hair roots shine through , do not go any deeper. This is easier to see when the skin is still wet. If you scrape it when it is already drying, you need to gauge it differently: I usually feel in from the sides with my arms and hands and try to determinate thickness, or try to pinch the skin if it is loose enough.
I go over the whole hide during this process. It is easy to punch holes at this time, especially when the scraper dulls and you try to force it. After it has been thinned properly, I take the skin out of the frame, cut the edge off, put new holes in it and relace it. This way you get a nice clean and thin edge.
The scrapings removed from the hide during the thinning process have a couple of uses. They can be boiled down into hide glue. Or as Grinnel states : "Many women saved the scrapings from the hides they tanned and put them in parfleches (rawhide containers) against a time of scarcity. Then they were boiled and made a palatable food."
Occasionally the whole green (untanned hide) would be eaten by the natives, cooked in a sort of pit bake according to Grinnell.

Braining and Working the Hide in the Frame

Now it is time for the first braining.
Braintanning is also referred to as "fat liquoring" and actually, a variety of tanning mixtures can be used. It seems that native people mainly used a mixture of all or some of the following: brains, bone marrow, liver, soapweed (according to Grinell) and grease.
Today we can substitute ingredients if we wish and use eggs, lecithin, soap, castor oil etc. Probably every modern and old-time tanner has his own recipe he uses.
All these substances are involved in complicated chemical reactions within the skin and help transforme it from rawhide into leather. For details on skin structure and what chemical reactions occur during tanning, I refer to: "Wetscrape Braintanned Buckskin" by S.Edholm and T. Wilder.
Whatever solution you use, the hide should be semi-dried - if the hide is somewhat moist, the solution is more easily absorbed, unlike a dry hide whose fiber structure is too tight to readily absorb the mixture.
To start with, I use a fairly thin mixture and heat it up hot enough so I can just stand to put my hand in it. I apply it to small areas at a time so the solution does not cool down to fast on the skin. While the liquor is

soaking in, I help it along by pushing and stretching the skin with a tool that has a blunt, rounded edge. (such as a paddle, an ax handle or a scraper with a dull blade). This work process will help force the solution deeper into the hide. Afterwards I add another thin coat, cover the hide with hot wet towels and leave it over night.

The next day I use the blunt tool again and also walk on the skin barefoot to further move and stretch it. While the skin is drying, I can leisurely repeat the walking and pushing process. If I work inside, I use a heater and a fan to help speed up drying time. If you do not want to finish the tanning process in one setting, this would be the point to take a break.

Boller writes about the tribes of the upper Missouri :" it (the skin) is then left to dry, when it is taken down and put away until wanted, for during the busy hunting season it is as much as a squaw can do".

According to many tanners, partially finished hides with at least one coating of brains dried into them will be easier to tan soft, as the enzymes of the tanning agent are at work during the storage time.

Braining and Pulling the Hide

To continue the tanning process, I take my dried hide out of storage and cut it in half along the spine. These so-called "split robes" were common among native people. Again Boller writes, that after the tanning:"the two sides are then sewed together with sinew and the robe is ready to be traded. "

This splitting technique came either from the way they skinned the animal or for the ease of tanning smaller sections because a big hide might have to be handled by more people. Marquis writes about the Crow: "In the original butchering of the animal, after one side was skinned, the hump was cut of. This was necessary in order to roll the carcass for skinning the other side", (as a shot buffalo usually died on its belly). According to Harold E. Briggs' "Frontiers of the Northwest": "one squaw was capable of preparing ten (buffalo) robes in a season. Although two or more worked together on heavier ones." This tailoring process of cutting hides in halves also helps reduce the size of the finished product.

Markus softening half of a buffalo hide using a metal strap.

Of course whole hides were used as well and were in high esteem. Marquis writes : "A head and tail buffalo robe , that is an entire robe of one piece and in good order, had a standard price of five dollars in goods. An extra good article would be higher.A split robe, one made up by the sewing of segments, was salable at a valuation lower than that of the full head and tail robe." One reason to keep the hide whole (leaving legs, tail and head attached) was, that the skin was seen as inheriting the spirit of the animal in its completeness.
Tanner Jim Miller for example does not cut his robes and does his entire tanning with the hide laced in the frame for the entire process. Other tailoring methods include attaching the skin of the front legs to the neck of the main body to maximize size or taking out sections of the head and hump area to make the hide lie flat.
For images of robes displaying these techniques I refer to "Robes of Splendor -North American Painted Buffalo Hides" by New York Press .
Having cut the hide in half, (I now work one half at a time) I spread another application of tanning solution onto it and then fold it up flesh side on flesh side and cover it with a plywood board. Then I put a weight on it (Once I saw tanner Randy Breeuwsma drive his truck onto the "sandwiched" hide he was working on.) This really presses the solution into the hide and allows no air to circulate. I leave it like this overnight.
The next morning I unfold it and scrape off all the solution that has not soaked in. Then I hang it out to dry. When the hide is partially dry, I start "pulling" it, as described below.
I use a heavy-duty metal strap, about 6 feet long and 2 inches wide. I nail the top and bottom of it to the walls of my house creating a nice stable D-curve to pass the skin through. I sit down while working .I lean back and pull the hide back and forth along the strap.
For this purpose, Natives would pull the skin around an upright pole; or fix to a tree a twisted cord of rawhide, or a buffalo shoulder blade bone with a hole in the center.
Besides the pulling, I stretch the hide over my knees and shake it out every once in a while to help it regain its original shape. Then I put it up to dry some more. After a while, I repeat the pulling and stretching process. While it is hanging to dry, I stretch it with my hands in all directions a little.
After this work session and when the hide is almost completely dry, I take it down put another coat of brains on and leave it folded up again over night.
The next morning I start sewing up the holes, that may have been created during the skinning or the earlier thinning process. I sew them up using sinew and a baseball stitch, entering the needle into the hair side. Usually they hold up during the softening process, although an occasional hole might have to be resewn.
Now I repeat the whole stretching and pulling process as mentioned previously.

At this time, I will be able to see where I left the hide too thick and where it is too thin. Where the fibers have started separating, I work around them.
Now the hide should turn out nice and soft. If it does not, the braining and pulling as described above can be repeated, but in thin areas, the risk of the skin fibers separating and creating holes becomes greater.

Photo on the right:
A very rare shot of Cheyenne women tanning buffalo hides (1870's). The woman to the left of the photo is softening a hairless buffalo hide by pulling the skin around a rope, while the woman to the right is thinning a buffalo skin with a scraper. It is interesting to note that the tipis in the back are already made of canvas not skins. The seams can be clearly seen on the original print.
Photo courtesy of the Smithsonian Institution
(negative # 90-17238

Finishing

After both halves have been softened, I cut a section off from each half along the spine.
This helps me to control the size of the finished product and also takes away the somewhat uneven and not completely tanned edge. Then I sew the two halves together to make the finished robe.
The leftover pieces of hide can be used for various smaller projects. Boller for example writes of these segments: "When a sufficient number accumulates, these pieces are sewed together and used as beds"
The lacing/stake holes around the skin can be cut off but I leave them intact.
On some hides, native people cut the somewhat untanned edges at intervals to maximize flexibility. This method can be seen on many paintings of Swiss artist Karl Bodmer, who during his travels in 1833/4, made drawings of tribes people. These are among the most detailed and accurate representations available for study.

Photo on the left:
Buffalo hide set up for smoking at the Rattlesnake Rendezvous in Sunol, California.

Smoking the hide

As with any braintanned product, the hide should be smoked. This process keeps it from becoming stiff should the robe get wet and will also help to keep dermis-eating bugs out of it. A lot of the hides in museums do not seem to be smoked as tanner Wes Housler also observed. Check out his article on tanning bison hides at www.braintan.com

I lace up my hide like a sleeping bag through the lacing holes, hair side out. Then I suspend it from a tree, hanging about 1 1/2 feet above a smoldering fire and tie a cloth around the bottom to funnel the smoke into it. To keep the sides of the hide from touching I arrange sticks in the interior, so that the smoke can circulate freely. I smoke the hide from 6 to 8 hours. For more detail on the smoking of braintanned hides, see "Wetscrape Braintanned Buckskin" by Steve Edholm and Tamara Wilder.

The smoking is the final step in the tanning process, so once that has been finished, the item is ready for use. If, after prolonged use, it seems necessary to clean the robe, various sources state that moist white clay was used for this purpose. It was rubbed into the flesh side of the robe to absorb dirt and grease and was then shaken out after the clay had dried. To clean the hair side, Jim Miller for example simply leaves his robes out in a light rain.

The finished product is a great "keep me warm" item for the house (if you do not object to the somewhat "wild natural" smell) or for camping trips. Unfortunately, the hides are somewhat too bulky for backpacking, unless you find someone to carry them for you.

In addition, I would especially like to thank Jim Miller for introducing me to the art of tanning buffalo hides, my friend Travis Dietz for his patience with the editing, and my wife Tamara for putting up with my "hobbies". Thanks also to all the other people that helped me in creating this article.

I will continuously update this article as I gain more experience, insight and information.

For additional information, comments or inquiries about my robes, please contact me.
NOTE: I am always looking to buy salted or dried buffalo hides. If you have any, please contact me via my home phone in Germany: 011-49 7657933259

References and books of interest:

- "Braintan Buffalo Robes Skins and Pelts" by Jim Miller
- "Among the Indians" by Henry A. Boller
- "Memories of a White Crow Indian" told by Thomas B. Marquis
- "The Cheyenne Indians Vol. 1" by George Bird Grinnell
- "Wetscrape Braintanned Buckskin" by Steven Edholm and Tamara Wilder
- "Leather" by Lotha Rahme
- "The Ecological Indian" by Shepard Krech
- "Karl Bodmers America" by University of Nebraska Press
- "Robes of Splendor" by New York Press
- "Seeing the White Buffalo" by Robert B. Pickering
- "Buckskin and Buffalo" by Colin F. Taylor
- "The Cheyenne in Plains Indians Trade Relations" by Joseph Jablow
- "Buffalo Nation" by Valarius Geist
- "Sacred Buffalo" by Sycamore Island Books
- "Blackfeet and Buffalo" by James W. Schultz
- "Andele, the Mexican-Kiowa captive" by J.J. Methvin
- "The Sacred Pipe" by Joseph Epes Brown
- "Women of the Earth Lodges" by Virginia Peters

Tourist postcard from the early 1960s showing members of the Kiowa tribe examining the drying of a buffalo hide. This is a remarkable document from a time when the art of braintanning buffalo hides was virtually forgotten among native people.
I assume that the skin shown in this photo was merely a display piece as it is racked very sloppy. To be tanned, the hide has to be taunt and evenly stretched.

Brain Tanned Buffalo Robes & Moccassins made by

Markus Klek

Back to the beginning

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Brain Tanned Buffalo Robes & Moccassins
Made by Markus Klek

Buffalo robe painted with earth pigments.

Katja and Whitedeer with one of my buffalo robes.

My friend, Matin, wearing a painted buffalo robe.

"The hide I have from Markus is personal. It is a work of art, like the difference between a plasic bowl and one hand made by a friend. It is a story of the past. Huge, cuddly, and warm. Moves me to the roots. Takes care of my ancestral desires for security."
Matin

Sonja in a robe with a beaded "Blanket Strip" along the whole length.

"I have been connected to the buffalo spirit ever since I was a little girl, always reading about the natives of North America. The wonderful surprise of meeting Markus with his brain tanned buffalo hides just made it very clear to me that I can finally connect with the Buffalo Nation on a real physical level. My buffalo hide was with me last year during my rite of passage and it was very powerful to be wrapped in the hide during the ceremony."
Sonja

Steven with his buffalo robe.

Markus in one of his buffalo robes.

Markus in one of his buffalo robes.

Cozy pair of buffalo hide moccassins.

For additional information, comments or inquiries about my robes, please contact me - Markus Klek.
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Brain Tanned Buffalo Hides

Contact "Markus Klek" at his home phone in Germany: 011-49 7657933259

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How an Urban Abo Tans a Fox Hide

by Bill Scherer

Urban Abo sounds like an oxymoron. A lot of us who like to practice primitive skills live in cities, have college degrees, hold regular jobs and careers. Maybe this is why primitive skills are so much fun for those of us who spend so much time inside factories and office buildings. In my own case, I'm a Midwestern farmer's son who married a city girl, works in the high tech industry and lives in a townhouse with a 10 X10 foot "yard" and a sundeck. I keep promising myself that someday we will be living in the country somewhere.

A lot of primitive skills can be practiced in back yards, sundecks, garages and living room couches, not necessarily in the woods or prairies. It takes a bit of imagination, and occasional foraging trips. Sometime the foraging take place in the urban places instead of the woods. After all a stick lying on the sidewalk can do the same job as a similar stick lying on a forest path. A lava rock found in the street will make a pretty good abrading tool.

My family in the Midwest has a lot of trappers and hunters so it is easy for me to get hides and furs. When I was back east to visit, I picked up some frozen furs and transported them frozen to my home and freezer in California. Fortunately, I have an understanding spouse who lets me keep frozen pelts in the freezer. Dried furs and rawhide are available from Moscow Hide and Fur. Fur bearing critters here in the bay area have really thin fur, and trappers are pretty much non-existent. A cold environment produces a much nicer fur.

So here is one of the frozen furs (in the plastic bag), and the tools. I mostly did one hide at a time.

The raw pelt just thawed out.

Some of my tanning tools are rather nontraditional, for a very simple reason. It is what circumstances allow. I used to have two wooden scraping beams, but my wife gave me the order to "get them damn logs out of my flowers". So I figured that a couple of chunks of PCV pipe mounted over a garden rake will suffice, and I can disassemble and store them in the garage when not in use. If the critters skulls are not saved for me, pork brains are available from the local Asian supermarket. I can't build a campfire in my yard to cook the brains, but I can use an old fondue pot. I'm not allowed to dig a hole to smoke my pelts but an old flower pot and denim skirt will suffice. I used to haul all my stuff out to the country to tan, but these days I have a wife and 5-year-old daughter to consider. If I am working just outside the door, I can keep an eye on the child, or come inside if the need arises. The point is that in an urban environment, I have to make some adaptations to my very limited workspace, and to other people.

The basic steps to tanning furs are cleaning, braining, softening, and smoking. Each of these steps has a lot of detail, and I will try to explain them as best I can. There is more than one way to skin a cat, or to tan a hide, and this is what works for me. I took these photos while tanning two pelts, so some of the pics have both pelts, sometimes one.

The first step is to thaw the frozen pelt, and clean it up. Most fresh frozen hides have a bit of meat and fat on then. So I turned it inside out, and started scraping with my blade. This is an old planner blade

with a couple of chunks of old radiator hoses for a handle. What I'm trying to do is to take off all the meat, fat, and membrane. The membrane is the most inside layer of the hide. It is very thin, a lot like a plastic wrap

If you don't get if off, the brain will not penetrate the skin, nor will the smoke. What I can't get with the blade, I will try to get off by abrading with a chunk of pumice stone or sandpaper. The torso of the fox goes easily, the head, legs and tail do not. Alcohol and paper towels work well for cleaning grease off hides. I don't know what was used traditionally to degrease pelts. Next the hide is buffed with an abrasive stone or sandpaper.

The tail here is still a tube, so it must be cut open.
The cut is made from the inside of the tail on the underside all the way to the tip.

Degreasing the pelt with alcohol.

The ear cartilage I have approached two different ways. One pelt, I removed nearly all the cartilage entirely. The other pelt, I merely removed separated the back of the ear, leaving the cartilage attached to the inside of the ear. I don't know what is traditionally done, but I will see how the ears hold out in a few years. I use a couple of thin sticks and my fingers to separate the skin from the cartilage.

Working the ear.

Canine hides are very thin, unlike some other critters. This means the skin can be easily damaged, so I must be gentle and cautious. Even so, I always get a few dings in the hide. Fortunately most breaks can be repaired, and from the outside, are not noticeable. The tail is a tiny strip of skin with a lot of fur hanging on it, so it probably can't be repaired easily. My very first fox hide I ruined the tail about halfway down.

Fat and membrane.

Scraping

Buffing the pelt with an abrasive stone.

Next step is the braining. I use a blender to mash up the brain and cook it in my old 1970s fondue pot. I think that fondue was one of the great things to come out of the 70s. My wife bought me a new fondue pot last Christmas. I think she got tired of the flower power motif. After the brain slurry is well cooked it should cool off until it is only warm. Too hot will cook the pelt; too cold will not penetrate the skin as well. The brains are rubbed into the skin, then the pelt is put into a plastic bag and in the shade. For the next two hours the pelt should be checked every half-hour. If it starts to smell too nasty, it is time to take it out of the bag and start softening.

Hey, I've got a lot of brains.

Braining the pelt.

Brains smell a little funny under the best of circumstances, and spoil quickly. Once my neighbor looked over the fence while I was working a hide and exclaimed, "What is that smell?" I make sure to clean up at the completion of the job. I wear old worn out clothing and a plastic apron. I don't mind if they get smelly, they can be discarded if need be. That GI T-shirt is going to fall apart one of these days.

Softening is a matter of manipulating the skin as it dries. This can be done a number of ways, stretching it over a stake, a cable, or between the hands. The hide changes color as it is stretched, turning paler as the fibers of the skin separate. Canine skins are very thin that must be stretched gently. Too rough and the skin will rip. If the stretching stops before the hide is COMPLETELY dry, the skin will revert back to the consistency of cardboard. I use a combination of stake and hand stretching. I have a portable stake as opposed to the traditional stationary stake, and a handheld deer bone chisel.

Softening the pelt over the stake. This is a lot of work.

Now for the smoking. The idea is to smoke the skin side of the pelt, not the fur. Smoking a softened pelt will do a few important things. It will prevent the skin from turning hard after being wet. Smoking also discourages bugs. The color and smell it gives to the skin is a pleasant side effect, and also where the "tan" comes from. I use dry punky cottonwood; it gives a nice color. A friend of mine uses dried cow chips. I think my wife would get pretty upset if I tried to keep cow chips lying around, so I won't press my luck. A piece of string goes from the eyeholes to an overhead tree branch and keeps the hide in the right position. I have had a few folks on the sidewalk become concerned when they see smoke coming over the fence, but that is a good excuse to say good morning.

Sssmmmoooookin!!!!!

Here is my "double barreled" hide tanner. The bottom of each hide is sewed to an old pair of jeans legs.
I use cotton denim skirts for larger hides. I get strange looks at garage sales when buying mini-skirts, but what the hell, I am in California. The important thing is to avoid synthetic cloth, it can melt.

The ceramic pot has a coffee can inside and a couple of charcoal coals. To this I add handfuls of the punky wood. I keep the spritz bottle handy to dampen the jeans to prevent flare-ups. Paper towels plug up the small holes like the mouth, eyes, and front leg holes. A few sticks inside the hide will hold it

open. I let it smoke until the color looks nice, usually about 2 hours. Smoking has to be watched without interruption, as a flare-up could ruin everything. I make sure to get all the personal comfort items taken care of before starting this job. If I have to leave it had better be an emergency and the hide/skirt gets hoisted off from the smudge until I return. The smoking is completed by bagging the hide for a couple of days to let the smoke set.

Now comes the really hard part, fashioning the pelts into usable clothing or blankets. Anyone out there ever make one of those hats that have the animal face at your forehead and the fur draping down your back like a cape? Give me a shout.

The author's daughter holding the two tanned fox pelts.

My thanks to Steven Edholm, Tamara Wilder, and George Michard, who set my feet on the path.

E-mail your commits to "Bill Scherer" at scherer_william@hotmail.com

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What to Do with Your Roadkill Raccoon Skin? Make a Bag!

by Markus Klek

All you braintanners know the situation: You have successfully tanned all those neat pelts and skins and now you wonder what the heck to do with them.

Well, I had two raccoon skins in my closet for a while and did not want to make them into Davy Crocket coon skin hats. First of all, it is almost never cold enough, where I live, to be able to wear such a piece of clothing and, on the other hand, I already have half a dozen fur hats lying around. So, I decided to fashion one of the raccoon skins into a bag. I like the design of the bag because it preserves and shows all the features typical of the animal and makes it easy to identify. Here is how to make it.

Drawing 1

Drawing 1 shows the flesh side of the skin. It is already cut into the pieces to be used. The two square-like pieces and the tail will be used for the bag, while the leg and belly parts get discarded. To cut the skin, I recommend a sharp knife as opposed to scissors. A knife will cut the skin, but leave the fur undamaged.

Drawing 2 & Drawing 3

Drawings 2 and 3 show how the face of the animal will be brought to the front in order to be the flap. The tail simply gets sewn to the front part of the bag.

Drawing 4

The last drawing shows how a border of cloth or leather gets sewn all the way around to connect the two pieces to form the bag. You could simply sew the two pieces together without the cloth strip, but this only gives you a very small pouch. The cloth insert strip increases the size of the bag and also adds a nice color contrast. The last thing to do is to attach the carrying strap to the cloth insert and your bag is finished.

My raccoon bag is about 9 inches by 9 inches square and 1 1/2 inches deep. The little black beads sewn to the cloth are seeds that I collected from an unidentified tree-like shrub that is fairly common where I live. The bag got me a lot of attention. People are usually either amused, surprised, or shocked when they hear of its origin. It is definitely "cooler" than something you can buy at The Gap. The only sweatshop labor involved being your own.

E-mail your comments to "Markus Klek" at markusklek@hotmail.com

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The Ties That BIND and The Bindings That Tie

by Norm Kidder

At the cosmic scale things are held together by gravity. At the molecular/nuclear level, electromagnetism does the trick. In our world it's friction and adhesives. A nail or screw depends on friction, as does a knot. The greater the friction the stronger the binding. Friction is a function of surface contact (which increases with rough textures) and pressure. Adhesives generally work by greatly increasing the area of contact (their opposites - lubricants, reduce contact). A loose knot may work if there's enough surface contact, and a very tight knot needs little string. Each binding method is suited for different situations - permanent versus temporary, binding material available, material to be bound and your skills.

As a Boy Scout I learned many useful knots and lashings that served me well in most circumstances. As I got into primitive skills situations, some of these knots continued to work while some entirely new needs turned up. The following is a compendium of my thoughts on this "bind" we find ourselves in as well as some of the more useful bindings one might need, and descriptions of some varied natural binders and special ways of dealing with them.

Tying knots with flexible cordage (thread, string or rope) is pretty well covered in books put out for Scout groups, sailors, etc. so I won't dwell on them here. Instead I will concentrate on bindings which work using found, natural binding material and some specialized cases where the books I have read don't provide information.

Some binding terminology:

1. Knot - technique for attaching things with cordage.
2. Bend - knot used to attach one cord to another.
3. Hitch - knot used to attach a cord to something else (often a pole).

4. Lashing - knot used to hold two or more things to each other.
5. Lacing - techniques used to connect a piece of fabric to something else along its edge.
6. Active end - end of a cord that you're working with.
7. Standing end - part of a cord that's left behind in the binding. Or the fixed end of the cord..
8. Open loop - 'U' shaped turn in a cord (the ends don't cross).
9. Closed loop - 'O' shaped turn in a cord where the ends simply lay one on top of the other.
10. Overhand loop - 'O' shaped turn in a cord where the ends intertwine around each other
11. Weave - working the running end over, then under, then over . . . a series of adjoining strands.
12. Frapping - wrapping a cord around two or more parallel bindings and pulling them together, tightening both.
13. Gordian Knot - a knot you untie with a cutting tool.

Working With Stiff Stuff

The most common problem with 'instant' natural binders is that they are stiff (except for wet rawhide). Most knots don't work well, with a few exceptions. Knots in string typically increase friction by creating some kind of loop in the cord. Picture, if you can, a square knot, as two interlocked open loops. Pulling around a corner increases pressure tremendously, so friction soars. Many stiff materials refuse to make tight loops, but improving surface contact can increase friction. A good example of a knot that uses surface contact is the clove hitch.

Review of Binding Material

1. Whole Vines, Roots and Shoots. Whole vines, roots and willow branches can be used in many crude binding situations. They have the disadvantage of being round, and often stiff. If dry, they are brittle, if green, they shrink while drying (in diameter, not length) and loosen. A stiff, round cross-section limits the surface area in contact and therefore the friction. If stiff, contact may not be continuous, further reducing the friction surface and ability to pull tight. These work best tying bundles of soft material such as grass or reeds that compress easily, increasing friction surface and conforming to uneven bending. Their greatest advantage is lack of preparation time, just cut and use.

2. Willow Wythes. Increased flexibility is achieved with whole shoots by twisting the stems back and forth around their axis. This separates the individual fibers and lets the wythe act like a piece of single ply cordage, with greatly increased friction.

3. Bark Strips. Willow, maple, basswood and many other woody plants have bark that can be stripped off in long strips when the sap is flowing. These ribbon like strips are normally much

stiffer than cordage, but being flat have a large friction surface and can be very strong when tied with appropriate binding techniques. When stripping single pieces, they tend to get smaller as you pull. I find it best to cut a stick about an inch in diameter and peel the whole thing at once into two strips. I can further split these down later. Bark strips can be dried and re-soaked, which also makes them a bit less prone to loosening through shrinkage than when used green. Some barks can also be separated into layers, increasing the quantity and usability of the material. Bark bindings will become quite stiff when dry, making it difficult to retighten them, but reducing the chance they will come loose even after shrinking.

4. Split Shoots. Many woody materials are split for use in basketry. In the west, willow, redbud, sedge roots, spruce and pine roots, and buck brush to name a few can be split into halves or thirds, then the harder central section further split out to leave the flat and flexible cambium layer for binding. This is usually stronger than bark, and can be preshrunk by drying and soaking if time permits. This is excellent for long term projects, but may be time consuming for quickie, disposable applications and takes a bit of practice to perfect.

5. Reeds and Grasses (and other stringy leaves and stems). With few exceptions, reeds, sedges and grasses are not very strong, but may be sufficient for quick tying of bundles for transport. They are best used when cut and wilted (partially dried to a leathery feel). This happens naturally to reeds attacked by muskrats or insects, so check out the stand for yellow colored stems. All these materials become much stronger when twisted into one or more ply cordage.

6. Yucca-type Leaves. The long, straight, and somewhat flat leaves of some agaves, yuccas and their relatives, New Zealand flax, and a few similar leaves can be used much like bark strips. Agaves are usually too flat unless they have dried out, and also may contain irritating juice. These may be used whole or split depending on their shape and state of dryness. When time is available to process them, they can produce progressively finer cordage.

7. Single Ply Cordage. Single ply refers to a bunch of fibers, either separated (like rope) or in a soft matrix (like reeds) which is uniformly twisted around an axis (either clockwise or counter-clockwise). Twisted fibers do not receive strain along their length, but at an angle, giving them some stretch. This elasticity allows them to take up shock gradually, reducing the risk of breaking. Also, as the separate fibers rub against each other, this friction helps equalize the load, allowing them to work together. In untwisted cordage, strain builds up in the shortest fiber first, until it breaks, then the next, and so on. Disadvantages include more time to make than some of the above and a strong tendency to unravel if not in use. Good for fixed bindings but not for fish lines, nets, or bowstrings, etc.

8. Two Ply Cordage. Two ply is made by wrapping two single plies around each other in the opposite direction of the twist in the plies (both plies must be twisted the same direction). This counter twist creates friction between the plies, holding them tightly together, and limiting unraveling to the ends. This cordage is the strongest in almost all situations (except for three-ply,

which is really hard to make by hand).

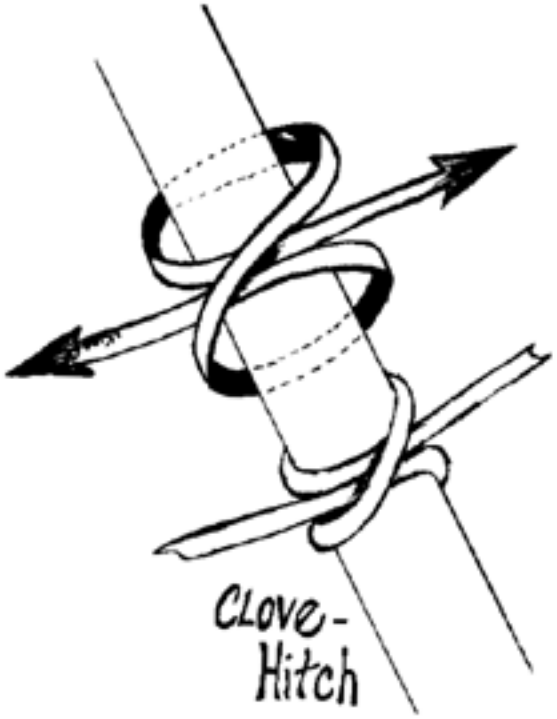
9. Braided Cordage. Braiding (or plaiting as it is sometimes called) involves diagonal weaving of three or more strands. Braiding is slower to do than thigh rolling two-ply cordage, but is usually done with flat leaves (cattail, juncus, etc.) which require little preparation. Also, the braid can be kept flat, making it more suitable for some applications than round cordage. As with all flat binding material, it requires different lashing techniques than flexible round cordage, but has more surface area for increased friction.

10. Rawhide. Cut strips of rawhide (babiche to French Canadian trappers) bound together snow shoes, drums, houses, clothing, basket rims, and many other items. It has some big advantages and disadvantages. On the plus side: it's easy to make in quantity anywhere large animals are hunted; when it's wet it is very flexible and takes knots well; when it dries it shrinks in both diameter and length, making it self tightening; and in a pinch, you can eat it. Negatives: mice eat it; when it gets wet, it stretches; when dry, it tends to be brittle; when it gets wet, it stretches (I'm repeating this for emphasis).

11. Leather (braintan of course). Similar to rawhide except that it doesn't shrink up as tight, nor get as stiff and brittle when dry.

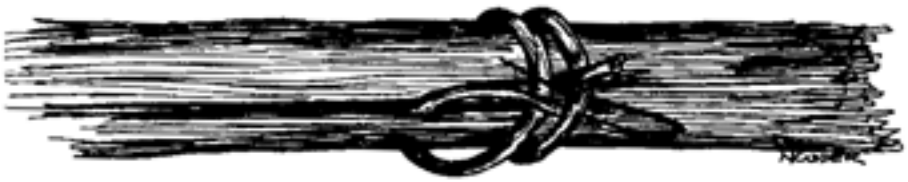
12. Sinew. Sinew is the connective tissue that attaches an animal's muscles to its bones. It is very strong and fine. It is used for thread, to make bowstrings, and strengthen the backs of bows. It is good for making arrows, etc., but like rawhide, it may come loose if it gets wet. It is a bit tricky to knot.

13. Animal (including human) Hair. Hair varies greatly in strength, length, texture and usability. Curly hairs spin into the best yarn, while very straight hair wants to slip apart. In primitive skills applications, this is not a likely option (unless you're in Mt. Goat country in the spring). Single human hairs are recorded as quail snares.



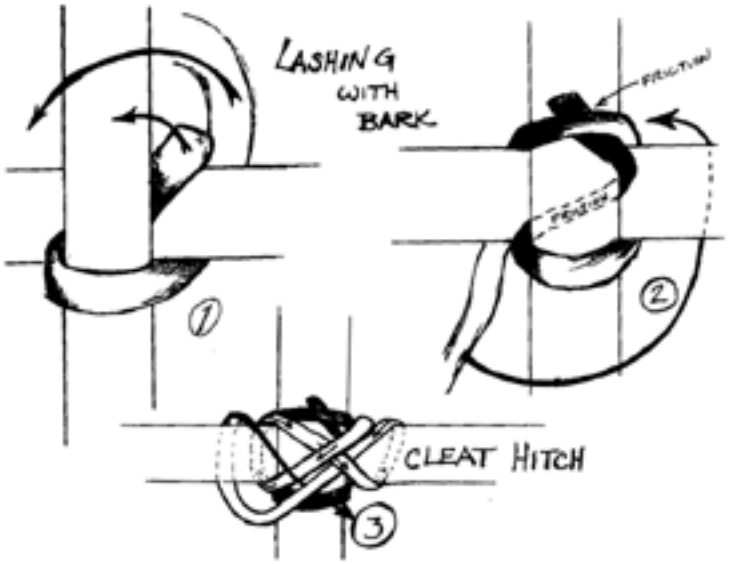
Real Life Applications

You've just collected a bunch of willow stems for basket making and you want to use one of the sticks to tie the bundle together. After neatening the bunch, pick a long stem (I prefer to use one with a gall or other defect) and insert the thick end through the middle of the bundle so that it sticks out the other side. Wrap the thin end around, passing next to the protruding end. The next time around, bend the protruding end over and wrap into the bundle. Finish by tying a clove hitch around half or less of the willow twigs, or, wrap around some of the twigs and push the bent side of the wrapper over one and under the next of the wraps (Figure 2). If the bundle is tapered, finish by pushing the binding towards the thicker end to tighten. A couple of things are at work here: a lot of wrapping creates a lot of friction; and by starting through the middle of the bundle, the binding can't rotate back and become loose. This same principle applies when wrapping any roundish object. When possible, both start and finish either through the center, or by tying off to a crossing piece (in lashing).



You are building a shelter, and are lashing poles together with bark strips. If you were using cordage, you would start with a timber hitch, wrap twice around in a square, over under pattern, then frap (wrap at right angles to first wraps, tightening them). The end would be secured with a clove hitch. Bark doesn't want to do much of this. Begin by doubling the end of the bark strip over

one of the poles. Leave enough overlap so that the double section (with the short end under) crosses over the second pole. Being flat, there should be enough friction to hold. The second round of wrapping should cross over the first so as to increase the pressure on the double section. Finish with a cleat hitch over both ends of one of the poles (Figure 3). Frapping is not very affective on stiff bark, so if the lashing is not tight enough, using a wedge between the poles can tighten it. A wedge can be used to retighten any binding that has become loose due to shrinkage of the wood as it dries.



You are tying a reed boat together with single ply cattail rope. You want to tighten a spiral wrapping but if you pull hard enough on the end to overcome the friction, the rope breaks. Even weak rope can be tightened if you tighten it section by section. Work the binding around, spreading the pull out over as much length as possible. If a rope breaks (or if you need to extend a binder), attach by creating a short piece of two-ply cord instead of tying a knot. This will hold as long as the rope is tightly wrapped around the bundle. Once the binding is tight, bury any ends inside of the bundle.

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What Knot to Use in a Primitive Situation

by Bill Scherer

It's been my observation that every practicing abo should have several knots memorized, ready to be used anytime. If you are making primitive cordage, then learn a few knots to go with it. Someone once asked me why one could not use the same knot in every situation. The answer is that different knots will fit different situations. A line may be tied onto its own cord, or a different line, onto a post, ring, fishhook, or animal. The strain may be steady, or intermittent, and from one angle or many. Sometimes the knot is only to hold for a short time, or it may be semi-permanent. Some knots are easily untied when wet, or with one hand. Some knots are stronger than others. The physical properties of the cord will also be a determining factor. Ease of untying may or may not be important. Many things should be considered when selecting a knot for a particular job.

What I would like to do here is list some of the knots that I have personally used while practicing primitive outdoor skills. Sometime the line is a homemade cord of natural fiber (flax, dogbane, New Zealand flax, cattail, etc), sometimes a strip of willow bark, or a piece of split pine root.

Half hitch

Double half hitch

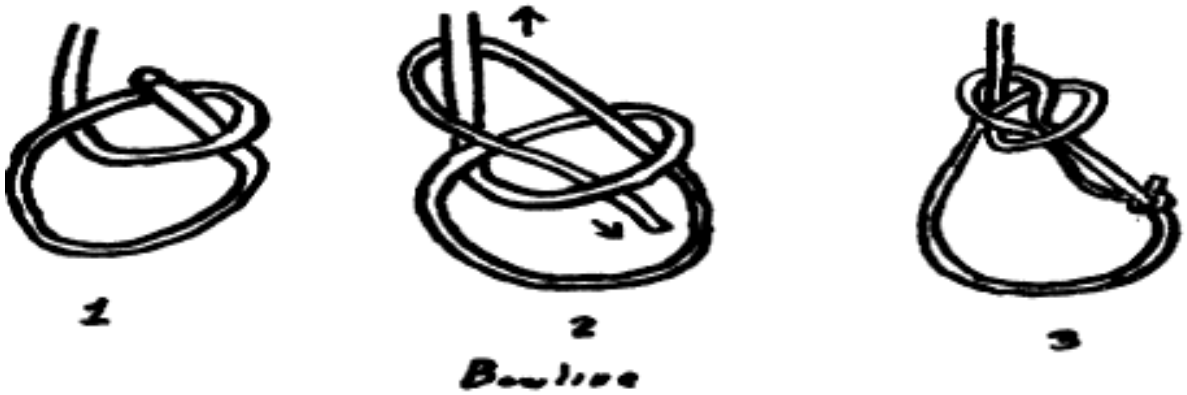
Slipped half hitch

Half hitch and double half hitch: The half hitch can be used for hanging a rope from a

branch or post. This is another knot that can be made to untie easily with the slipped version. I like to make mine a slipped version. For tethering animals there is a version known as the cow hitch/ lanyard hitch. The cow hitch is made of two single hitches on a post or ring.

Timber hitch **Timber hitch with additional half hitch**

Timber Hitch: This is used traditionally for skidding logs, sometimes used with an additional half hitch. I use a timber hitch on one end of my longbow string.



Bowline tied off with half hitch

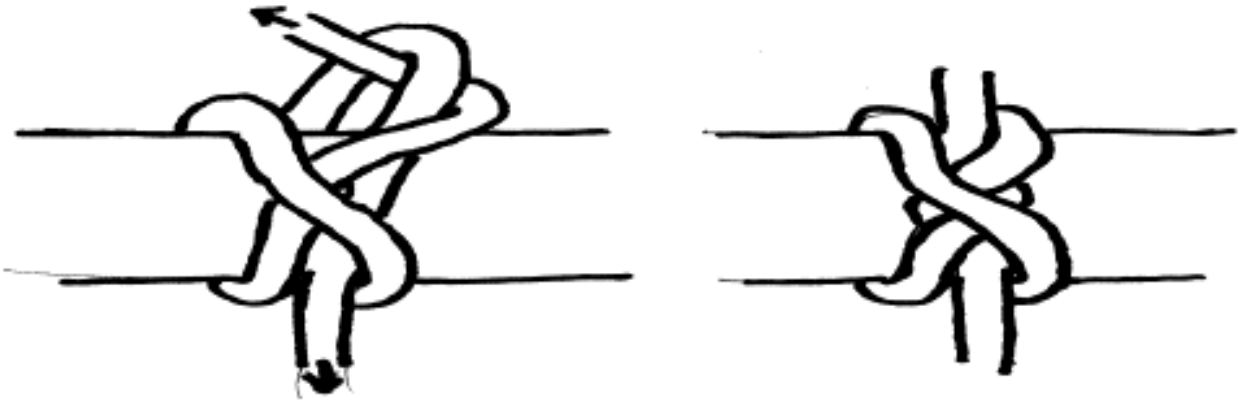
Bowline: This is a loop that won't slip, or come loose. It can be untied even under tension. It is used to attach a line to an object, such as a peg, or ring, or a person (rescue work). This is the knot remembered with "a rabbit comes out of the hole, goes around the tree, and back in the hole". It should not be used with a stiff line.

Sheet Bend: This is used to tie two lines together, to extend a line, or to tie a line to fabric. It is particularly useful for tying two lines of different diameters. A variation is the slipped sheet bend for ease of untying. Try this mnemonic "the rabbit comes out of the hole, around the tree, and under the exposed tree root".

Overhand knot

Overhand Knot: Used as a stopper knot or as a sewing knot. If you learn this knot you will have the basis of several other knots. The Overhand loop is the same knot with the line doubled over. Related knots not detailed here are the multiple overhand knot, the Carrick bend and the Hunters

bend.



Constrictor knot

Constrictor Knot: The primitive equivalent to a twist tie. Used to close bags, or tie them onto a pole, or to bundle objects together. A good knot for the Egyptian bow drill spindle. This knot can be broken down as two overhand knots, the second over the first. Very similar to the clove hitch; and difficult to untie unless you make it a slipped version.

Continued

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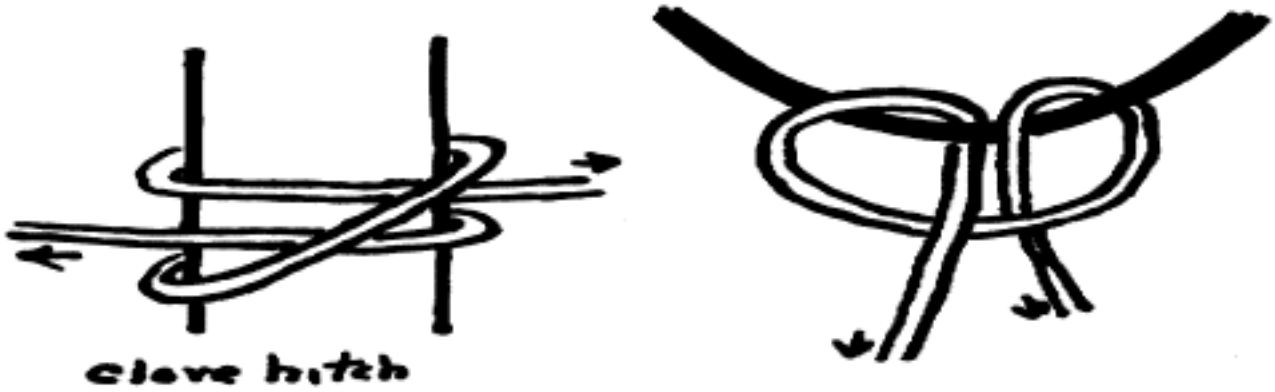
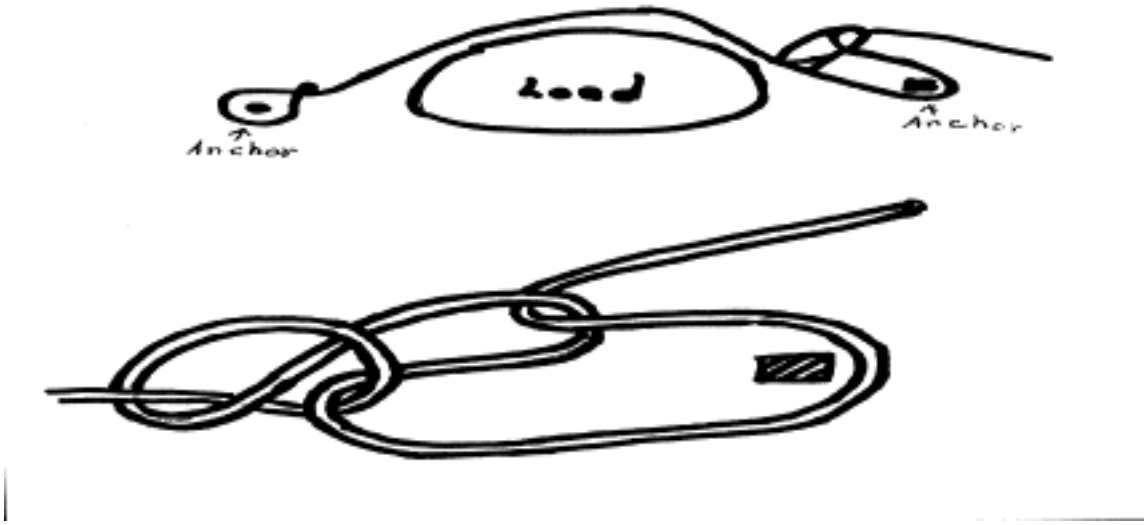
Transom knot

Transom Knot: Very similar to the constrictor knot. This is to tie perpendicular branches to each other. I have used this knot with willow bark cordage to build a primitive shelter frame.



Clove Hitch, AKA peg knot or boatman's knot: Used to fasten lines to a post or ring. It has been used on primitive fishing poles by attaching the line at intervals along the pole. Use this knot on tent pegs.



Trucker Hitch: The primitive equivalent of cinch straps. This hitch will give a two to one mechanical advantage. This works well for strapping bundles onto a backpack frame or a pack animal's saddle. Once I impressed my coworkers by using this knot to strap down some cargo in a pickup truck box. Tie off the free end with a slipped double half hitch.

Highwayman's hitch

Highwayman's Hitch: This is a fun one. Used for tethering horses, or lowering loads. Its advantage is the quick release. Robbers use this knot to prep for a fast getaway. If you tether critters, learn this knot.

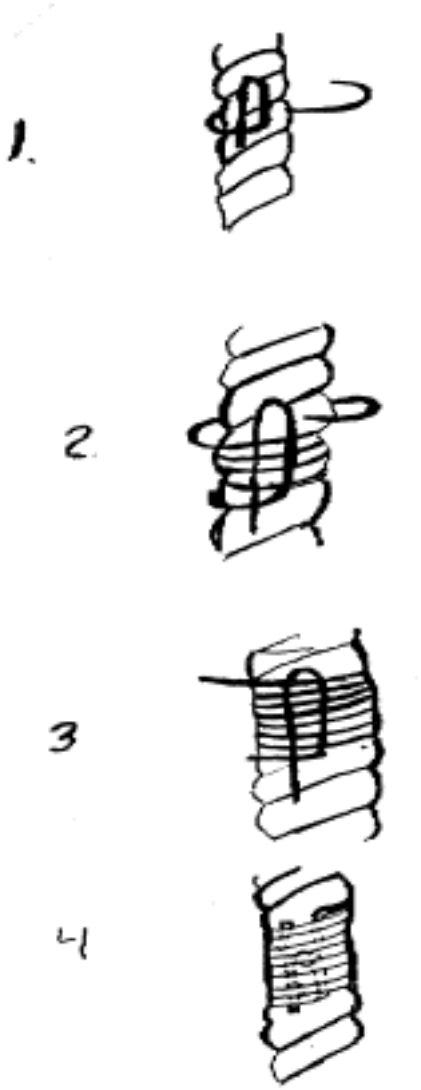
Noose

Noose: I have used this knot to hang deer from branches while field dressing and skinning. It can be used for snaring, although I don't know anyone who has used it successfully.

Sheep shank

Sheep Shank: This knot is used to shorten lines to the required length. If you have ever spent several hours twisting natural fibers in cordage by hand, cutting your precious cord is the last thing

you wish to do. Another use is to bypass a damaged section of line.



Rope Locker, AKA Whipping: This is used to keep your nice hand twisted rope end from unraveling. This is equivalent to plastic tape or melting synthetic rope ends. Plastic tape would look out of place on a primitive rope. I like to use a single thin strip of fiber to wrap the end of my cordage. I use whipping as the arrow nocking area of my bowstring.

I have not included any fishing knots here because I have never done any angling with primitive gear. The only primitive fishing I have ever done is with a spear. If anyone has successfully used primitive angling gear, please let me know what knots and gear you were using.

Learning knots takes a bit of practice. It is one of the primitive skills that can be practiced practically anywhere, for any amount of time. I have passed hours of time in airplanes by practicing knots or a few minutes in my cubicle during lunch break. It is a skill that would serve you well in the Stone Age or the 21st century. If you are in a situation where the knot is needed right now, the time to learn was long before. It is my hope that this short piece will generate some correspondence about your favorite knots and their uses.

Knots are a large subject matter. There are probably hundreds of knots with a couple of variations on each of them, and a couple of names for each of them. The important thing is to select the right knot for the given situation.

References and links:

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This Old House, Knots Homeowners Should Know by Joe Hurst-Wajszczuk
http://www.thisoldhouse.com/

Knots How To
http://www.magnacraypots.com.nz

Knot Knowledge
http://www.iland.net

Knots on the Web by Peter Stuber
http://www.earlham.edu.~peters/knotlink.htm

Ropers Knot Page by Ed Prin
http://www.realknots.com

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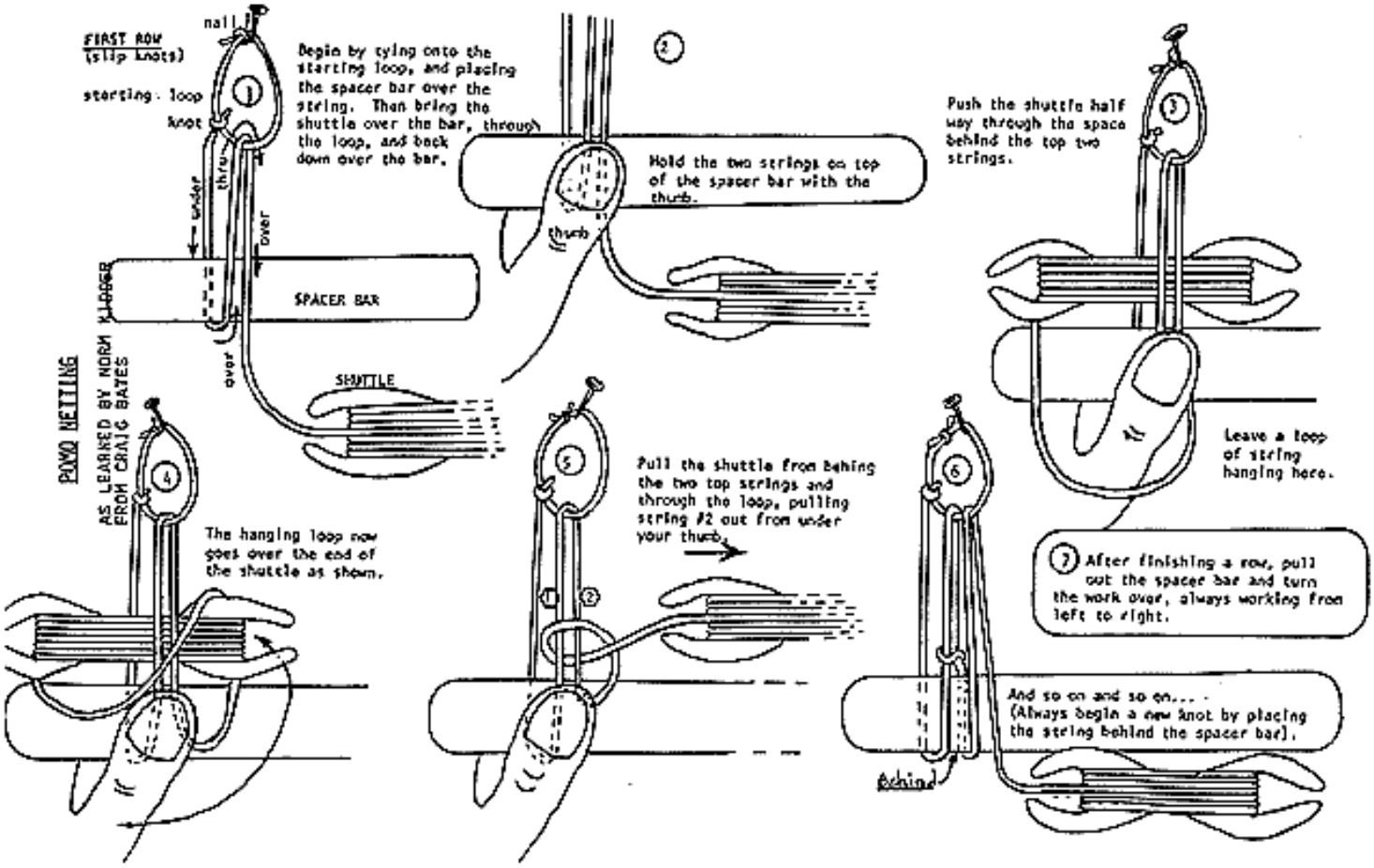
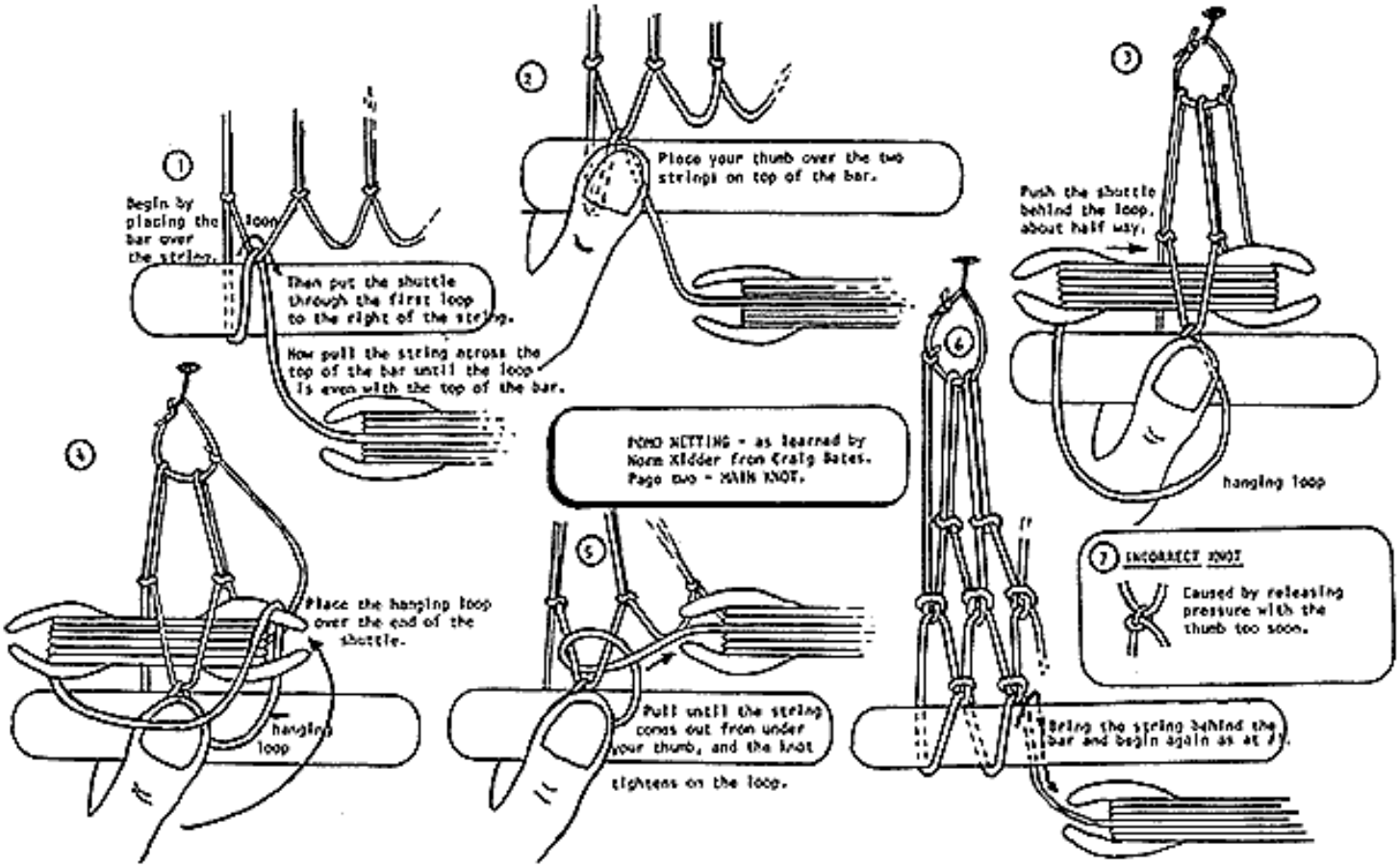
Pomo Netting

(As learned from Craig Bates)

by Norm Kidder





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Cordage Fiber Shredder Made From Bone

by Dick Baugh

This little device arose from two situations. I had some left over bone pieces from a knife handle project and I use a lot of cattail leaves for cordage in grade school projects. Cattail leaf cordage is stronger and more flexible when it is finely shredded. In the past I have shown students how to shred the leaves by pulling them apart by hand while holding the base of the leaf with their feet. The ultimate way to shred the leaves is with a florists frog but that isn,t very aboriginal. Why not make a small bone comb? I used a piece of cow cannon bone. I also cheated and used steel tools (hacksaw and small file) to shape it. The only critical feature is that the teeth should be sharp. The cattail leaves should ideally be picked late in the growing season, allowed to dry and then slightly dampened before shredding. Start the shredding process about a forearm,s length from the tip of the leaf, and pull the shredder towards the tip. Next, start the shredder about 2 forearm,s length from the tip and again pull towards the tip. By always pulling towards the tip you have less tangling. This process also tends to strip away the pithy interior part of the leaf. After the leaves have been shredded into fine fibers they can be made into cordage via any method that you choose.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Making Cordage By Hand

by Norm Kidder

Cordage (rope and string) can be made from many different fibers including (Bast) Dogbane, Milkweed, Nettles, Hemp, Flax; (Leaves) Cattail, Yucca, Agave, Douglas Iris; (Bark) Willow, Maple, Basswood, Cedar; (Root) Leather Root, Beach Lupine; (Whole stem) Tule, straw, Juncus. Each material has specific requirements for extracting and preparing the fibers, but there are only two basic ways for using the fibers to make a cord: braiding (or plaiting) and twining. Braiding was usually done with flat, split materials such as cattail or flattened straw. The instructions in this article will deal only with twining, specifically with two ply (S-twist, Z ply, also called right handed) cordage.

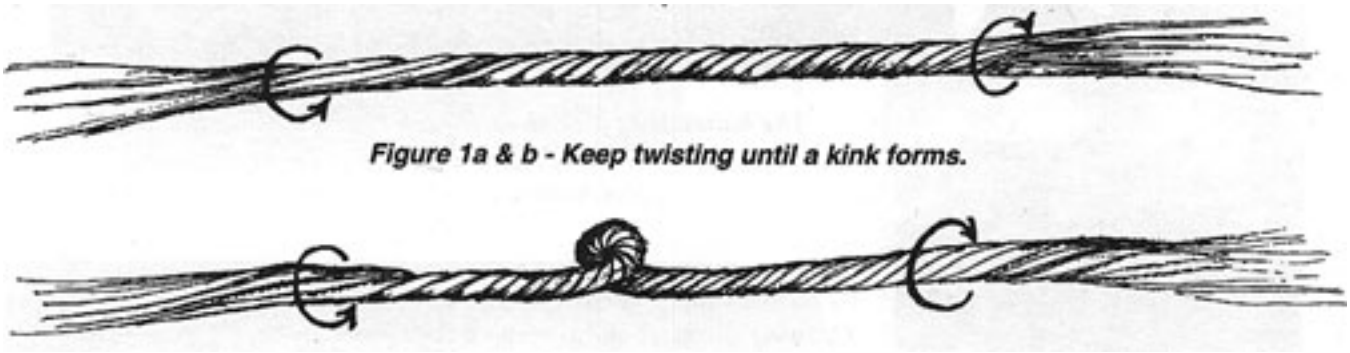
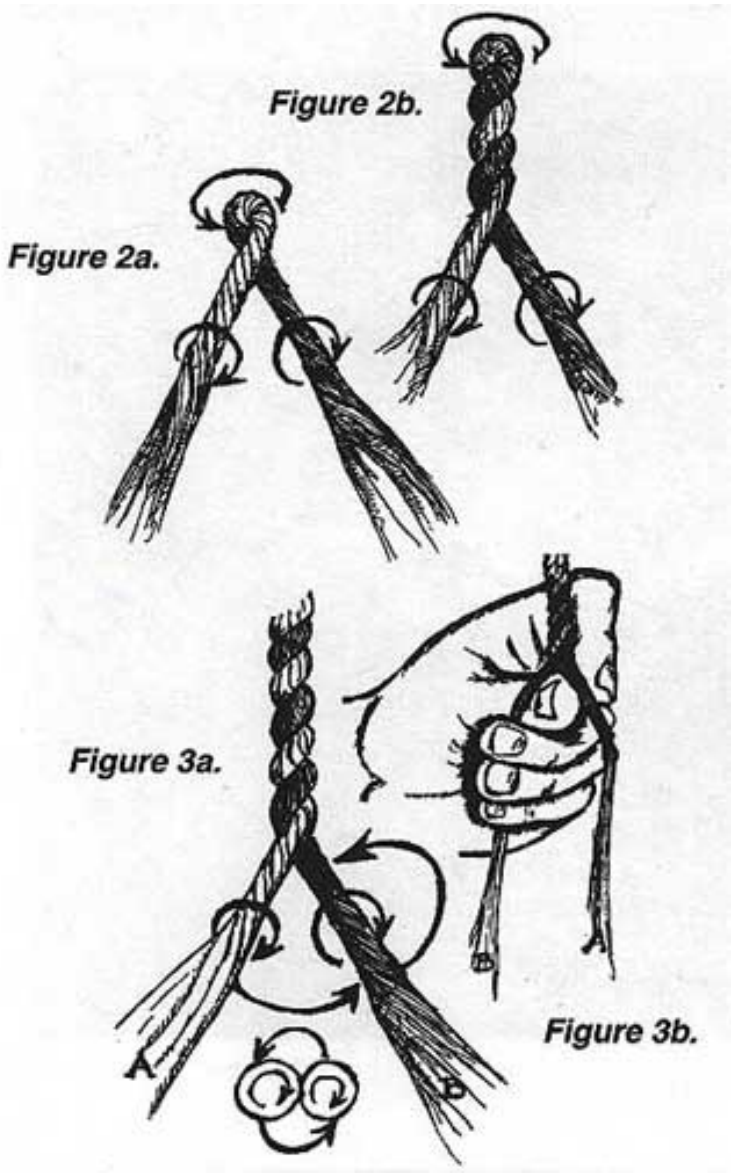


Figure 1a & b - Keep twisting until a kink forms.

After preparing a bundle of fiber half the thickness of the finished cord, place your hands six to twelve inches apart and about one third of the way from one end. Twisting the fibers clockwise with both hands, wind the bundle tight (making single-ply cordage).



Bring your hands closer together and keep twisting. The kink should rotate on its own in a counterclockwise direction (Fig. la & b). Twist until two or three rotations occur (Fig. 2a & b). This is the start of a two ply cord. At this time you can attach the end to something (or someone) which can rotate (free-end) and keep twisting with both hands turning clockwise OR you can attach the end to something solid (fixed-end) and begin twisting and counter-rotating (see below).

Counter-rotating, one form of finger-twisting, involves each hand applying a clockwise (S) twist into a ply, while passing the right ply over, and the left ply under (counter-clockwise or Z-plying). In Figure 3a, your left hand twists ply A clockwise, while your right hand does the same with ply B. At the same time, you pass ply B over and behind your left thumb and lock it in place with your remaining fingers, as in Figure 3b. You then take A in your right hand and B in your left and repeat, over and over and over again! These two methods are particularly handy with larger and coarser materials such as cattail and tule ropes.

Finger-twisting finer material is usually done completely in the hand, with the finished string being wound on a bobbin or netting needle as you go. Your left hand acts to control tension while your right hand does the twisting. Begin as in Figure 1, then place the Y (the point where the two plys come together) between your left thumb and fore finger. Take the lower of the two ply strands and twist it tightly clockwise until it begins to kink. Lock the twist in by closing your remaining three fingers over the strand (see Fig. 4a.). Then, while holding the twisted ply A securely, twist ply B with your right thumb and forefinger. As you twist, you should feel the completed string begin to twist counter-clockwise (step Fig. 4b.). Follow this motion with your left thumb and forefinger while maintaining even tension and a symmetrical Y . Next move your left thumb up to the fork in the Y as before and repeat steps 1 and 2 until you need to add more fiber.

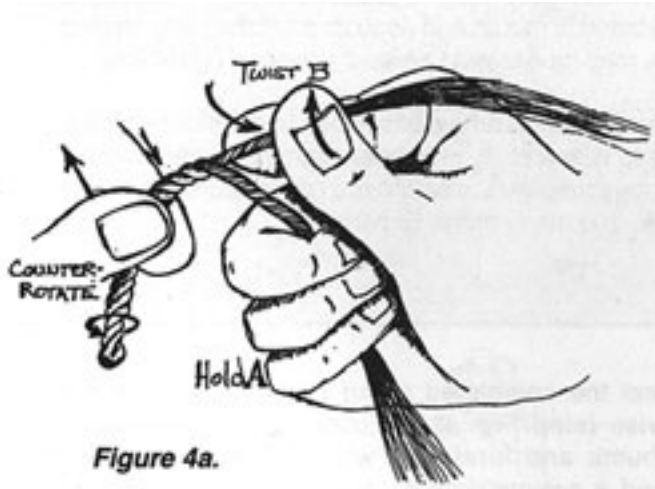


Figure 4a.

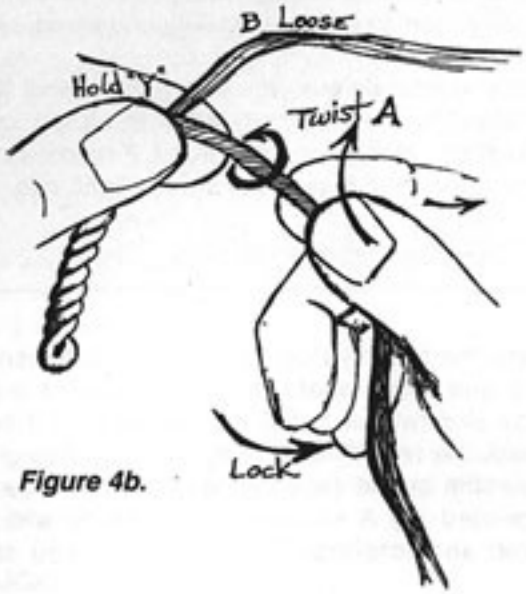


Figure 4b.

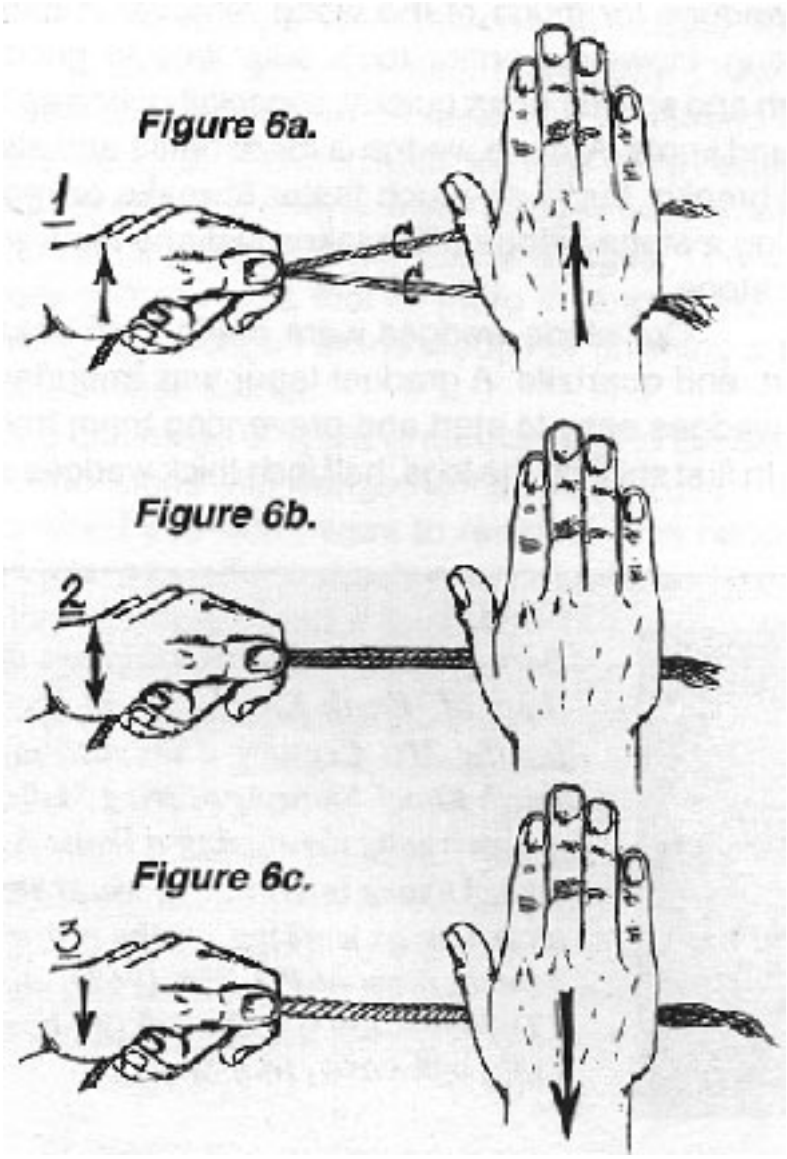
If you began your cord off-center, then one side will run out of fiber first. As you get to within about 3 inches of the end of this short ply, prepare another bundle of fibers the same size as you began with, but taper the end of the bundle for about 4 inches. Lay this bundle parallel to the bundle being replaced, and sticking out about an inch beyond the Y (Fig. 5). Continue twisting as before. You should also add in if one ply becomes thinner than the other, or if both plies become thinner than they started. In these cases add just enough fiber to bring them back to correct size. Ideally, your cord should stay the same size throughout, although aboriginal cordage did vary about fifty percent in nets. Bow strings and fish lines under heavy pull should be very even. It is also possible to add to both sides at the same time by bending a bundle of fiber in half and placing the Y of the bundle into the V of the Y, but it is harder to keep from making a lump at this point. After your string is finished, you can cut or burn (carefully) off the overlap ends to make your string less fuzzy.

Figure 5.

NOTE: dry surfaces tend to slip, so you should keep your hands and the fiber damp while you are working. Squeeze out excess water though or your string will be loose when it dries.

Finger-twisting methods are best used when a relatively small amount of string is being made and/or has to be very tight and even, and when very stiff or coarse materials are being used, such as cattail or tule. When making mass quantities of cordage, it is much faster and easier on the hands to use the leg (thigh) rolling method. The principle is the same, S-twist, Z-ply, but the twist is applied by rolling on the leg, rather than twisting between the thumb and finger. You can

continue to work without getting cramps in your hand muscles, and you can (with practice) work faster (about ten feet per hour). The critical element in making this method work is having the right surface on which to roll. Traditionally the bare left thigh is used. If you do not want to expose your skin, or if your legs are hairy, you can use pants, but these should be tight around your leg, so they won't bunch up as you roll, and they should have a rough enough surface to give traction. Keeping them damp is also critical. I keep a bucket of water next to me while work. This method is illustrated in Figure 6a-c.



Before you begin, prepare as much fiber as you will be using during that session. Once you get into the rhythm of the work, you won't want to stop and clean material.

Roll both plies away from you with the palm of your right hand (pre-roll each separately). Your left hand holds the Y and follows the movement.

Bring the two plies together by moving the left hand forward and back. If the two plies did not get tightly rolled the first time, carefully pick up both plies and repeat step one first.

When the plies are tight and touching, bring the right palm back towards you, counter-rotating the two plies into two-ply cordage.

Before repeating step one, it is necessary to untangle the loose ends of fiber, separate into two plies, and move the left hand up to the new Y.

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Introduction to Tule Ethnobotany

by Norm Kidder

In many parts of the world tules, reeds, bulrushes and their relatives have been used by local groups as building material. The Egyptians used papyrus for paper and boats (more technically called balsas, or floats). A statue of King Tut shows him spearing hippos from a reed 'surfboard', while multi-ton slabs of stone are known to have been transported on large ocean going reed vessels. (See Thor Heyerdahl, the Ra Expeditions). Natives in other parts of Africa, the Marsh Arabs of Iraq, and Indians of South America, Mexico, and California also used the versatile reeds for watercraft. In this article I will stick to the uses of tule reeds by the Indian peoples of Central California and neighboring Nevada.

Tule, seems to be both a general term for freshwater marshes and also for the sedges of the genus Scirpus. The term Tule Fog refers to moisture rising from the ground. The Spanish called the seasonally flooded center of the San Joaquin Valley the "tulares". In the San Francisco Bay area, the Common Tule is Scirpus acutus. This tule grows up to over 16 feet tall, has a round dark green stem, and only vestigial leaves. Its seed head is an open tassel normally 2 inches or less across. A similar looking relative, Scirpus californicus, or California Tri-square differs in having a lighter green and triangular stem, and a larger seed head. The tri-square also has a larger internal cell structure which makes it inferior for most construction purposes. A number of other species are found around the country, and may or may not prove suitable for making useable items.

In Central California, Tules were made into:
baskets - from loose berry baskets to water carriers (Yokuts);
clothing - Pomo 'grass' skirts and leggings to Yurok sun visors;
mats - to thatch a house or sit on, or rolled up for storage;
dolls and toys - slings, quivers, swaddling clothes, arrow skippers;
balsa boats and rafts - from one man floats to small islands;
duck decoys - plain, painted, and feather covered.

WORKING WITH TULES

Cut tules anytime after they have reached full height. They will tend to get firmer from late summer into fall. They can be cut in the fall until wind and rain have broken and dried them. The feel of the stem is the real determining factor. Be careful when cutting to keep the tules neatly stacked in the same direction so they don't bend or break. I tie them into bundles about 8 inches thick at the base with cords near each end and one in the middle. Always carry the bundles with the butt ends forward to avoid breakage.

Once cut, the stems must dried before use. Depending on when they are cut, they may shrink up to 50% in diameter as they dry. When they are uniformly light green they are just dry enough, although yellow or tan is better. While drying, be sure to allow for good ventilation, and don't stack the tules too thickly, or mold and mildew will result. I prefer to dry tules in the shade. It takes longer, but they acquire a leathery texture. Drying in the sun is quicker (few days instead of a few weeks), but the stems end up more crisp and brittle.

TWINING

Twining is easily confused with weaving, but differs in a fundamental way. Weaving involves a single strand passing in and out between the standing stock or ribs. Twining involves two (or three) strands which pass around the ribs in sequence, while intertwining around each other. This results in a 'locked' stitch compared to weaving's looser wrapping. Twining done without ribs (twisting) results in a two (or three) ply rope.

TWISTING

Twisting is used to turn fibers into string, or in this case using whole or split tules to make tule rope. To begin, grasp a bundle of at least two tules at each end and twist them between your fingers until the tules begin to 'kink' back on themselves. Move your hands closer together as the tule strands are twisted, and the kink begins to twist into a 2-ply strand. Attach the end to something (your teeth?), and now, as you twist clockwise, pass the strand over each other counterclockwise, switching hands. Repeat this endlessly, adding in new tules (fat end first) into each side as needed (See the "Bulletin of Primitive Technology" #2 for a complete description of the string making process).

TULE MATS AND SUCH

To twine tules into mats or other items, begin as you would for rope, twisting together three or tour inches of single ply cord. Instead of twisting the plys together, place the twisted section around a small bunch of tules with each twist. You should have the tules laid out roughly. Pass the strand which lies on top of the first bunch over the strand which comes up from beneath, and then this strand passes beneath the second bunch of tules and then comes back out to the working face. Repeat this - over, behind and out - until you have completed a row. Add in additional pieces of tule as needed to maintain the thickness of the strand. As the row progresses, each 'stitch' should slant at the same angle across the face of the project At the end of a row, twine the tule strands into rope until it is long enough to reach the next spot you want a row to begin, then turn and twine the row. Continue this process until you have finished. End the last row with a knot, then tuck the ends back into the work.

TULE DUCK DECOYS

From observations by early explorers, decoys of tules and feathers were used over a wide area in the West. A cache of decoys was found, wrapped in a tule mat, in a dry cave in Nevada in 1924. Most were painted and partly feathered, others plain. A bag of feathers was found with it. Paiute Indians have continued to make tule duck decoys to this day. Jimmy George, a Paiute shaman, is shown making a decoy in Margaret Wheat's book "Survival Arts of the Primitive Paiutes" (Univ. of Nevada Press, 1967) in the 1940's. I have a decoy I believe was made by his son some years later, and we have recently purchased two decoys from Daren George, the grandson.

There appear to be two styles of decoys. One was finished by pinning a fresh duck skin to a body of tule (shown in Wheat), and adding the stuffed head. The other type (from Lovelock Cave) has the whole figure made from tule, with paint and feathers applied over it to define the species of duck (or goose). The following instructions are for making the second type, leaving decoration up to the user.

Decoys were commonly set out in a marshland where they would attract a flight of ducks to land. A concealed hunter then pulled up a net, weighted with stones (so as to sink out of sight), and attached on the opposite bank, ensnaring the flock. Other methods included shooting with arrows equipped with 'skip bomb' heads which would skip along the surface of the water and into the swimming group of birds; and nets thrown into the landing or leaving flock.

Tule decoys made in recent times have been primarily for decoration, but there is no reason a motivated primitive hunter couldn't give the old ways a try.

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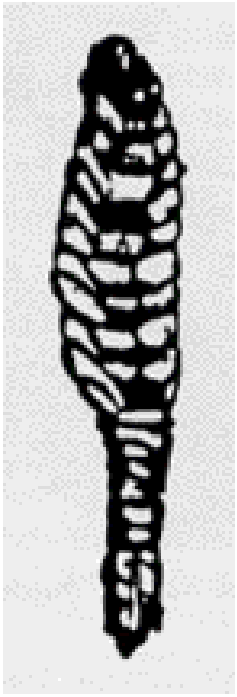
Pomo Tule Bittern

by Norm Kidder

"These were woven by adults for the children."
from "Material Aspects of Pomo Culture, in the Bulletin of the Public Museum of the City of Milwaukee"
by S. A. Barrett, 1952

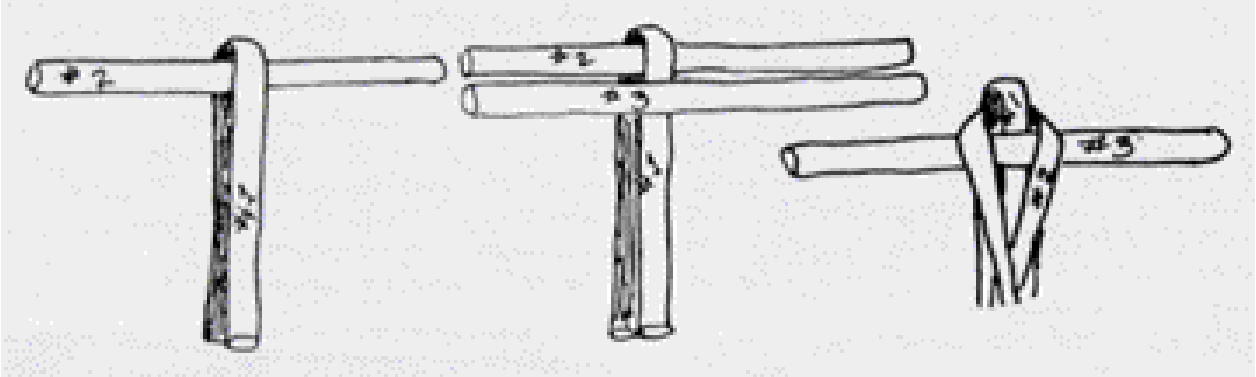


1. Cut two 16", and eight to fourteen 8" tules, and flatten them.

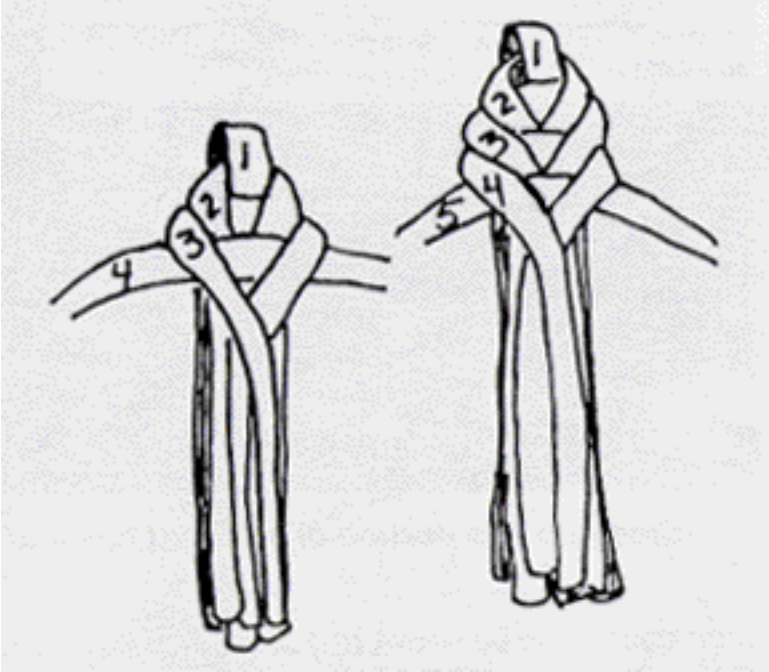
2. Center a short tule (#2) over the middle of a long tule (#1), then fold the long one in half.

3. Center a 2nd short tule (#3) over the folded #1, just below #2.

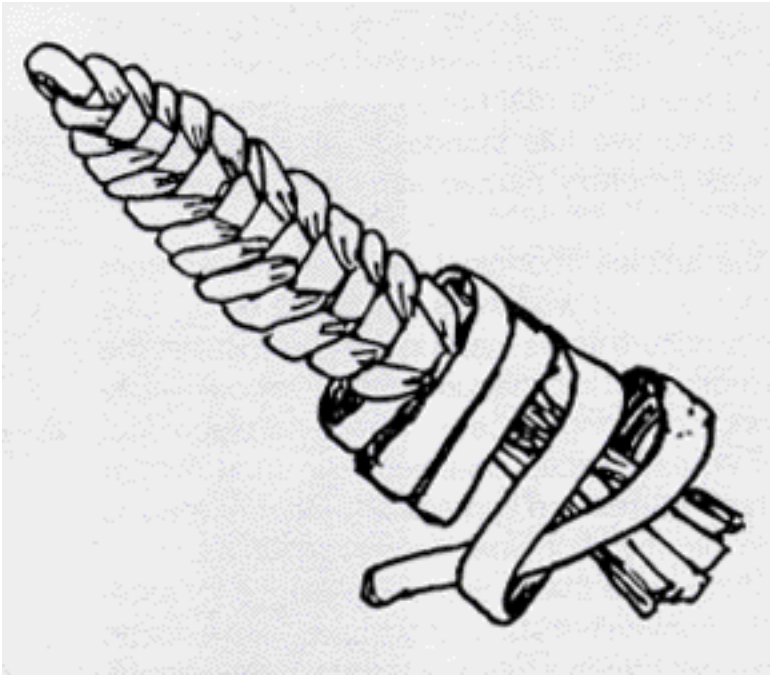
4. Fold both halves of #2 over #3.



5. Continue with #4, as with #3, folding #3 over #4, then #4 over #5, #5 over #6, #6 over #7 until all the short tules are used.



6. When the last short tule is ready to fold down, place one end of the 2nd long piece over the doll, then fold down both sides of the short tule, locking it in place. Then use the long end remaining to wrap the lower part of the doll. Tuck the end of the tule under the last wrap and pull tight. Trim the ends.



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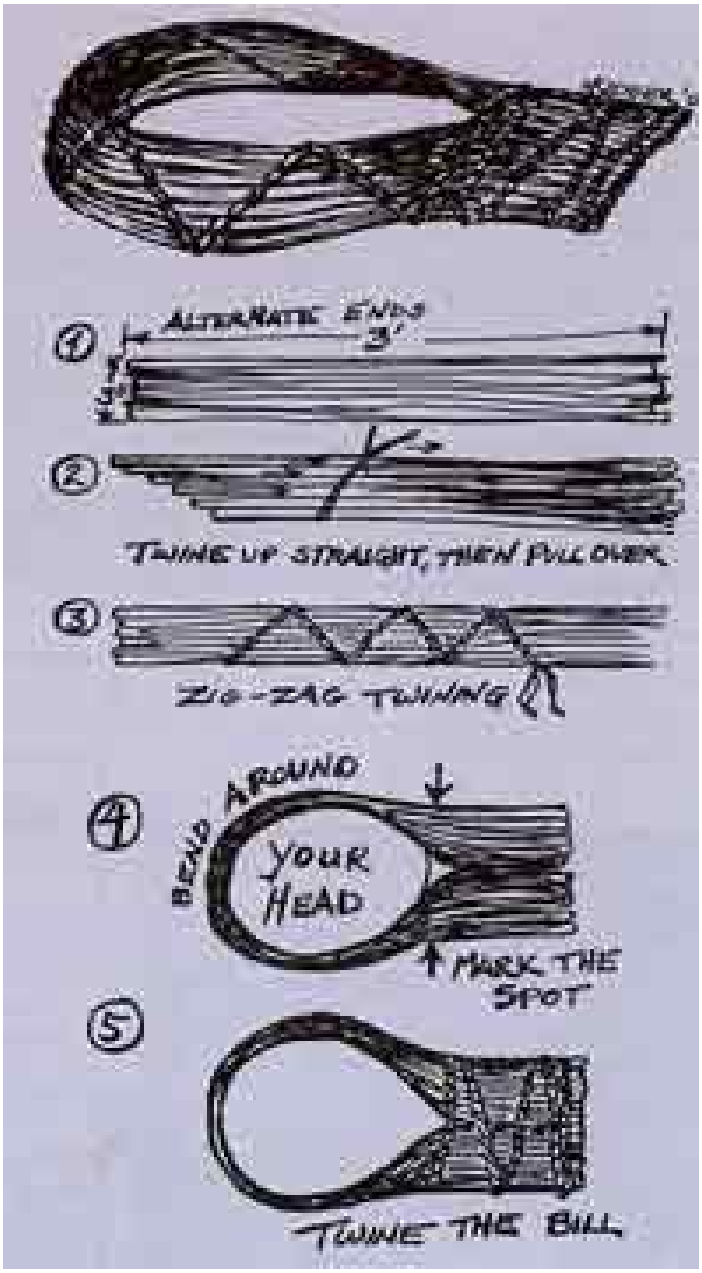
Klamath Twined Tule Visor

by Norm Kidder

This simple sun visor is based on an example attributed to the Klamath Indians of Northern California. It can be made from green tule reeds (also called bulrushes) for temporary use or with dried and re-soaked tule for long term use. The twining can be done with either split tule or cattail leaf. If doing a quick version in the field, try to find cattail or tule that has been naturally cut and dried to at least a yellow color as it will be more pliable.



Begin twining at least 8 inches from the ends of the tules. Twining begins by twisting up a split, soaked tule, then bending it around the first tule ribs (not in the center). After a half twist, add in the next rib and so on until about 3 inches have been incorporated. This twining should be done so as to angle through the ribs as shown. You know the twining is correct if the two twiners alternate into the up position, and also twist around each other. This project may work even if you do it wrong.

Wrap the twined tule band around your head so that it forms a bill with the beginning of the twining on one side and the end of the zig-zag on the other. Holding it together at this point, twine all the way across both halves of the bill. Recheck the fit, adjusting as necessary and then twine more rows until the bill has been completed. Finish with a tight double row and tie off the ends. Now wear it proudly.

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A Paiute Tule Duck Decoy

(Based on a model made by Davin George)

by Norm Kidder

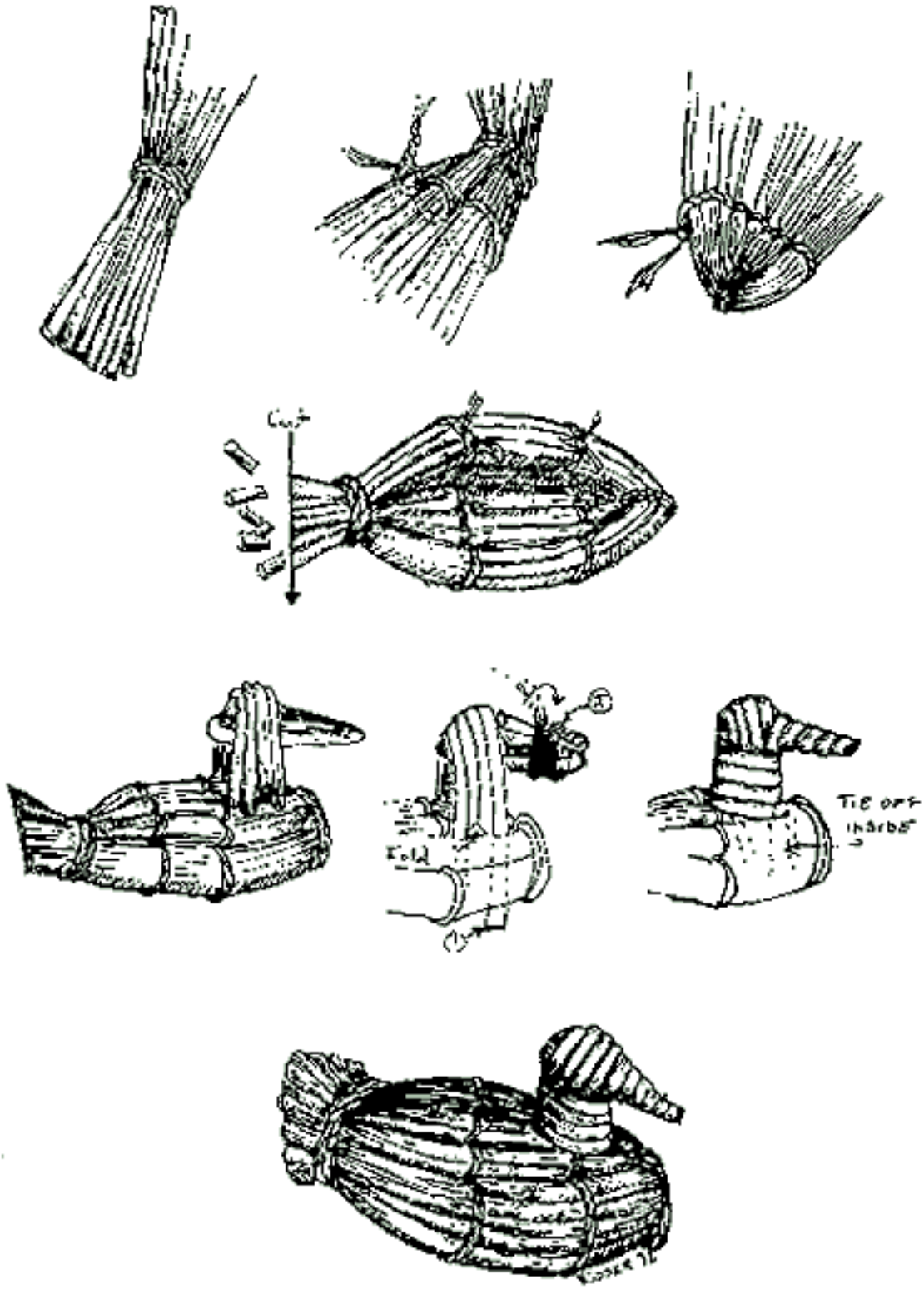
1. Tie off a 2 feet bunch of tules, 2" in diameter in the middle with dampened cattail leaf, twisted into a cord.

2. Twine into 3 bundles with cattail cord, about 3" from middle. The 1st bundle should use half of the tules, the second bundle use 2/3 of what remains, and the 3rd bundle uses what's left.

3. Bend the bundle in the middle and continue on across to the other side, twining into 3 parts, going from smallest to largest.

4. Twine a 2nd row of 6 bundles across the whole ducks body, about 3" from the 1st row. Then tie the whole body together another 3" from this 2nd row with a cattail cord. Sculpt the body to shape, making sure the base is open and wide. Cut off the excess tail at an angle.

5. Use tule to make the basic head shape, with each coil of tule passing through the top of the body. Make sure the neck sticks up only about 2". Then wrap with dampened cattail leaf or split tule until the desired shape is achieved. Finish by running the end of the wrapper into the body and tying it off. Add paint and feathers as desired.



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Ajumawi Fish Traps

by Dino Labiste

Stone fish traps were constructed by the native Pit River groups in northeastern California. These ingeniously simple and efficient fishing structures were used to harvest the Sacramento sucker (*Catostomus occidentalis*), a bottom dwelling, boney fish that reached a size of 18 inches and weighed five pounds or more. The suckers spawn between late January and early June, with the heaviest activity being in February. During this period, they collect in large schools during the daylight hours and as evening approaches, the suckers move into the shallows where spawning is done in the flows of cold spring water. The Pit River people harvested Sacramento suckers by understanding the spawning behavior of the species and its habitat, while helping to propagate and actively manage this fishery resource with their stone fish traps.

The photos show the lava fish traps that were used by the native Ajumawi people, one of nine bands of the Pit River Indians who occupied a large area of northeastern California. The fish traps are located in the Ahjumawi Lava Springs State Park. A description of the park, by John W. Foster, Senior State Archaeologist of California State Parks, explains the unique landscape that draws the suckers to the area.

> *The state park is composed of a vast lava field on the north extending many miles beyond the park boundary. This is the result of a geologically recent flow, perhaps 2,000 years in age, resulting in a landscape of sharp-edged rock, craters, pressure ridges and lava tubes. The aqueous setting is as soft as the land is harsh. Where lava meets lake is a zone of critical importance. The lava flow collects rainfall over a vast area. It percolates through the broken rock, collects in great volume and issues through a series of reliable cold-water springs into the lake. These occur mainly along the shore, although several important flows can be detected in the main body of the Big Lake itself.*

The traps utilize the flow of the clear, cool waters emerging from the lava and the propensity of suckers to seek these lakeside springs for spawning.

Common elements of the Ajumawi stone fish trap consisted of a large outer wall that formed an impoundment, connecting two points of land.

> *Water depth may be 50-150 cm and the stone wall is built up to the lake level using three courses of lava stones or more. A central opening measuring 20-50 cm is designed to allow suckers to enter. It can be closed with a keystone (which can sometimes be seen underwater) or a log, dip net or canoe prow. The outer wall and opening serve to concentrate the spring outflow as it enters the lake, making a strong attraction flow to the spawning suckers.*
>
> *Within the stone enclosure there is sometimes found a series of rock alignments forming an inner chamber. These invariably lead to a strong spring flow. They are constructed from lava rock near the spring itself. This exposes a layer of smaller vesicular gravels over which the spring waters issue. The most complex trap within the park is constructed at Crystal Spring. Here an elaborate maze of interior channels, chambers, rock piles and outer wall direct the spawning fish into very shallow water. During the peak spawning season, the preoccupied fish can be touched from the bank as they deposit eggs on the gravels.* (Foster)

Harvesting of the suckers, by the Ajumawi, was done during the evening. The outside enclosure opening was blocked, torches were lit, and the fish were collected using hands, nets, spears, or basket scoops.

> *When an adequate supply was taken, the trap was reopened and fish were allowed to resume their spawn. Occasionally, it would be left closed until the following day, but great care was taken to allow the spawn to be successful.* (Foster)

The fish catch were gutted and sun-dried or smoked over a wooden frame.

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E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Inuit Thimble

by Dick Baugh (January 23, 2000)

How many times have you acquired a sore thumb either from a lot of whittling or pushing a needle through tough material? Here is a simple remedy for that situation. Looking through some book on Inuit (Eskimo) material culture I saw a design for the world's simplest leather thimble. I don't even remember the title of the book. Normally one would make this device from heavy leather but the one in the photos was made from corrugated cardboard.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Willow Rake

by Dino Labiste

Aaaah! The great outdoors. Breath in the fragrance of fresh air. No smog to make you hack and cough. Just the scent of wild mint, the aromatic smell of Bay laurel leaves, and a hint of vinegar weed. A babbling creek to lull you to sleep and the sounds of squawking acorn woodpeckers busily stuffing their acorn granary. What better way to recharge your energy and get away from urban life. A chance to drink in the rhythms of the earth and practice your primitive technology skills.

A few friends and I took a couple of days off to relax on a camping trip in the woods. Far away from the hustle and bustle of city routine. Our campsite was nestled under towering Valley oak trees that were getting ready to settle in for the winter. Their leaves had changed to its golden colors and had blanketed the earth with hues of yellow, orange, and brown. The ground was littered with huge, chocolate colored acorns everywhere. An abundant crop this year.

We had arrived late in the evening and the first agenda was to prepare our sleeping area before the sun sank over the horizon and the chill of the evening air crept in. Markus Klek decided to construct an oak leaf bedding to cushion and insulate himself from the cold ground. Gathering up Valley oak leaves with just your hands is a time consuming chore. Markus thought of making a willow rake to sweep up a huge pile of leaves and to use the rake as a scoop to carry his load.

After cutting some long, straight willow branches near the creek, Markus stripped off the bark to use for lashing material. He took six willow branches, added a willow cross piece near the end and tied the cross piece to the other branches with the willow bark. Markus then bound the six willow branches into a handle and, in a matter of minutes, he had fashioned a useful and efficient tool.

Raking up the leaves into a pile was very fast and easy. Markus scooped up the pile of Valley oak leaves and deposited the stash onto his bedding area. He placed some logs on the opposite edges of his pile to confine the leaf debris to one spot. After the first night, the leaves compressed into the ground and a new layer of oak leaves were added for the next night.

With creativity and respect, Nature can provide for your needs as long as you don't take more than what you need.

Aaaah! Smell that crisp, morning air. Wake up to the melodic song of chirping birds. There is no place like the wilderness to soothe and comfort the restless spirit.

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The Three-Stick Roycroft Pack Frame

by Dick Baugh

How would you like a pack frame that is comfortable, strong, and can be made from natural materials in less than 1/2 hour? We were introduced to the Roycroft pack by Mors Kochansky at the Rabbitstick Rendezvous a few years ago.

Its an excellent lesson in self sufficiency, outdoor survival skills, knifecraft, lashing, multiple use of an

object (blanket) and use of natural materials. What more do you want? But is it primitive? I don't know if our stone age ancestors actually made this type of pack frame. We do know, however, that the "Iceman", whose remains were found after 5,300 years in the Alps between Italy and Austria, had with him a wood pack frame (1, 2, 3. See drawing also). The archaeologists have released very few details on his pack frame but say that it was an inverted U shape. I also saw a photo taken in the Himalayas early in the 1900's of a simple inverted U-shaped pack frame. The Koreans have been using A-frame packs for centuries.

Essentially we are lashing together a triangular wood frame, wrapping our belongings in a blanket and tying the bundle to the frame. A single piece of thick cordage is then used as combination shoulder straps and waist band

The Frame

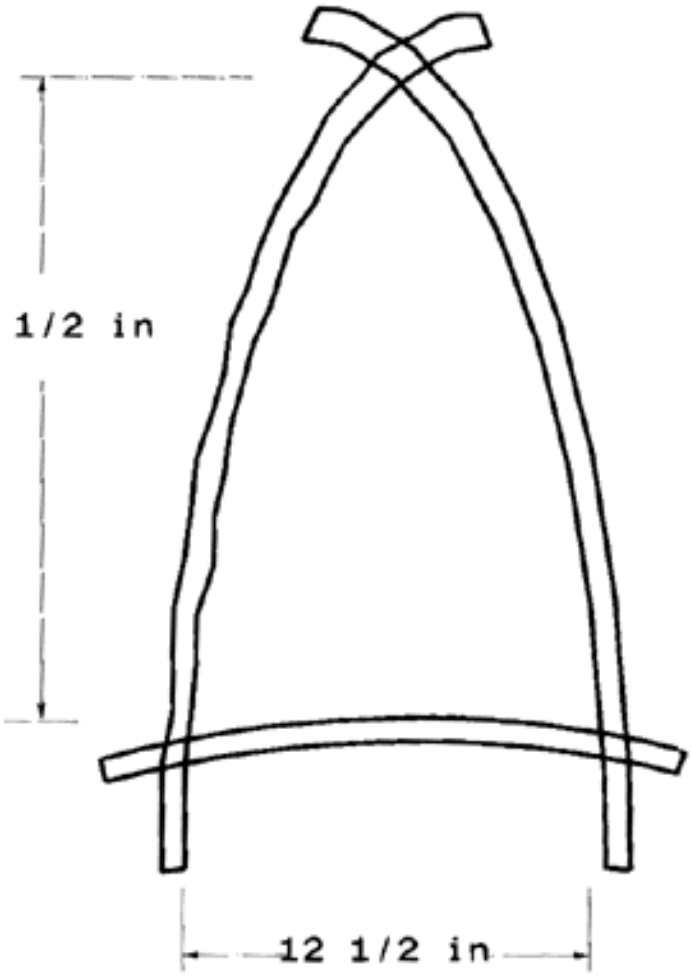


Figure 1.

Cut three sticks for the frame. They should be about as thick as your thumb. The length of the bottom piece should be the width of your buttocks. Ideally it should also be slightly curved to fit your back. The length of the two side pieces should be equal to or slightly longer than the distance from your buttocks to the back of your head. I have heard of other ways to select the lengths but this works for me. In the past I have used green willow (Salix sp.) because it was available in the correct diameter, straight, plentiful and easy to cut and if necessary, bend. The Iceman's pack frame was made from hazelnut and larch. Hazelnut is a much tougher wood than willow. The three sticks are held together by a combination of joints and lashing. Figure 1 shows detailed dimensions of the pack that works best for me. As a reference point I am 5'8" tall and weigh 140 pounds. If the pack frame is too short, then a greater fraction of the weight will be carried by your shoulders. If it is too long, then the shoulder straps will be very loose and the load will wobble from side to side.

Figure 2 shows two different kinds of joint that can be used to hold the sticks together, the lap (Abe Lincoln) joint or the butterfly joint, another Mors Kochansky original (4). I don't see much difference between the two but the lap joint is possibly more appropriate if you have weak wood and strong cordage, whereas the butterfly joint works well if you have stronger wood and/or weaker cordage. My frame uses a lap joint on top and butterfly joints on the

two bottom joints.

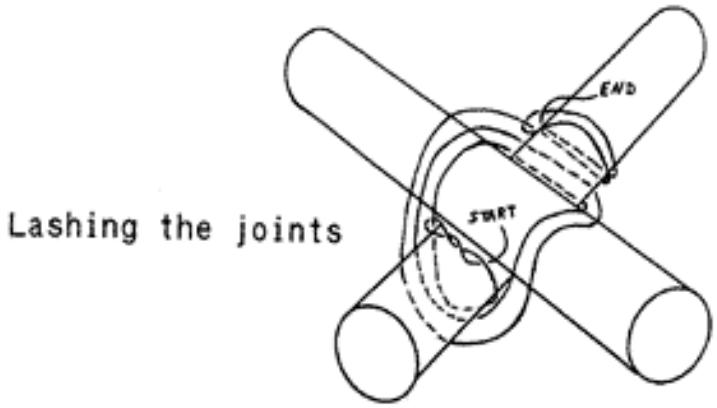
The lashing material can be any kind of vegetable fiber cordage or rawhide. It doesn't even have to be very strong if the joints are tight. One joint on my pack is put together with finely shredded cattail leaf fiber, another with New Zealand flax and the third with willow bark cordage. Figure 3 shows one possible way of lashing. It isn't very critical since most of the strength should come from the joint.

The original strap for my pack frame was made from a worn out Volvo seat belt plus a piece of nylon rope. Strong, durable and comfortable but it wasn't very primitive. The strap I am now using is two-ply shredded cattail (Typha sp.) leaf rope. It is made with the middle part, used for the shoulder straps, thicker than the ends. For comfort, the straps should be at least one inch (2.54 cm) in diameter. The straps should taper down to 1/2 inch after they leave the shoulders to facilitate tying them around your waist.

Making straps out of cattail leaves is a good lesson in cordage techniques. Making a piece of cordage can be an abstract exercise which doesn't mean much if you have no specific application for the cordage however making a piece of cordage for a particular application combines the "How to make it" with the "What do I use it for after I've made it?". For optimum results gather the cattail leaves late in the growing season, before they have died and turned brown (5). Shred them into narrow strips. A coarse "comb" made by driving nails into a board is a useful tool for the shredding. Otherwise it can be done by hand. Finely shredded fibers will be stronger and more flexible. After shredding, the fibers should be dried and then moistened before twining.

Three-ply braided versus two-ply twined straps: take your choice. The important things are that the cattail leaves should be shredded finely to give flexibility and the straps should be thick enough to give comfort.

Packing and tying on the load:



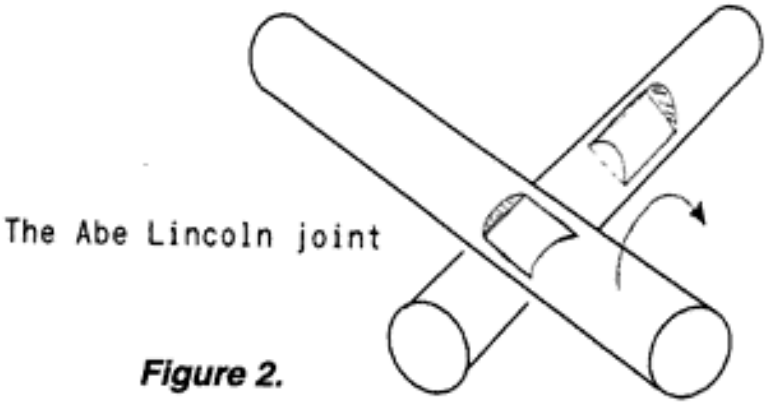
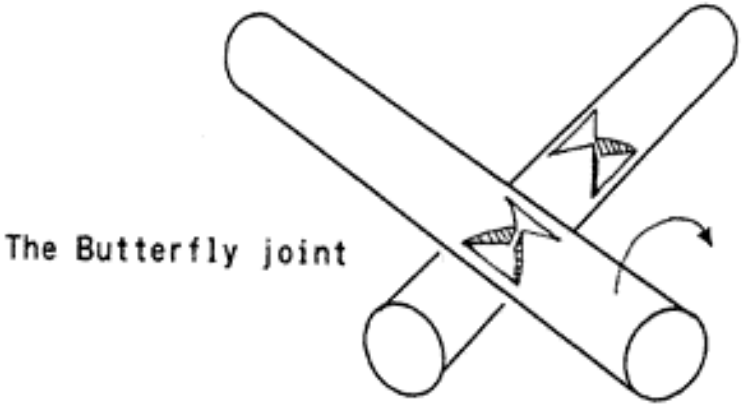


Figure 2.



You want to pack your load in such a way that it is comfortable and everything is readily accessible without having to take it all apart. The best way I have found so far is to wrap up your gear the same way you would a baby. Another analogy is to say the blanket is folded like an envelope. Fold your blanket into a square and place it on top of the pack frame with the corners up, down, left and right. Place something soft, such as a coat or sweater, at the bottom for padding where it will contact your lower back. This is very important. Otherwise the crosspiece digs into your lower back. Put the rest of your gear on the blanket. Fold up the bottom corner, and then wrap the left and right corners around the gear. Last, fold the top corner down. This way it is easy to access anything by lifting up the top corner.

Tying the pack to the frame: Begin securing the load to the pack frame by first tying a rope to the

center of the crosspiece. The load is then tied on in accordance with Figure 4. It is critical to tighten the rope sufficiently that some of the soft padded portion of the pack protrudes through to keep the crosspiece from contacting your lower back. That is shown in Figure 5.

Securing the straps:

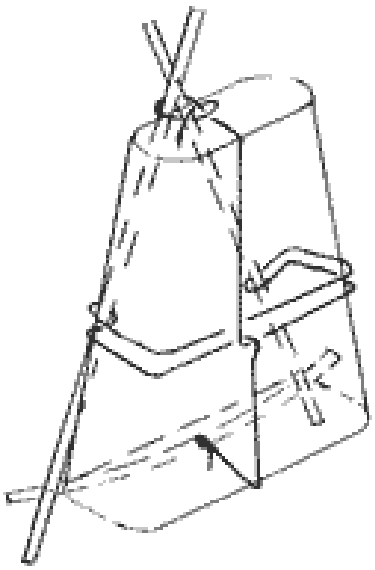


Figure 4.

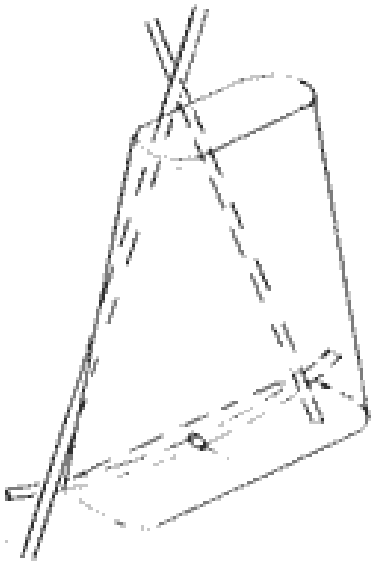


Figure 5.

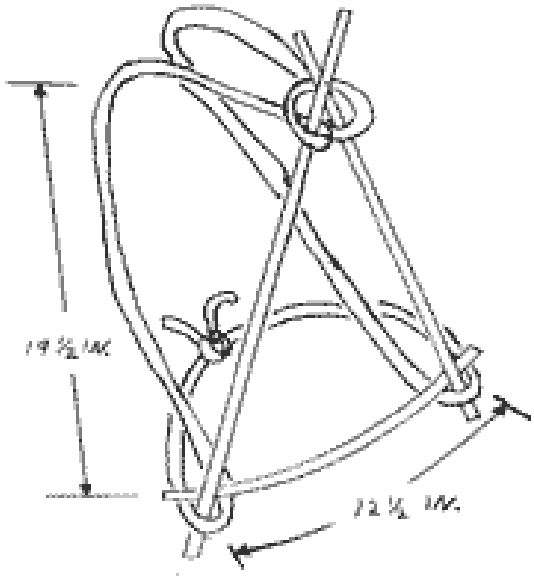


Figure 6.

Secure the center of the straps to the top of the pack as shown in Figure 6. It can be done as illustrated or with a "lark's head" knot. The straps then go over your shoulders, around the bottom of the side pieces and then are tied around your waist. Once the straps are tied together you can leave the knot in place and remove the pack simply by slipping the straps off the bottom of the side pieces.

Pack secured to the pack frame.

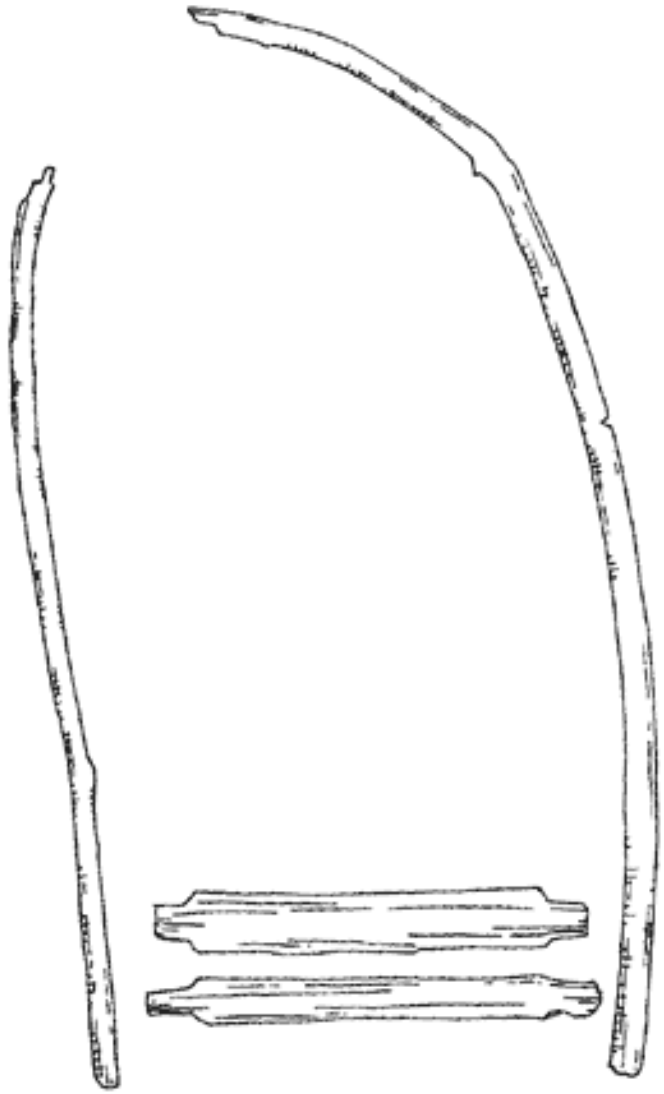
Field testing: My first real experience with a Roycroft pack was on a two week BOSS walkabout in south eastern Utah. I was using the Roycroft whereas my compadres were using very simple blanket packs. None of us had very heavy loads. One big advantage of the Roycroft over the simpler pack was the ease with which you could untie the pack, add something or take something out, and then re-tie it and be on your way. The other advantage was greater comfort.

My next test of the Roycroft pack was to see how it did with a heavier load. I packed a heavy coat and 25 pounds (11.36 kilograms) of books in the Roycroft and took off on a 1 1/2 hour hike in the hills. This is where I learned that narrow straps don't work well. It is also important that there be enough padding in the bottom of the pack to keep the cross piece off your tail. Other than that it works great.

Footnotes

(l.) 1993, "The Iceman", National Geographic, June, page 36.
(2.) 1993, "Who Was the Iceman?", Popular Science, February, page 46.
(3.) 1992, "The Long-Lost Hunter", Audubon, September-October, page 92.
(4.) Mors Kochansky, "Northern Bushcraft", Lone Pine Publishing, ISBN # 0-919433-51-0.
(5) 1994, "SPT Fall Bulletin", pages 10- 17

Iceman's Backpack



Drawn to scale from photos in "The Man In The Ice" by Konrad Spindler, 1994

Cross boards - Larch (Larix decidua). Only faces show traces of being worked. Boards were split from small branches.
Top board - 38.3 cent. long x 6.1 cent. wide x 1.2 cent. thick. Bottom board - 40.5 cent. long x 4.6 cent. wide x O.6 cent. thick. All boards had rounded end notches like bottom right.
Rod - Hazel (Corylus avellana) 1.98 meters long.

This article was first published in The Bulletin of Primitive Technology (Spring 1995, #9)
E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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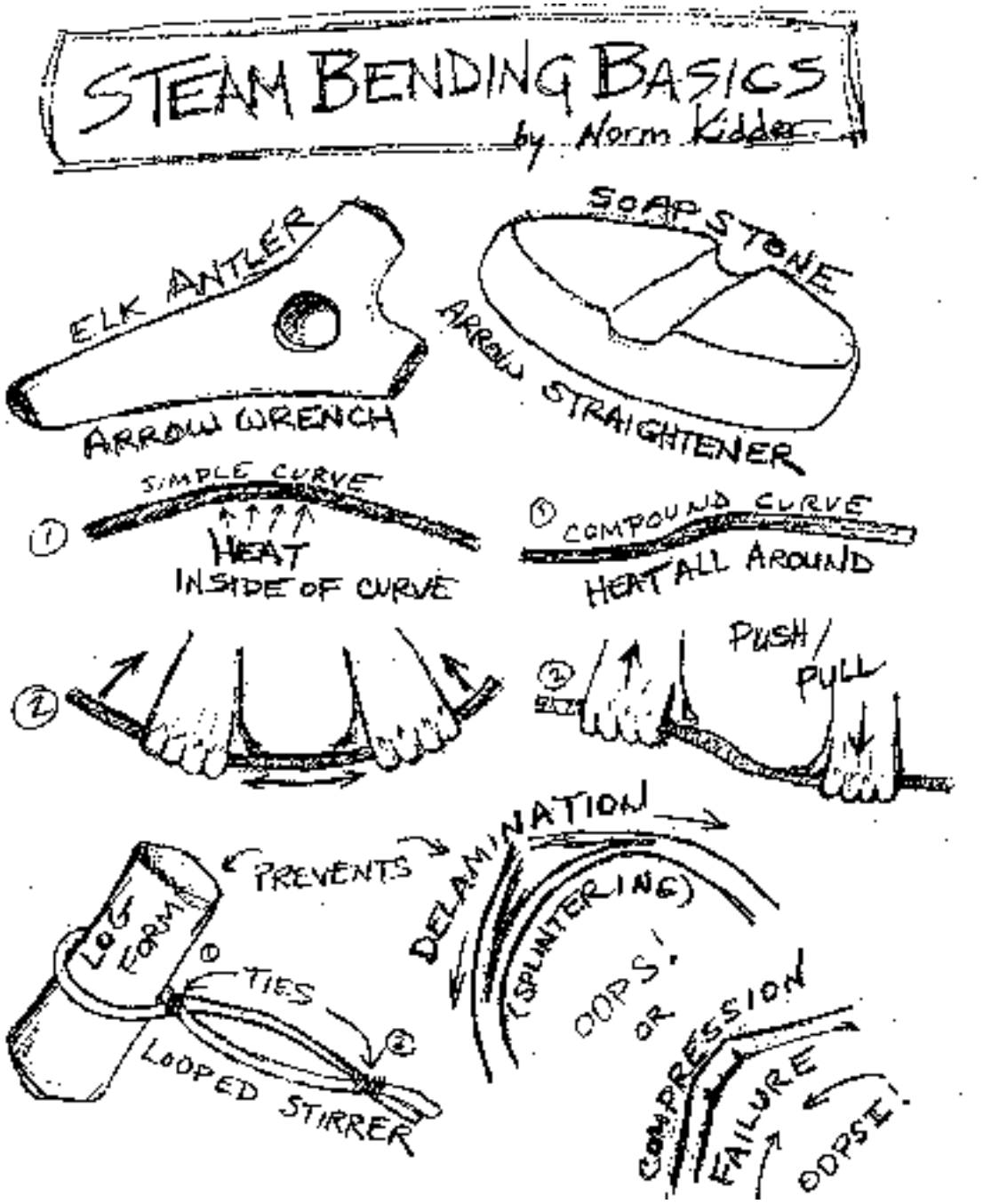
Steam Bending Wood

by Norm Kidder (September 1, 2001)

If you want a real challenge, walk through the woods and find a straight stick. Even if you think you have succeeded, leave it in a corner for a few weeks and check it again. Trees are living things, and they respond to changing conditions and stresses, especially moisture and wind. The life history of each tree is reflected in the wood grain. As they dry, they shrink unevenly - resulting in warping and cracking. Today kiln drying, milling and laminating are all used to deal with these tendencies, but in ancient times one became intimate with the art of steam bending.

Wood is made up of long tube-like cells of cellulose connected end to end forming long fibers running the length of the tree. Additional fibers run across the grain, tying everything together. Except for the outermost layer (cambium), wood is dead, serving the plant for structural support and water storage and transport. Each year a new layer of fibers is added under the bark, its thickness determined by growing conditions and stress - more moisture = a thicker ring, and more stress = a thicker ring on the stressed side. Over time, the inner layers may fill with resins, forming heartwood, which is usually denser, and more rigid. The newer, outer layers, sapwood, are still relatively flexible and wet. (Excellent bows are made with the compression resistant heartwood on the face and flexible sapwood on the back.) Heating the wet wood turns the water to steam which dissolves some of the bonds between fibers allowing them to realign, reforming the bonds when they cool. So, steam bending is the process of weakening, stretching and reforming wood fibers to the desired shape. Rawhide acts in a similar and more dramatic way when it is wet, and then dried to shape.



There are many applications for steam bending in primitive technology. Straightening shafts for arrows, spears and fire drills is probably the most common. Others uses include straightening blowguns, recurving and reflexing bows, bending basket rim sticks, net hoops and looped stirring sticks, bending curfed wooden boxes, and shaping dugout canoes. A complete list wood (oops) would quickly become encyclopedic.

There are three basic ways of softening the wood fibers. The first is to heat moisture already in the wood. This means using already moist, green wood, or soaking dry wood to replace the necessary moisture, then using a fire, or other heat source to turn the water to steams. The second method is to create steam first, and then force the steam into the wood. The final method is to use boiling water to penetrate the wood fibers. [There are also chemicals that will dissolve the wood bonds - definitely not primitive.]

The choice of steaming method is determined by the size and dryness of the wood to be bent, the method of bending, and the available options. Small green sticks of solid wood for arrow shafts are easy to do over the coals of the fire or a heated soapstone arrow straightener. The only problem that may arise comes from over heating the stick, drying it out and making it brittle. Thicker pieces of wood, such as bow staves and boxes are more difficult, as the outside may dry out before the inside becomes soft enough to bend. For these, wet heat - boiling or steaming - is necessary. Dry

wood may be soaked and heated if it is thin enough (this is how the sides of violins and guitars are made). When steaming or boiling is required, the method will be determined by what you can practically do with the available material.

The process most used in a primitive camp is direct heating of a still green stick over the coals, and then bending it to shape. The stick may be solid wood, such as chokecherry, or hollow, like rivercane, or have a pithy core as with elderberry. If your goal is to straighten out gentle curves, heat the inside of the curve over the fire (a good even bed of coals is preferable) as you are going to stretch this side. Using gloved hands, bend the stick past where you want it to end up, so that it will spring back to the desired point. You know to apply this pressure when you feel the wood lose most of its springiness. Sight down the length of the stick after each bending operation to check on your progress and to make sure you didn't over-bend it. Sharp bends can sometimes be worked out using a soapstone arrow straightener or an arrow wrench (see illustrations). Some compound bends can be handled by a push/pull maneuver. . If you heat both sides of the stick, you run the risk of the inside collapsing while you are stretching the outside. This is especially true of elderberry and other soft woods. Rivercane and phragmites both have hollow spaces between sealed nodes, so expanding air may cause these sealed containers to explode, or burst out the side if overheated.

If the stick you start with is fresh cut, there is a very good chance it will warp as it dries. If cut during peak growth times - late spring and summer, the large amount of water in the stick may actually make it more brittle. Dormant season wood, with less moisture may be more flexible. This is one reason to start with a dry stick and rewet it. It is even better to let the stick dry to a point where it has just enough moisture left to produce steam, but the process of bending brings it to full dryness. Knowing just when this happens takes experience, but it will keep you from having to re-straighten your drills and arrows repeatedly as they dry. Changes in air moisture will always cause wood to warp, so some re-straightening will be necessary for arrows and darts to fly perfectly straight. Cold straightening will sometimes hold long enough for you to shoot, or start your fire before the shaft warps back (since you won't be able to heat bend it until you have a fire started).

Bending a green stick into a circle for a basket rim, or a net hoop can be done with no heat if the bend is not too sharp for the diameter of the stick. The hoop must be tied until the wood has dried completely for it to hold its shape. If the curves are too sharp, then heat must be used. Tying off is still necessary if the wood is still wet. Bending compound curves, as in a looped stirring stick, or simple rims when there is a weak spot are aided by the use of forms, which can be as simple as a chunk of wood and some cordage (see illustration). Even with a form, the hot wood should be massaged gently over the form, and clamped or held to avoid split outs (delaminating) on the outside of the bend or compression failures on the inside. Once the stick is cooled, it should hold its shape.

To make and use steam to bend already dry and thick (over about an inch thick) wood, you'll need to construct a device of some kind. BPT # 9 (or Primitive Technology - a Book of Earth Skills) has a couple of set ups for steaming boxes within the article Bent Corner Box Making, by Greg Blomberg (page 47 in BPT #9). For small stuff, I simply boil water on my stove, put aluminum foil over the top and slide in my stick. Bigger stuff requires building a box or pipe to hold the wood, and then channeling steam into it from a boiler. None of these methods is of much use out in the field. One quick field method used along the coast was to take a piece of bull kelp, which is hollow at its upper end, put the stick inside and heat it under a fire. Where bull kelp doesn't grow

(in other words most everywhere), steaming can be done in a long pit oven with lots of green plant material to provide the moisture. [Dig a pit, line it with rocks, heat the rocks, rake out the fire, fill the pit with wet grass or leaves, lay in the wood, add green stuff, cover with dirt, wait a few hours, remove and bend the wood].

I've used boiling to recurve the ends of a bow stave. I put the wood into the boiling water for about 20 minutes, which softened it enough to do the job. I bent the wood by pushing down against a solid surface, and had to hold it or tie it in place until it cooled. Over boiling could soften the wood too much and allow compression failure. Wooden hayforks with steam bent tines still made today are scorched along the outside of the bend in each tine. I assume this acts to harden the wood against future compression failure (the tines tend to break above this scorched bend). I haven't seen any bow staves treated this way, but heat drying the curve should help it hold its shape. An application of sinew on the inside of a curve will also hold the curve for the long run, or even increase the curve as it dries.

Another, rather dramatic use of boiling is found in the creation of dugout canoes. Once the digging out is completed, the canoe is filled with water and red-hot rocks added until it is boiling. The water is kept hot until the sides of the vessel are softened at which time a thwart (crosspiece) is hammered into place, causing the sides to bend out and the keel to round up a bit.

The ability to shape wood with simple tools and methods such as steam bending served our ancestors for the millennia it took to create more sophisticated systems. This technology belongs with fire making, cordage spinning, knapping, twinning and tanning in the skills collection of all primitive technologists.

E-mail your comments to "Norm Kidder" at atlatl1@aol.com

Primitive Ladder

by Bob Gillis

The photo above is of an early indigenous ladder displayed at the Oakland Museum in California.

I made a similar wooden ladder from a recycled 8" by 8" redwood beam.

We used a bandsaw to remove the bulk of the notches. The detail and finish work was done with a small adze. Other woods would work including sections of logs. Try to find well seasoned wood (standing dead for a long time) to reduce checking (large cracks forming in the wood - most extreme when green or freshly cut wood is used).

The finished ladder has a pleasing, sculpted look and is quite functional.

E-mail your comments to "Bob Gillis" at shelter@best.com

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How to Paint a Mammoth

By Chuck Kritzon

Overview

In this paper we will explore the materials, processes and techniques used by Paleolithic peoples to illustrate the animals in which they shared their world. We will use European cave art as our starting point, but expand to include the rest of the world as the materials and techniques that are explored, are pandemic.

Natural Mineral Pigments

What is a pigment? A pigment is in its simplest form is a finely powdered mineral, i.e. colored earth, that is mechanically bound to a surface with a binder. Dyes on the other hand are chemically bound to a material generally with the use of a mordant (alum, chromium, copper, tin and iron.) This paper will focus on ground mineral pigments, binders and application methods.

Listed below are the most commonly used colors in rock paintings around the world. Other colors like blues and greens were used, but very rarely. Blues and greens could be composed of toxic materials. We will focus on those colors that are easily found and processed and that are safe to use. There are always exceptions. Learn what your local materials are made of, and be careful. An extensive list of dangerous materials can be found in Bulletin of Primitive Technology #15 "The Dirt On Colors".

Colors

The range of natural occurring earth colors is truly remarkable. Literally every color of the visible spectrum can be found. Below is a list of the most common and readily available materials that can be found in most places of the world.

RED: Iron oxide, also known as red ocher, hematite or more commonly as rust.
YELLOW: Also iron oxide, also known as yellow ocher or limonite. A trick that ancient peoples around the world knew, was if you heat up yellow iron oxide in a camp fire, it will turn from yellow to orange, then to bright red!
BLACK: Wood charcoal. Soft woods generally are easier to use than hard woods. Other common materials were manganese dioxide and natural graphite which was used after breaking it down by heating it. Both manganese dioxide and graphite are common through out the world. Another preprocessed black, is soot, which can be collected from burning pine resin. This is the process in which black (lampblack) is created for use in India ink and for the ink blocks used in Japanese and Chinese calligraphy.
WHITE: Clay known as KAOLIN clay, or porcelain clay. White could also be chalk, gypsum, diatomaceous earth, burned bone or shell.

Red, Yellow, Black and White. These are the 4 colors that make up the pallet of most native cultures around the world. As mentioned above, these are also the most commonly occurring colors around the world.

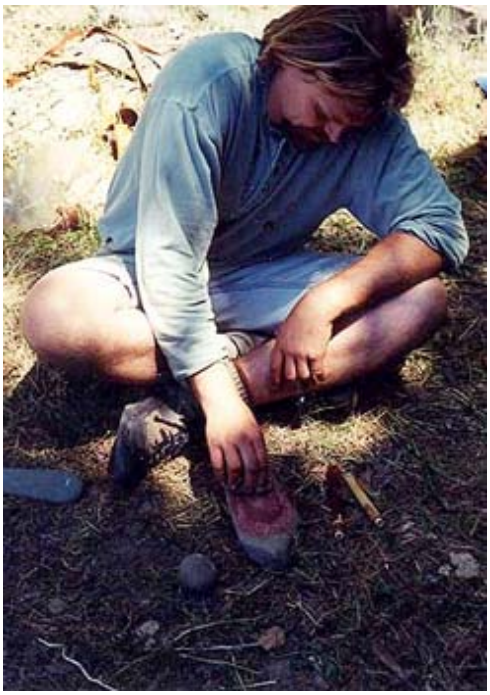
Brilliant natural colors from the earth. *These beautiful streaks represent raw un-processed pigment samples. All of the mineral pigments shown in this picture were collected off the ground from locations in multiple states. Each was oxidized and soft enough to make these colorful streaks with very little pressure.*

Colors from left to right:
Rich Brown: *Red Ocher/Haematite (iron oxide) Amador County, CA.*
Yellow: *Yellow Ocher/Limonite (iron oxide) Alameda County, CA.*
White: *Diatomaceous Earth, Southern OR.*
Black: *Charcoal*
Pinkish Red: *Cinnabar (mercury sulfate), Santa Clara County, CA.*
Golden Yellow: *Yellow Ocher/Limonite (iron oxide) Plumas County, CA.*
Flat Yellow: *Yellow Ocher/Limonite (iron oxide), Placer County, CA.*
Bright Red: *Red Ocher/Haematite (iron oxide), Iron Point Road along I-80, NV.*
Black: *Graphite, ?, CA.*
Dark Red: *Red Ocher/Haematite (iron oxide), Alameda County, CA.*

Processing

To convert a raw mineral into usable pigment is only a matter of grinding it into a very fine powder. Sometimes, if the mineral pigment has been exposed to the air and is oxidized, soft and in a pure enough form, little or no processing would be needed. In many cases, a pigment can be found ready to use out of the ground. In the famous cave paintings in Lascaux France (http://www.culture.fr/culture/arcnat/lascaux/en/), hundreds of pigment "crayons" were discovered there. They were found to be pure pigment cut directly from the earth and shaped. More recently a discovery was made in the Blombos Cave archeological dig site in South Africa dated at 70,000 years old (http://naples.cc.sunysb.edu/CAS/cape.nsf/pages/blombos). A piece of red ocher had been carved out of a deposit several miles away from the cave, and was again shaped like a large crayon or piece of chalk. Evidence of scraping on the red ocher from both the French and South African sites show us that our ancestors had been storing the red pigment in this form, then

removing only what they needed for a particular project.



Some times though, mineral pigments are very hard and have to be processed. This is done by grinding the mineral using a mortar and pestle (molcahjete) or simply a flat hand stone called a muller or mano, on a larger flat stationary stone (metate). The material being ground can be left dry or water can be added to help keep the fine particles from scattering as it is being processed. This is a tedious task, but knowing that not all of the mineral material need be perfectly ground to make it usable can help us to persevere.

One method of separating the finely ground pigment from the courser material is done using a process called settling. The powdered mineral is poured into a container of water. The water is then stirred to mix the ground pigment thoroughly through the water. The heavier particles of pigment will begin to settle to the bottom, while the lighter, finer particles remain suspended in the liquid. The amount of time given for the heavier particles to settle, will determine the consistency of the finished pigment; less settling time gives a courser pigment, more settling time results in a finer pigment. Usually, after less than a minute, the water with the lighter pigment particles is carefully poured off into another container and allowed to settle to the bottom. The fine pigment will settle to the bottom of this new container leaving the remaining water perfectly clear. Only now, should this clear water be carefully poured off and the remaining moisture in the wet pigment be allowed to evaporate away. The pigment that is left is fine and of uniform size. When it is completely dry, the finished pigment is then ready for use or storage.

Storing and Shaping

Once the pigment is processed, it can be stored in a number of ways. Containers that can be used to store powdered pigments include bamboo sections, hollow bones with the ends sealed, hollow elderberry (Sambucus mexicana) branch sections and buckskin leather bags. Historically though, Native Peoples would form the processed pigments into a ball or cake. This was also the usual method for storing pigment for trade. Strong evidence supports the theory that pigments were traded far and wide, sometimes over a thousand miles as with the cinnabar (true crimson or mercury sulfate) from the New Almaden mines near San Jose, California.

If the pigment is clay based, then the only thing that would need to be done, is to add water to the processed pigment to make it stick together. If the pigment was a pure mineral, then a small amount of glue should be added to the water to help it hold its desired shape. In addition to plant juices such as soaproot (Chlorogalum pomeridianum) glue and milkweed (Asclepias sp.) sap and various nut and seed oils, animal based glues may have been used. I have had very good success using a very thin mixture of hide glue. Hide glue which is also known as rabbit skin glue or horse hoof glue was traditionally made from cooking down all of the left over parts after an animal was butchered. Skin, bones, tendons etc. were cooked until they were reduced to basically solids, fats and gelatin. It is the gelatin that makes the glue. KNOX brand unflavored gelatin works great. Seaweed based gelatins are also available and work just as well.

Like Jell-O, hide glue is solid at room temperature so it must be heated to make it liquid. You only need to add a little hide glue in the warm water you will use to form our pigment shapes. After the cakes or balls have been formed and allowed to cool, they will be firm and fairly waterproof. As you need a color for a project, you will only have to scrape off as much as required.

Application

Now that you have usable, storable pigment, you need a binder to apply it to whatever surface you want to decorate. The simplest binder is water. In fact, when it comes to cave painting, tests have shown that cave water is the best thing to use. What if you don't want to do a cave painting? The questions you have to ask yourself are: What is the material that you are applying the pigment onto? How long do you want it to last? Will it need to be water proof or at least water resistant? Answers to all these questions determine the binder that will be used. The basic rule of thumb for applying pigments onto any surface is: The binder should be as similar a material you can find as the material you are applying it to. Plant based oils, juices and saps on woods and plant fibers, animal based oils, fats, egg yolks, eye and hide glues on hides, skins and bones. Experience using hide glue and milkweed sap as a binder, have shown them to be water resistant on a variety of surfaces. Binders are as varied as the cultures that used them. Local materials would have been known and used. A good example is the binder used by the Chumash Indians of Southern California, to produce their wonderful polychrome cave paintings. It is believed that they used a combination of milkweed sap and wild cucumber (Marah fabaceus) seed oil as a binder.

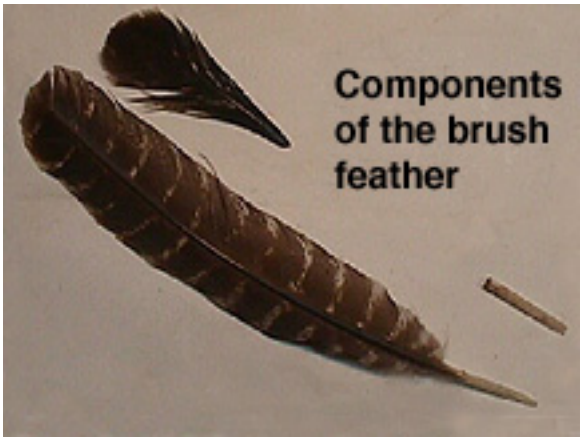
Once you have decided on a binder, the paint can be applied in a number of ways: brushed, daubed or sprayed to name a few. Brushes can be anything that transfer the paint to the material surface. The oldest and most handy is your finger as evidenced in the creating of many of the cave paintings and tracings of Paleolithic Europe.


Kamber Farneman applying a design to a buckskin skirt using warm hide glue / pigment mixture with a feather brush (Rabbitstick Rendezvous 2002. Rexburg, ID).

Painting a wooden mask with fresh ground red ocher mixed with a warm hide glue / water binder using a feather brush (Rabbitstick Rendezvous 2002. Rexburg, ID).

The brushes shown are made of the following: Soaproot (Chlorogalum pomeridianum) fibers bound together with hand made dogbane string (Apocynum canabinum) ; dried yucca (Yucca sp.) leaves lightly pounded and separated; agave (Agave deserti) fiber bound with dogbane string; a turkey feather tip in a handle made from the bottom, thick, but hollow quill of the same feather; a horse hair brush with a fox leg bone handle. Moss or fur can be used to daub and blend. A pointed stick or bone also works quite well. Again, local materials and customs dictate the range of materials that could have and would have been used.

Many of the beautiful rock art images found in the European caves as well as the myriad of hand stencils from around the world, were made by spraying the pigment out of the artists' mouth sometimes through a tube. Any hollow tube of approximately .25 inch (6 cm) diameter will work; bird or animal bones, bamboo, reeds etc. You can also blow the pigment out of our mouth without using a tube. Although I haven't found this technique as controllable, the Australian Aboriginal people still use this method today. (!Caution! When spraying any pigment out of your mouth, make sure your binder does not contain any harmful materials, i.e.: poisonous or toxic plant saps, juices, etc.)



In experimenting with both spraying methods, I have had the most success using a tube to spray the liquid pigment. I start by sipping a small amount of liquid pigment into my mouth. I then cup my tongue to make a trough or reservoir to hold the pigment in one place. Taking a deep breath, I position the tube directly over the pigment. I begin to blow air out through the tube while lowering it closer to the pigment cupped on my tongue and/or raising my tongue up to the tube. When the tube is close enough to the pigment it will begin to be sucked up, mixed with the air, atomized and projected onto the surface of what I am painting. There are many variables when using this technique such as: pigment thickness, tube diameter and length and force of breath. By changing these variables and with practice, you can achieve a finely sprayed, very controllable end result. Trial and error (albeit messy) is the best way perfect this ancient method of pigment application.

Using your hand or a piece of bark or raw hide, can provide a stencil for creating many complex shapes. This technique was used by Paleolithic people in Europe in many instances to create very detailed images of a variety of animals by both spraying and daubing.

Spraying red ocher and water mixture through a hollow fox leg bone to create a negative handprint on a stone outcropping above camp at the 2002 Rattlesnake Rendezvous.

To me, the negative or positive hand print is the most universal way of saying "a human was here!"

A 20,000 year connection to our past.

Conclusion

These materials and techniques may be simple, but they are the result of thousands of years of experimentation. Some of the most beautiful cave paintings in Europe are over 30,000 years old. The piece of red ocher from the Blombos Cave was engraved with geometric designs over 70,000 years ago. For countless generations Indigenous peoples around the world have used these techniques and processes to decorate their world for personal, aesthetic and spiritual purposes.

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This article was first published in The Bulletin of Primitive Technology (Fall 2002, #24)

This version on the website has many additions and more complete information.
E-mail your comments to "Chuck Kritzon" at chuckk@petroglyphics.com

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Thirty Years in the Jungle!
Could you do it?

By Christopher Nyerges © 2003

We are all inspired to learn and practice primitive technologies for different reasons. Some are weekend hobbyists who want to expand their feeling of self-reliance in the woods. Some are anthropologists, botanists, teachers, hunters, and students of the American Indian and aboriginal ways of life. My initial interest in the "survival skills" was stimulated by a desire to know what to do should I ever get lost in the woods. And, yes, a lot of us are at least partially motivated by such a desire. Should our car ever fail on a remote road, or if we took a wrong turn on a wilderness trail, we'd want to know how to provide warmth, water, shelter, and food until we were found or got rescued. That is, very few of us ever expect to actually practice these skills for more than a few days -- maybe a week at the most. We expect to return to our homes, to "civilization." In fact, primitive skills and technologies are not "dead" or "lost" arts. Though the spread of western technology over the face of the earth has rendered many of the old arts seemingly less useful, they are by no means forgotten or unnecessary. Some of the many situations that seem to affect people in any part of the world at any given time are wars, famines, forced evacuations (often the result of war), hurricanes, erupting volcanoes, plagues, severe economic hardships, poor leadership which causes undue suffering of the people, etc. etc. etc. Knowledge of specific survival skills can make all the difference in such circumstances, until the normal of society can return. But can you imagine practicing your survival skills, completely living off the land, not for a summer, not for a year, but for 30 years? Two men did just that for 28 and 30 years. Both were World War II Japanese soldiers who steadfastly held to their orders to not surrender. Though most Japanese soldiers preferred death to surrender, there were pockets of men who managed to hide out and survive. Two of the more extreme cases were Shoichi Yokoi who was discovered in 1972, and Hiroo Onoda who finally came out in 1974. Both Yokoi and Onoda were on different islands with different circumstances, and neither would not surrender. Though the underlying philosophy that compelled these men to stay hidden even though each knew the war was long over is a fascinating topic in itself, we are going to focus primarily upon some of the skills and technologies used by both men to stay alive and meet their needs. After all, if these men could do it for up to 30 years, all the while avoiding detection, they are the real "survival skills" experts. All of our modern "survival experts" pale in comparison to what these two men actually did. By exploring the details

of Yokoi and Onoda, we can learn some practical lessons regarding how they met their most fundamental needs and how they overcame their challenges.

SHOICHI YOKOI

On January 24, 1972, two residents of the village of Talofofo in the southern part of Guam were out hunting along the Talofofo River when they heard a sound in the tall reeds. They thought it was an animal or maybe a child in the bushes, but out came a very old and wild appearing Japanese man carrying a shrimp trap. The hunters were started at first, and after a few confused words, they subdued 56-year-old Shoichi Yokoi and took him back to their corrugated metal home in the jungle, about an hour's walk away. Eventually, the police were summoned, and the story of Shoichi Yokoi's saga became known. During WWII, Yokoi had been transferred from Manchuria to Guam, and he served as a sergeant in the supply corps. When the Americans came, he and nine other men hid in the jungle. Their numbers gradually dwindled to three, and they shared a cave for a while. He knew from a leaflet he found in 1952 that the war was over but never gave himself up because "we Japanese soldiers were told to prefer death to the disgrace of getting captured alive." Eight years before he was found, the other two men died, leaving him alone. How did Yokoi handle the basics necessities of life? Food? Water? Clothing? Shelter? Tools? Let's explore, one by one, how he managed to provide these necessities in a situation where he had no hope (or desire) of returning to "civilization."

FOOD

According to Yokoi, obtaining necessary food was "a continuous hardship." He described it as his single hardest on-going task, despite the fact that food in the jungle is said to be plentiful. His diet included mangoes, various nuts, crabs, prawns, snails, rats, eels, pigeons, and wild hog. Though he had no salt for flavoring or as a preservative, he boiled coconuts in coconut milk. He built little traps and caught shrimp and eel from the river. He put grated coconut into the traps to serve as bait. He would then skewer the eel and shrimp and grill them over his fire. Yokoi had fashioned a rat trap from wire, based on a design that was formerly very common in Japan. Yokoi's trap measured about 10 by 6 by 4 inches, and just the slightest touch of the bait causes the lid to shut. He said he liked rat meat, especially the liver. However, he added that he could not afford to be concerned with whether or not he "liked" any of the food he obtained. He ate it all. On one occasion, he caught a wild pig and became ill. Apparently, he hadn't cooked it well enough and he experienced severe stomach pains for a month.

WATER

Though water was abundant, and clear, Yokoi said that he always boiled the water before drinking it as a precaution.

CLOTHING

Reporters who saw Yokoi's clothing were amazed. They were unable to determine from what sort

of materials they had been made. He even had home-made buttons! His clothes were made by beating the bark of the pago tree into flat pieces of fabric. The pago tree is very common in the mountains of Guam. He then beat pieces of brass in order to create a needle shape, and gradually drilled holes in his sewing needle using an awl. His thread also came from the beaten bark of the island's pago trees. He wove cloth from the beaten fibre, and sewed the pieces together to make a total of three "suits" during his 28 years on the island. By the way, Yokoi had been a tailor before the war, a craft that served him well. His 3 sets of pants and shirts were hand-made and then he would constantly repair them to keep them serviceable. On each of his shirts, he made outside pockets for carrying things. His pants even had belt loops! And he took plastic from a flashlight and fashioned buttons, button-holes and all. He manufactured one belt by weaving the pago fibres, and onto the belt he had a hand-made buckle that he'd fashioned from wire. It turned out that in the past, the people of Guam used to manufacture a rough cloth from the pago fibre, and they turned these into something like burlap bags. It is said that this is no longer done today, so Yokoi - out of necessity -- rediscovered one of nature's secrets.

FIRE

In the beginning, Yokoi used a lens for fire-starting. It was a flashlight lens manufactured by the Japan Optics Company. At some point he lost this lens and he is said to have made his fire by "rubbing two sticks together." This was apparently a description of a hand drill, or some variation. In order to keep a coal, he wove a rope from coconut fibre and used this as a punk.

SHELTER

Yokoi lived in different shelters during his 28 years. One of his shelters was a small house made from rushes he collected. He also lived in a hole that he dug under a bamboo grove. Yokoi said that he chose that particular site because it was well hidden and because the ground is more solid under a grove of bamboos. Officials had reported that it was nearly impossible to see the opening to his cave even when you were right next to it. The entire cave was dug with a trowel that Yokoi fashioned from an old cannon shell. He carried the excavated soil, handful by handful, to a nearby grassy area and scattered it so that no one would notice. After one month of digging, he was able to move in, even though he continually expanded the interior space. The opening to his cave was about two foot square, which he kept well-camouflaged. A bamboo ladder led eight or nine feet into the inside. The inside of this cave, even at its highest point, was still just slightly more than three feet tall, which meant that Yokoi always had to squat. Inside, he had a toilet hole so well designed that it would flow off naturally to the river below. On another end of the cave -- the "kitchen" -- Yokoi had some shelves, and a hearth with a cooking pot. Keep in mind that the interior of this cave was pitch-black, so Yokoi had devised a coconut shell lantern which burned oils. He had fitted the cave with a ventilation hole, and kept bamboo leaves on the floor.

TOOLS

Yokoi described the acquiring of food as his single greatest hardship; the second greatest hardship was the production of tools and other articles of daily use. Remember, no hardware store, no supermarket, no K-mart. All he had to work with was raw nature, and whatever metal and other objects he could scavenge from the island. Yokoi collected whatever he found, such as discarded

cans. He carefully cut a Japanese canteen in two, and made a frying pan from one half and a plate from the other half. He found a water kettle and repaired the leaks so he could use it. He took cylinders of bamboo and used them to collect rainwater and as dippers to collect water from the river.

HEALTH

Doctors who examine Yokoi after he was found said that he was fine both physically and mentally. Though the two hunters who initially discovered Yokoi thought he was much older than 56, they did report that he seemed quite strong for his size. Apparently, he remained healthier in the jungle than most folks do in front of their televisions and behind the wheel of their smog-belchers.

HIROO ONODA

Hiroo Onoda was sent to the jungle of Lubang Island of the Phillippines in December of 1944. His intelligence duties consisted of gathering information about the enemy movements and sabotaging the enemy rear. Within eight months the war was over, but Onoda refused to surrender until he had a direct order from his old commander. So Onoda and three enlisted men hid out on the island; one of the three others surrendered in 1950, and the two others died in a shootout with Philippine police in 1954 and 1972. But it would be 30 years before Onoda would be found, and convinced to surrender when they brought in his old commander. Onoda survived by setting up a series of hideouts on the 74 square mile island, and by stealing food (the island was occupied), and making sure his caches of live ammo were kept intact. After returning home to Japan, Onoda said that the toughest part of the experience was losing his comrades. He added that there was nothing at all pleasant that happened to him during the entire 30 years. But, he added "My country today is rich and great. When my purpose in the war has been attained, in the fact that Japan today is rich and great, to have won or lost the war is entirely beside the point."

FOOD

Onoda survived on boiled bananas, and coconuts. He would occasionally pilfer rice and salt from the nearby village. But the main staple was boiled bananas. They would pick the bananas as needed, cut it all up, skin and all, and boil it. The green bananas lost their bitterness this way, and they were often cooked in coconut milk or dried meats. "The result tasted like overcooked sweet potatoes. It was not good. But we ate this most of the time." Next to bananas, cows on the island provided meat for Onoda and his comrades. They killed about three a year. They would shoot cows that wandered away from the village, and shoot it in the evening, and best would be when there was a rain so the noise would be muffled. It took them about an hour to dismember a cow, then they would discard what was left in a place that wouldn't reveal their whereabouts. They ate fresh meat for about three days, and then dried the rest on drying racks they built. One cow provided about 250 pieces of dried beef, and generally they each ate only one piece a day. Though they had some rice, they did not each much because it was difficult to hull. The rice was typically stolen from the villagers. Other food supplies included occasional coffee and canned goods stolen

from the homes of the villagers. When Onoda and his comrades went to steal these things, they said they were "stepping out for the evening."

WATER
There was always plenty of water on Lubang, and the water was so clear you could see the bottom of the streams. However, Onoda always boiled the water since they believed it may have been contaminated by cattle.

CLOTHING
Onoda noted that his clothes were always rotting. He made a needle from some wire netting that he found, which he straightened and managed to put an eye on one end. He made thread from the fibres of a hemp-like plant that grew wild in the forest. Fishing line was also used for thread. He would patch and patch, and then even take pieces of canvas from the edges of his tents. After his clothes could no longer be patched, he would steal fabric or clothing from the village whenever he could. Much of the fabric that he would steal he'd use to add linings to his existing clothes, or to double the knees or seats, any places where there were weaknesses. He would take old shoes and make sandals. He had a jacket which he could turn inside-out and attach branches to little loops he'd sewn. This made the jacket into a camouflage coat. He also wove straw sandals.

FIRE
Onoda did have ammunition which was used to make fire. He would remove the powder from ammo that was rusty and ignite it with a lens. He also would make fire using two dried pieces of split bamboo. One piece was hammered into the ground, and the other piece, held horizontally, would be stroked up and down to produce the coal. (He had plenty of time to practice!)

SHELTER
Onoda and the others would build a shelter during the wet season, and then just sleep in the open during the rest of the year. Site selection of the shelter was important. It had to be near food, but not too far from where the cows grazed. It had to be on the opposite side of the hill from the village so their fire or smoke would not be seen. They also built it on sloping ground. They would find one secure tree, and then build a pole structure that was secured to at least this one tree. Rafters were placed slantwise on the ridgepole and covered with coconut leaves. Everything was tied together with vines. The upper part of the shelter was the "bedroom" and the lower part was the "kitchen." The stove consisted of two piles of flat rocks stacked close so that a fire could be built between them and a pole secured above to hang a pot. Onoda and a partner could build such a hut in seven or eight hours. They said that these huts, called a "bahai," was more comfortable than the tents they had, but the roof began to leak in the bahai by the end of each season. Onoda states that "during my entire 30 years on Lubang, I never once slept soundly through the night."

TOOLS
Using wire, cans, and other materials, he constructed rat traps, snares, and traps for other small game.

HEALTH

Onoda noted that if he ate much meat after they'd killed a cow, his temperature would soar. He found that if he drank the milk of green coconuts, his temperature would return to normal. Onoda constantly would monitor his physical well-being, and would adjust his diet or activities if he did not feel well. Onoda says he was sick "in bed" with a fever only once. Much time was spent digging and covering latrines; they used palm leaves for toilet paper. Though he had no soap, he often washed his clothes just in plain water and sometimes with kelp or lye from wood ashes. He washed his face daily, and brushed his teeth with the fibre from the palm trees. A doctor who examined Onoda after he came out of the jungle noted that he had no cavities.

Writing in Newsweek on March 25, 1974, Kermit Lansner states "As someone who is just about Onoda's age and served in the Great Pacific War (as the Japanese call it), I have spent most of my patrimony on dentists. There is not much I admire about Onoda, but I do hope we learn something from his teeth."

We never know what the future will bring. Still, it seems unlikely that most readers will ever undergo anything as intense as the years spent in the jungle by Shoichi Yokoi and Hiroo Onoda. But by carefully examining the methods they did employ for up to 30 years, we can all learn at least a few new ideas that can enhance our lives. At the very least, they demonstrated that one doesn't need the trinkets of modern society to remain healthy. By studying the rigors they underwent, we all should be able to see the folly of so many of our preferences and preconceptions, and should discover that most of our "limits" are far beyond what we have chosen to accept.

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This article also appeared in "Wilderness Way", Volume 4, Issue 3. Christopher Nyerges wrote under his "trail name", Victor Woodenturtle.

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Was Agriculture a Good Idea, or an Act of Desperation?

by Norm Kidder

One of the attributes of modern western thought is the firm conviction that whatever it is doing now must be better than what it was doing before - that all change is progress. We are so convinced of this that we assume that if there are other planets with intelligent life, they are trying to get in touch with us using the same technologies that we recognize ourselves. In the book *Making Silent Stones Speak*, after reviewing the evidence for the evolution of stone tools and technology, Kathy Schick and Nicholas Toth end with the question - why aren't we hearing from other civilized worlds in the universe? They wonder if it is because intelligent life, once it reaches the level of technology that allows it to send messages into outer space, invariably destroys itself. The question unasked is - whether intelligent life can make choices that lead to other, non-destructive technologies either before it self-destructs or after? In looking back over the history of human social evolution, the critical change that seems to have taken us from positive adaptation to self-destructive reaction came with the advent of agriculture. The rest of this piece will take a brief and over simplified look at the development of agriculture, the 'domestication' of various plants and animals and the affect of all this on human health and happiness.

First, let's consider domestication of animals, thought to have occurred around 20,000 years ago with the appearance of dogs within human habitations. The general picture in most of our minds is now of Ayla, or some other stone-age person, adopting a wolf cub, wild horse or cow and training it to be tame, substituting the humans for it's canine/equine/bovine pack/herd. Then, overtime, the wolf is bred for dog-like characteristics until we have the poodle (at least I have a poodle), the horse or cow for Arabian or Jersey qualities and so on. Recent discoveries, including a dog skeleton of 100,000 years antiquity and not in human context, have suggested a different scenario.

Picture a scene in Stone Age Europe. The cave dwelling humans spread from their permanent village to hunt. The hunted learn to avoid the area close to the cave as a danger zone, but the level of avoidance is determined by genetic factors that control the fear response. The animals with the least fear live closest to the danger. Because they tend to interact with each other, the genetic tendency is increased. Coincidentally, the same gene that controls the fear response controls other

factors including coloration and breading cycles. Less fearful animals will breed more often and be more solid colors than the 'normal' animals. Thus reduced fear made these prey species more easily hunted, and in most cases led to their elimination, but in some cases, and it only took one, the members of the hunting community saw value in this close to home population and treated it as insurance against a poor hunt. They knew they could get something on the way home. Over time, this population of hunters and prey formed a relationship in which the hunters began to protect this segment of the hunted until they became isolated from their peers and bred exclusively within - creating the domestic livestock we have today. It may well have been a mutual proposition developing over a long period of time until the two species became dependent on each other for survival. Different animals in different environments and providing different products each went through this process, eventually moving with their human allies into many new places around the world.

The history of plant cultivation followed a different path. Hunter/gatherer societies gradually became so efficient at utilizing the local resources for food that they began to settle in semi-permanent villages. In doing so, they also became more dependent on trade for special materials not found close to home. Food plants were tended where they grew by selective burning and harvesting methods. (This has been documented for California in the book *Before the Wilderness.*) In some areas, a few plants were grown from imported seeds to eliminate the need to trade for them. In central California it was tobacco, in Peru it was cotton and gourds, all essentially non-food items. The Peruvian gourd growers latter began irrigating these crops, then irrigating their wild food plants, and then latter, irrigating imported corn and potatoes. What led to the change from wild to cultivated food and what were the social and health repercussions? Answers can be found at a site on the Illinois River called Koster (after the local farmer).

The Koster site had been occupied for an extended period, so that archaeologists led by Stuart Streuver, were able to find evidence from early hunter/gatherer times around 7500 BC to full scale farming times at 1200 AD. They found many things, but the most intriguing to me was the discovery that they became settled in permanent villages well before they became farmers, It was also during this time that they appear to have been the healthiest and most culturally stable. Evidence of their diets showed a dependency on a variety of nuts, seeds and tubers as well as fish and game, each seasonally abundant. At the same time, there was limited gardening of specialty crops. Sounds good to me, so what happened? Apparently the good times led to population growth, which led to overuse and decline of the wild foods, which led to using progressively less desirable species, which led to increased gardening and ultimately wholesale farming. Once farmers, their bones show increased stress and poorer nutrition, with decreased life-span and increased warfare. An additional social consequence of agriculture was the consolidation of the political/religious structure.

Hunter/gatherers tend to be egalitarian, with each family or clan in control of themselves, cultivating personal relationships with a variety of spirits/gods to keep everything healthy. Farming led to monocultures with fewer and more powerful gods, a priestly class to bring rain and protect the crops, and eventually god-kings with the divine right to rule, and control irrigation,

passed down from above. This is the pattern of the Pharaohs of Egypt and the Great Sun of the Natchez, the leaders of the Inca, Maya and Aztec, and the Louis' of France. We call that progress because those guys got to write the histories.

There were places however where people stayed in the optimized hunter/gatherer mode sometimes called collecting. In most of Califomia food was abundant, yet population seems to have stayed stable in both numbers and life style. Was there some other factor controlling population? Perhaps there was insufficient firewood in the valleys and insufficient farmable land in the hills. Perhaps they developed social customs that reduced the birth rate. Perhaps they would have become farmers in time. Many areas show different combinations of gardening, hunting and gathering depending on their environment, so perhaps farming has always had limited potential. The result however, was that farmers ended up with big families with time on their hands for extended periods when a few could manage the growing crops. This labor force became both the cause of and the resource for empire building in both the construction of monuments and the creation of armies. Thus farm-based empires were able to conquer even the most successful collectors appearing to be more successful, at least in the short run.

In the long run, they have one big problem - crops fail, and they have put all their eggs in one market basket. Crops fail for three basic reasons - drought, soil depletion and bugs. Whole religions were based on controlling water. Conquest temporarily solved soil depletion problems. We're still fighting the bugs. (Hunter/gatherers eat the bugs.) As a result, the Greeks turned the Cedars of Lebanon into goat pasture, and the Romans did the same to North Africa and other parts of the Mediterranean. To overcome this flaw, the Ceasars sent armies to conquer everybody who might be able to send food to Rome.

In looking to the past, it seems clear that groups were most stable when they combined some gardening with collecting for an economy that was varied and adaptable to climatic change. A smallish population which is family or clan based also seems to be the most suitable for long term survival. At present, civilization is carrying on the experiment started by all the failed civilizations before to see if we can keep endlessly finding new resources to replace those we use up. The race is on to find renewable fuels, sustainable agriculture, a defense against disease and a rising population of angry inhabitants. If this current experiment should also fail, perhaps we (if we still exist) can start over and do things on a smaller, more personal scale learning from history (and pre-history). Then we may stop worrying about other civilizations on other planets and why they aren't contacting us and be glad the Society of Primitive Technology preserved knowledge from the past.

Teosinte, a wild grass, is one of the ancestors of the cultivated corn.

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Calendar of Harvesting and Gathering of Plants in Central Valley California

by Ken Peek

Disclaimer: *A website is insufficient to convey the knowledge to safely and responsibly use wild plants for consumption. Before eating or using any plant, seek hands-on field training with a qualified professional in the proper identification and use of wild plants. Gather only what you need or use. You should leave more than enough for the plant to easily reproduce and grow. Also know that gathering in State and National Parks and wildlife preserves may be detrimental and/or illegal. Be sure to get permission from the landowner of private property before gathering wild plants.*

<table>
<tr><th>JANUARY</th><th>FEBRUARY</th><th>MARCH</th><th>APRIL</th><th>MAY</th><th>JUNE</th><th>JULY</th><th>AUGUST</th><th>SEPTEMBER</th><th>OCTOBER</th><th>NOVEMBER</th><th>DECEMBER</th></tr>
<tr><td colspan="2">Cut sandbar willow for baskets.</td><td></td><td colspan="3">Collect grass seeds: Collecting grass seeds varies a lot depending on elevation. April and May are pretty early, especially as you go uphill.</td><td></td><td>Gather oak galls.</td><td>Devils claw seed pods</td><td colspan="2">Acorns</td><td></td></tr>
<tr><td></td><td>Cut bush dogwood.</td><td></td><td></td><td colspan="2">Fremontia: Strip bark for fiber.</td><td></td><td>Gray pine nuts and Sugar pine nuts</td><td colspan="3">Tules:
Tules can be gathered as early as June in select spots.

Woodwardia ferns</td><td></td></tr>
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Elderberry and spice bush for drills and clapper sticks.			Cedar inner bark		Cut nettles.			Bay laurel nuts	Durango root fiber		
Cut redbud for baskets.			Cut shoots of maple, redbud (white), and hazel.			Collect feathers from molting birds.		Contact butchers to check for deer hides and bones from hunters.	Stinging netttle fiber: Gather before the first rain of the winter season, late Nov - early Dec.		
Dogbane									Dogbane: November is a bit early and it's still good all winter, Dec - Feb.		
Gather willow bark for cordage and baskets.									Milkweed fiber		
JANUARY	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**	**JULY**	**AUGUST**	**SEPTEMBER**	**OCTOBER**	**NOVEMBER**	**DECEMBER**

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Coppicing Willow for Basketry Withes

by Dino Labiste

Coppicing is a traditional practice of environmental management used by the Native California basket weavers. It involves cutting a plant back to its base and removing the weak shoots to encourage vigorous regrowth. The plant is allowed to regrow from the cut stumps. Willows are coppice to stimulate the propagation of newly formed long, slender, and flexible branches or shoots that are utilized in basketry. Coppicing provides an environmentally sustainable source of willow withes through periodic cutting, which actually prolongs the life of the tree. Besides preserving traditional skills, coppicing creates a rich mosaic of habitats, attracting a diverse range of flora and fauna.

Coppicing is based on the principles of plant physiology. In order to coppice effectively, you should know something about how a plant grows.

A plant has three main structures. They are roots, stem, and leaves. The roots main functions are 1) anchoring the plant in the soil; 2) absorption of water and nutrients; and 3) storage of food, which is released when required by root cells or distributed to above ground parts. The stem 1) supports other plant parts, leaves, flowers, etc.; 2) transports materials; and 3) stores certain materials. The leaves main function is photosynthesis. Photosynthesis is a process where energy from the sun is converted to chemical energy and then synthesized to glucose and other organic compounds necessary for the plant's nutrition.

The stem (also called shoot, trunk, twig, branch, or limb) carries water and nutrients from the roots to the plant's growing points (buds, leaves, flowers). It also carries food (sugars) that the leaves make to the roots. Because stems are conveying tubes, you can cut off a stem to divert the flow of nutrients to other buds and branches. By stopping growth in one direction, you encourage growth in other directions.

The willow that was coppice in the photos is Hinds willow (*Salix hinsiana*). It is also called Grey willow. This shrub or small tree forms thickets with many trunks. The leaves are very narrow, taper at both ends, and are covered with gray, silky hairs. Hinds willow inhabits moist soils of ditches, sandbars, and stream banks. It's range is usually confined to California. Willows must have a source of moisture throughout the year. When looking for Hinds willow, look for water.
Another species of basketry willow was Sandbar willow (*Salix exigua*). This hardy plant has perhaps the greatest range of all tree willows in the United States. It is found throughout the interior from the Yukon River in central Alaska to the Mississippi River in southern Louisiana. The leaves are also very narrow and pointed at the ends. The color of the leaves are gray-green on both surfaces. Sandbar willows grow in wet soils, especially riverbanks, sandbars, and silt flats.
Unfortunately, not all willow withes are as flexible as Hinds or Sandbar willow. To test a willow to see if it is suitable for basketry withes, pick a thin branch or shoot (preferably from one year's growth and no side branches) and try tying an overhand knot without cracking it.

Hinds willow thickets in the wild have dense growth with lots of weak shoots all competing for the light. These dense thickets have the effect of taking all the light away from the plants and grasses growing underneath, eventually killing them off. Most of the new branches and shoots in the spring are sometimes infested with insect larvae that make them undesirable for baskets. To control insect infestation and to cultivate the thin, long branches for basketry withes, a patch of willow is coppice to provide an indefinite supply of branches, which regenerates itself, without the need for a continuous cycle of planting. The willow is pruned back while the plant is in its dormant stage during the winter season or early spring. This is the time of year when the sap is low in the plant. Generally, willows that are native to cool or cold-winter regions are dormant during their leafless period. The best time to do any coppicing is when it will shock the plant least, which is when it is not actively growing.

Besides admitting rapid regrowth from the edge of the stumps and removing poor specimens, coppicing Hinds willow has other benefits to the environment. It also increases the amount of light into the ground floor allowing a multitude of flora to carpet the area, which in turn supports a more diverse wildlife. Also any diseased growth is cut away before it can spread throughout the whole tree. For the best willow withes, coppice the plant severely the previous winter or early spring to promote fast growing, straight shoots for the following year.

To begin coppicing Hinds willow, the small twigs are first trimmed away, then medium stems and large trunks are cut about a foot above ground level. This is so that when the stem falls, it does not rip the wood near the final cutting place. All stumps are then cut two inches above ground level. The clean, smooth surface cut is angled, with the top sloping outwards to allow any rain water to drain away. For successful coppicing, you need sharp tools like pruning saws and loppers.

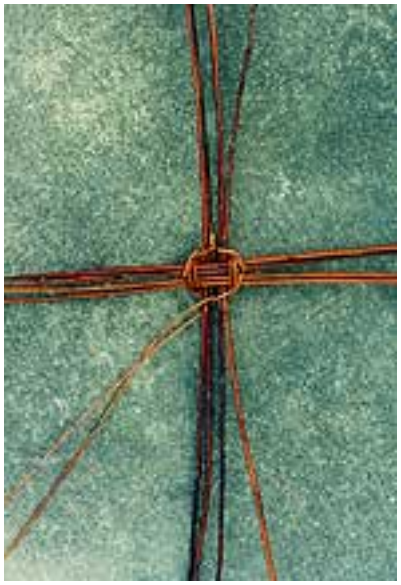
For whole shoot twining basketry, use one year's growth gathered in the early spring. That is, anytime between the dropping of the leaves and the appearance of new buds in the spring. Tamara Wilder and Steven Edholm mentions a few notes on harvesting willow withes in their article entitled, "Whole-Shoot Willow Baskets":

> "If the shoots are gathered in the dormant season (from leaf drop to bud swell), the bark will adhere tenaciously. If they are harvested in early spring (just after bud break), the bark slips off easily. By mid spring, anything that was not cut will begin branching out and will become less desirable. We prefer to harvest during the dormant season and weave with the bark on. This way the shoots are less prone to cracking and have greater wear resistance."

Also, willow withes should be gathered when it's dormant, not when it's growing. When it grows, the shoots have a lot of water, which causes them to shrink more when drying.

After gathering, the willow withes are completely dried in the shade and then reconstituted later for use. This creates a finished twined basket that is stiffer and tighter. To reconstitute the willow, completely submerge them in a container of water for about a week. Use rocks to keep the withes from floating to the surface. After soaking, begin weaving your basket. Resoak your material whenever they begin to dry out to keep them flexible.






The practice of coppicing dates back to Neolithic times. Evidence suggests the Romans coppice large areas of the Wealdon woodlands to fuel their iron works. In the 11th century, England

practiced a form of woodland management by coppicing plant species such as hazel, alder, ash, crab apple, field maple, oak, willow, small-leaved lime, sweet chestnut, birch, and hornbeam. Each different tree species which was coppice produced wood suitable for different products.

NOTE: Before you go out to coppice an area, be aware that coppicing in State and National Parks and wildlife preserves is prohibited. Know the laws in your area before attempting to practice any skill. Also, be sure to get permission from the landowner before coppicing wild plants on private property.
Be responsible. Utilize nature's bounties wisely by not taking more than what is needed and by not wasting what is taken. To coppice an area just for the sake of doing it and not utilizing the fruits of your labor is irresponsible and insensitive to the environment and the plant. Learning about coppicing skills also involves knowing about the growing cycle of the plant and ensuring that the plant will continue to propagate.

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A Piece of Fibre Could Save Your Life

Nature's General Store: The Yuccas and Agaves

By Christopher Nyerges © 2003

The wilderness provides virtually all of our needs if we have trained our brain and eyes to see what is before us, and if we have learned to identify actual needs (as opposed to whims and wants). A knife and a tool to make fire provide us with the means to produce most of our needs. In addition to a knife and firestarter, I always like to carry a small ball of very versatile twine. Strange as it may sound, a piece of twine or rope could make the difference between life and death. Fortunately, many plants in the wilderness provide us with ample fibre for making rope and twine.

In the foothills, deserts, and mountains of the West and Southwest U.S., two common plants provided generations of Native Americans with all the cordage they needed. These two plants are the yucca and agave. On one of the outings I conducted, we focused exclusively upon making as many products as possible from the yucca and agave.

An overall view of the yucca plant in fruit. Location is the Arroyo Seco on Pasadena's west side.
Photo by Christopher Nyerges

One Saturday I met with a small group of students and hiked a few miles along a narrow trail in the Angeles Forest. Eventually, we came to a site where a cabin once sat, now all ruins, overgrown with ivy. Nearby was a thick patch of over a hundred agave plants, which have large bluish leaves over three feet long. Many of the agaves had matured, and their 25 foot tall flower stalks stood graceful watch over the patch. We found one stalk that had fallen over. It was about a foot thick at the base. The agave stalk has a hard outer rind, but the inside is soft and pithy. I advised everyone to take a little of the pith to add to their tinder boxes, since this was a nearly ideal tinder. Then, within a few minutes, we each cut off a three foot length of the stalk to use in crafting a quiver-like carrying case. (Yucca's dry stalk can be used identically, though yucca tends to be smaller.) The four of us carried our pieces of the agave stalk further upstream where we could sit in the shade and work on hollowing out the agave stalks. Everyone began the hollowing with a knife, but you can only reach so far with a sheath knife. So I showed everyone how to sharpen the end of a three-foot stick to be used for hollowing out the remainder of the stalk. Everyone finished their hollowing in about an hour and a half. Now we needed to add straps to each of the tubular quivers in order to carry it. This time we collected fresh leaves from a nearby patch of yucca plants. Yucca

leaves are thin, narrow and sharp-pointed. When they send up their flower stalks, a profusion of creamy-white flowers follows. Yucca is an excellent fibre source with many other uses besides just rope. But rope was all we needed at the moment, so I instructed everyone in carefully stripping the leaves into even thinner segments, until each person had what looked liked a pile of thick threads. To reduce the leaves to just fibre, we wet the stripped leaves in the river and agitated them between our hands. A wonderful soap results from this process -- in fact, this is possibly the easiest and most-readily available year-round soap of the wilderness. Once the leaves were reduced to mostly fibre, we took our strands and braided them into ropes to use for carrying our agave quivers. The ropes were easily attached to the agave quivers. Everyone fashioned various bottoms for their agave tubes -- the easiest was done by Jimmy, who simply tied his kerchief onto the bottom using some more of the yucca fibre. Though it took us several hours to make our carrying cases using only plants from nature, it illustrated that even without a pack, you can fabricate an excellent carrying case if you know what to look for. The cord made from yucca -- or agave -- has a multitude of uses, from tying together an emergency shelter, to fire-making, to fishing.

Alan Halcon (left) and Christopher Nyerges remove a dead yucca stalk.
Alan Halcon has cut a section of the dried yucca stalk, and is now making it into a quiver.

Nyerges demonstrates how to make twine with the yucca leaves.
Photo by Timothy Snider

Three students from Nyerges' class practice making twine from the shredded yucca leaves.
Photo by Christopher Nyerges

Yucca was used extensively by the Native Americans throughout the Southwest. In the course of one hour of our field trip, I demonstrated the traditional inch-thick sandal that was worn by the Chumash and Gabrielinos who once resided here. It is a simple weave that any child could master in an afternoon. Though agave leaves have a fibre which is as useful as the yucca, the juice of the fresh agave leaves can cause a rash which is equal to a poison oak rash. So when yucca is abundant, I just leave the agave alone.

NEEDLES

The leaf tips of both can be cut, dried, and used for various sewing or basketry projects, either as a needle or an awl. Depending on your need, you'll find thin or fat tips, and tips that dry so hard that they can penetrate canvas. Most are improved upon drying, but some can be cut fresh and used immediately, if needed.

Timothy Snider examines the young flower stalk. The pink color is typical.
Photo by Christopher Nyerges

THE SHOOTS

Both the yuccas and agaves which are found in the wild live up to about 20 years. Then, one spring, they send up a tall flower spike, produce flowers, then fruit, and then the whole plant dies. Little babies sprout up around the parent. While these shoots are sprouting up -- before they sprout side flower branches -- they resemble a huge asparagus shoot. One shoot can have a diameter up to a foot in thickness and several feet tall. These are an excellent food source. You cut off the top three feet or so, which is the most tender. You then peel back the fibrous outer rind. The insides can be eaten raw, which is akin to jicama in texture and flavor. Or, you can bake, boil, or roast it -- baking is best. Generally, when you cut off this shoot, other side shoots develop. Remember that this flower stalk only occur when the plant is going to die, and the plant's instinct to produce seed is so compelling that shoots will continue to grow up until its final act is accomplished. Also, bear in mind that you should check local regulations, since it may be illegal to pick this shoot in certain protected areas.



Yucca sends up this flower stalk and then dies. When the stalk is first coming up in the spring, it can be cut and eaten. Its appearance is like a large asparagus. It can feed several people. Nyerges is holding a flower stalk that is edible raw, and is improved by boiling or baking.

THE FLOWERS

Again, both these plants flower when they are in their final year. Don't pick the flowers where it is illegal to do so. The yucca flowers are creamy-yellow to white, depending on species. Some yucca flowers can be picked off the plant and eaten raw, and they are good. But most have a slightly soapy under flavor. The best way I have enjoyed the raw yucca flowers was with a sour cream dip. We had a bowl of flowers and a bowl of dip, and we just dipped each flower. The blend of flavors was quite good. Their flavor is improved by boiling, upon which they can be eaten as-is, or seasoned with butter or various sauces. The boiled flowers are also delicious if sauteed for just a few minutes before eating. Agave flowers are another matter. They are more brightly colored, and are best cooked -- boiled, or baked. Plant expert John Watkins told me that while visiting in Mexico City in 1979, he was served patties made from the agave flowers. He observed the women boiling the flowers, mashing them into patties, adding herbs, and then sauteing them. He said they were delicious.

Three dishes from the yucca flowers. Top: sauteed flowers and pods.
Left: yucca flowers to be dipped in sour cream or dip. Right: boiled yucca flowers.
Photo by Christopher Nyerges

THE FRUITS

Yucca fruits tend to be larger, more plump, and agave fruits tend to be narrower, smaller. Typically, you find these during the summer under the yucca or agave plants. If the fruits are still on the stalk, you might be able to shake the stalk to loosen up a few. To use either of these fruits, you want to collect them while they are still tender. You simply cut one open, and if the inside is white, it's still young and tender. As they get older, the seeds mature and turn black, and the fruits are less palatable.

The flavor of these fruits is similar in both -- somewhat like raw squash, and often a mild bitter or soapy flavor. They are definitely best when roasted, boiled, or baked. I recommend you try them plain at first, and then experiment with various methods of preparation. Mashing the boiled fruits into patties, and then sauteing them, often produces a delicious food. My most common method of preparation is to place a few dozen of the tender fruits directly in the ash around the edges of a firepit. Don't put the fruits right into the fire, but let the fire burn awhile so you have a good hot bed of coals. Then place the fruits around the edges, and let them cook. Generally, they'll be ready to eat in under 30 minutes. With no seasoning, you'll find these fruits interestingly sweet, and often with just a slight bitter under-flavor.

Phillip Thompson and Eleca Dunham shake yucca fruits from the flower stalk.
The fruits follow the flowers, and are best eaten when they are still white inside.
Closeup of the yucca fruit.
Photos by Christopher Nyerges

THE SEEDS

The flat black seeds from both plants have been used for centuries by various Western Native Americans. The seeds are used in a variety ways, either group into a flour for bread-type products, or cooked into a porridge-like mush. The flavor of each is similar, but it all depends how you prepare them. Though I generally have found these to be acceptable, some people tell me that they do not like the seeds. However, after a few days with no food, most people will enjoy the nutritious seeds cooked into porridge, or made into bread or pancakes. (It's amazing how hunger will affect your food preferences!)

CONTRAST

Though yuccas and agaves are very similar with regards to their fibre, and the edibility of the shoots, the flowers, seeds, and fruits, there are some important distinctions between these two. Keep in mind that until somewhat recently, botanists considered Yucca saps. and Agave sps. as members of the Lily family -- that is, akin to asparagus and onions. But today, after closer scrutiny of botanical differences, they classify Yucca sps. in its own Yucca Family, and Agave sps. in its

own Agave Family. Still, the two groups are so close that we can call them "cousins." Here's how they differ in important ways.

YUCCA

Yuccas are generally smaller than agaves. Their leaves are narrow and long, and typically light green. They resemble big pin cushions. The flower stalks rise up about 10, maybe 15 feet, and they produce cream-colored flowers. Yucca is unique in that it is one of the best soap plants. Though the root has long been used, you can extract an excellent soap simply by shredding a green leaf, adding water, and agitating between the hands.

AGAVE

Agaves are generally much larger than yuccas. Their leaves are wide and broad -- the leaf can be up to a foot broad at the base and up to four feet long. They are often a shade of blue-green. The flower stalks arise up to 25 tall, and the flowers are more colorful than yuccas -- bright yellows and oranges. Agave has two unique properties. It produces both paper and water with little processing. The skin or epidermal layer of the mature agave leaf can be carefully peeled to produce a parchment. When dried, it can be used for notes or letters. There is no other plant in nature that I am aware of from which a paper can be so easily produced. Birch bark comes to mind, but birch bark is thick and not at all like modern paper. To obtain water, you cut the central spike of agave horizontally. You then cut out a bowl in this central spike, and cover it, and come back in a few hours. Drinkable water seeps into this bowl, and will continue to do so at the rate of up to a quart a day for up to a month. This is a mildly sweet water which you can actually drink as-is. Aside from the tapping of certain trees -- like sycamore -- I know of no other plant which produces such a readily palatable water. Even cactus doesn't truly produce "free" water. In the case of cactus, you eat your water. Another distinction about agave is that it has a large starchy core, called the caudex. This can be as big as a human head, and it located at ground level, just above the roots, and just below the central spike. Harvesting it kills the plant, and requires a fair amount of work. I have eaten this a few times. Properly baked -- which means slowly for several hours -- it has a delicious flavor like a mildly sweet squash. If cooked too quick, there is a bitter under flavor that persists.

Agave is also the source of tequila. However, I don't want to contribute to anyone's delinquency, so if you want to know more about this, most library's have ample reference materials. But remember: The fresh juice from the leaves of agave causes serious itching and usually a rash if you get it on your skin. For this reason, I rely almost exclusively on the yuccas for all the above uses. I typically only use agave when there are no yuccas around. Yuccas and Agaves are widespread throughout the entire Southwest, throughout the West, Great Basin, and Plains. They are extremely valuable plants to know. In fact, I have only scratched the surface here. I recommend that you

observe where these plants grow, and learn more about them. My book, *Guide to Wild Foods*, has a chapter on each the Agave and Yucca, and provides additional details. Another exceptional book on the use of fibre is *Survival Arts of the Primitive Paiutes* by Margaret Wheat (University of Nevada Press, Reno, NV). Also highly recommended is *Temalpakh: Cahuilla Indian Knowledge and Usage of Plants* by Saubel and Bean (Malki Museum Press, Morongo In Reservation, Banning, CA).

Christopher Nyerges next to a fruiting yucca stalk.
Location is the Arroyo Seco in California's Angeles National Forest.

E-mail your comments to "Christopher Nyerges" at nyerges@hotmail.com

Nyerges is the author of *Guide to Wild Foods* ($17), *Testing Your Outdoor Survival Skills* ($15), and *Enter the Forest* ($10). These books and videos are available from the School of Self-Reliance, Box 41834, Eagle Rock, CA 90041. Nyerges has led survival skills classes since 1974. The schedule of his classes is available in the Talking Leafs Newsletter. For more information, see the School of Self-Reliance website at www.self-reliance.net or www.home.earthlink.net/~cnyerges.

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The Ti Plant Called Ki

by Dino Labiste

Over the vast, South Pacific Ocean came the double-hulled canoes, searching northward into an unknown sea. On these voyagining canoes were the Children of Tangaroa, Tane, Ti and Rongo. In search of new land, these Polynesian settlers, called Kanaka Maoli (The People), came upon a chain of islands. With them they brought various seeds, tubers and roots to plant in their new homeland, Hawai'i.

One of the introduced plants to Hawai'i by the early Polynesians was a tall, stalk with tightly clustered, green pointed, oval and blade-shaped leaves. The leaf was about 4 inches wide and varied from 1 to 2 feet long. It was a fast growing woody plant that reached from 3 to 12 feet in height. The plant was Cordyline fruticosa. Known to the Hawaiians as Ki, it was a ti plant, a member of the lily family.

Ki was considered sacred to the Hawaiian god, Lono, and to the goddess of the hula, Laka. It was also an emblem of high rank and divine power. The kahili, in its early form, was a Ki stalk with its clustered foliage of glossy, green leaves at the top. The leaves were used by the kahuna priests in their ancient religious ceremonial rituals as protection to ward off evil spirits and to call in good.

There were many uses for the ti plant in old Hawai'i. The boiled roots were brewed into a potent liquor known as 'okolehao. The large, sweet starchy roots were baked and eaten as a dessert. This versatile plant also had many medicinal uses, either alone or as a wrapping for other herbs needing to be steamed or boiled. The ti leaves were wrapped around warm stones to serve as hot packs, used in poultices and applied to fevered brows. A drink from boiled green ti leaves were used to aid nerve and muscle relaxation. Steam from boiled young shoots and leaves made an effective decongestant. The pleasantly fragrant flowers were also used for asthma. Besides its use in healing practices, the large ti leaves became roof thatching, wrappings for cooking food, plates, cups,

fishing lures on hukilau nets, woven into sandals, hula skirts, leis and rain capes.

TI LEAF RAIN CAPE

The early Polynesians made a shingled ti leaf rain cape, called **kui la'i**, to protect them from the rain and cold. It was a form of portable ti leaf thatch that was tied to a net foundation and worn over the shoulders.

To construct a ti leaf rain cape, a fine netting was first woven. A cord was passed through the neck marginal meshes, knotted to the meshes at each end, and the cord ends left free for tying. The traditional netting for the cape in Old Hawai'i was made of olona *(Touchardia latifolia)* or hau *(Hibiscus tiliaceus)* cordage.

Large ti leaves were gathered.

The midrib, or bone, from the center of the leaf was removed from each leaf. The ti leaves were then split in two halves.

The half-leaves were tied to the net mesh, starting at the bottom of the cape.

Another row of ti half-leaves were added on top of the bottom row until the layered rows reached the top of the cape.

The thatched ti leaves acted as a wick to drain the water down the cape. Also the heavy thatching insulated against the cold winds.

Over time, the constant use, the winds, and the elements shredded the ti leaves on the cape. The green leaves eventually turned brown. This did not diminish the practicality of the ti leaf rain cape.

The ti leaves ability to shed water come from it's semitransparent, protective surface called the cuticle. The leaf is covered by a waxy cuticle which keeps water outside and restricts evaporative water loss from the plant.
The many parallel veins, which provide strength, is another reason why the ti leaf is a good plant resource. Leaf veins are vascular bundles and have a fibrous bundle sheath. Vascular bundles are composed of xylem (a tissue having pipelines that conduct water and dissolved mineral ions), phloem (a tissue having pipelines which distribute dissolved sugars and other photosynthetic products), and fibers which support and protect the xylem and phloem. Fibers and vascular bundles in leaves are called fibrovascular bundles. The fibers and the xylem in fibrovascular bundles make ti leaves strong, thus the many uses of this versatile plant.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Olona

by Gerry Labiste and Thad Hegerberg

Once Vital, Now Forgotten

Significance in Hawaiian Culture -- So important was the olona plant to the early Hawaiians, that it was grown in small plantations and was the only endemic species and the only non-food plant grown in that manner. This is certainly evidence of its great value to the natives, but it is only part of the story. In a society without nails or man-made fibers, olona fibers had many, many important uses in the Hawaiian culture. The white cordage derived from the fibers was highly valued for its lightweight and exceeding great strength under duress. Therefore it was also often used for bartering in the Hawaiian community.

Taxes were paid to the King after the fall harvest during the Makahiki, and the monarchy received many of these payments in the form of olona. The ali'i, or royalty, had many uses for this valuable commodity, including its use in the making of the royal kahili (a cylindrical plume of feathers on tall poles associated with the ali'i), feathered images of the Hawaiian gods, and for the fabrication of the royal cloaks, capes and helmets.

Still further evidence of the value of olona developed after contact was made with sailors from the Western world. Sailing ships traded for miles of rigging made from olona, considered to be better in every way than conventional rigging, which was twice the diameter. This, in turn, was important to the Hawaiians because it afforded them bargaining power with the sailors to trade the olona for things newly arrived from the outside world - things which the Hawaiians strongly desired to possess.

After the plants were cut and stripped, offerings were made before spinning the fibers began. Prayers such as this one were also said.

Growing Environment -- Handy and Handy (1972) reported that olona grows in "boggy interior valleys" and "upland areas", and Kamakau (1976) described olona habitat as rainy, marshy, mossy, in mountainous areas, often near banana trees. Although it is not common today, this rain forest shrub can still be found on all six major islands in the gullies of lower elevation forests, near the 2,000-foot level, and near streams.

Although olona still grew in wild clumps, the Hawaiians grew it in patches and, if space allowed, in large plantations of up to two acres. Stalks were encouraged to grow straight and tall and close to one

another to reduce branching. Lateral branches were regularly removed from upright stems to reduce the number of holes in the fiber. In a year to eighteen months the plants were mature enough to harvest. They were 6 to 10 feet tall, and the bark could be easily stripped at this young age

Identification -- Olona, Touchardia latfolia, is a wood shrub endemic to Hawaii. Though it is a member of the Urticaceae, stinging nettle family, olona is free of stinging hairs. The plant is characterized by its prominent stipules, which are two to three inches long. The leaves are large, 9 to 16 inches long and 5 to 9 inches wide, ovate in shape with serrated (fine-toothed) margins, three distinct veins, and green on both sides. Male flowers are borne in dense clusters, 1/2 to 1 inch in diameter and 3 to 5 inches long. Female flowers are borne on smaller heads in shorter clusters. The fruit is roundish and mulberry-like, and at maturity it is bright to dull orange and is fleshy.

Preparation -- The processing sheds were normally constructed near running water, since water was used in the process of extracting the fibers from the mature olona stems. The bark was first carefully stripped and hung to drain in the shed. After draining, the strips were laid in the running water for a day or two.

Next the strips were placed on a narrow board, fastened securely at the top of the board, and then scraped with a tool called the uhi, made from the backbone of a turtle or a segment of its shell. After drying and after the removal of the outside bark, the resulting product was a mass of fine white fibers, which were then dried in the sun. At the same time workers were separating the clean strong fibers into various widths, and bundling them into rolls for the return to the village.

There they were bleached in the sunlight and later twisted by the village women into fine cordage of varying thicknesses.

Raw olona fibers being prepared with a scraper prior to spinning into cord.

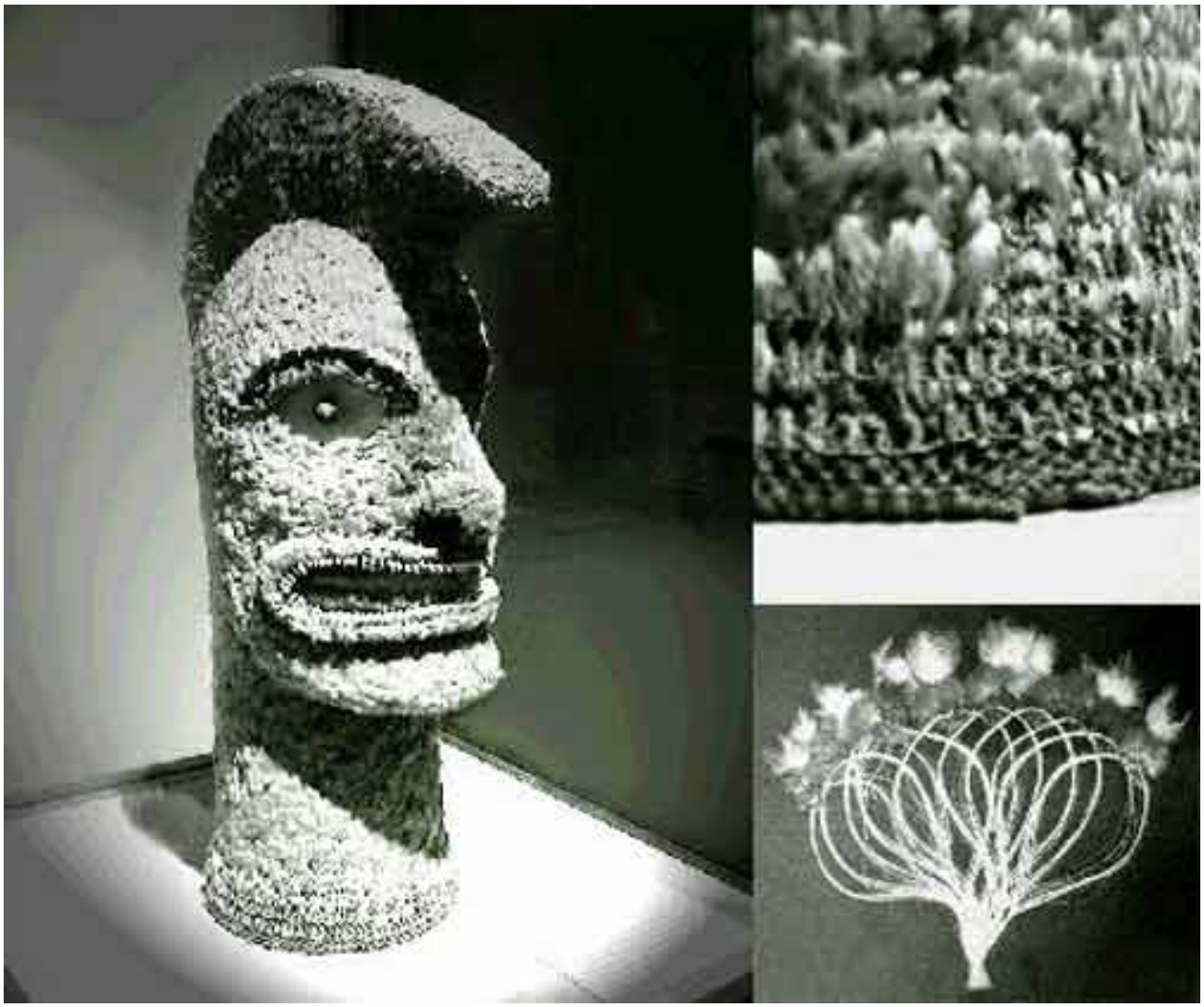
Finished Products -- In Hawaii Nei, olona was the main fiber used for aho, fishing line, where the no-kink and
no-stretch factors were very useful. Fishnets with large mesh, upena, as well as finer fishnets, and net bags for
carrying containers, koko, were also crafted from olona fiber. To prolong its life, it was often treated with kukui oil.

An ancient net maker bartered dogs, loads of fish, and food from his field and taro lo'i in exchange for 4,000 or more strands of olona fiber, which his wife would braid into cord for the net. A fine-mesh net for catching small fish might take a year to complete. The size of the cord increased when larger four and five-finger nets were made for catching big fish such as ulua and papio.

Carefully crafted olona fibers also made up the net base that provided backing for the exceptionally fine feather cloaks, ahu'ula, as well as for some of the feather helmets, mahiole, and for ti leaf capes, ahu la'i. Kahili feather standards were wound with olona cord, and olona cordage was superior for tying adz heads to hau wood handles.

Other uses for olona in ancient Hawaii were as threads for stitching together kapa, tapa bark cloth, into garments, for stringing and wrapping all manner of lei, to tie off the umbilical cord after a birth, for canoe lines, stretching drum skins over drums, and for every possible purpose that we today might use rope, twine, string or thread.

Olona cordage has been replaced by nylon and other synthetics of modern technology, but its incredible strength has not lessened by comparison. Olona could still be used in communities or cultures that produce their own cordage, for it is superior to hemp and agave. The strands are also rather soft and one can imagine their use in clothing. Olona has been forgotten, however, except in places remote from modern society where it is still cultivated on a small scale.



A feather representation of the war God Kuka'ilimoku, the personal God of Kamehameha the Great. The figure was first covered with a fine olona netting followed by hundreds of small clusters of feathers held together with olona threads.

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Common name: Dogbane

Scientific name: *Apocynum cannabinum L.*

Kingdom: Plantae - Plants
Subkingdom: Tracheobionta - Vascular plants
Superdivision: Spermatophyta - Seed plants
Division: Magnoliophyta - Flowering plants
Class: Magnoliopsida - Dicotyledons
Subclass: Asteridae -
Order: Gentianales -
Family: Apocynaceae - Dogbane family
Genus: Apocynum L. - dogbane
Species: Apocynum cannabinum L. - Indian hemp

The common name, Dogbane, refers to the plant's toxic nature, which has been described as "poisonous to dogs." Apocynum means "Away dog!" and cannabinum means "like hemp," in reference to the strong cordage that was made by weaving together the stem's long fibers.

Description: A perennial with opposite leaves that secretes a milky sap when bruised or broken, reaching 5-6 feet in height. Found throughout the United States.

Group: Dicot
Family: Apocynaceae
Growth Habit: Forb/herb

Duration: Perennial
U.S. Nativity: Native

Other common names used for "Dogbane" in California: Hemp dogbane, Indian hemp, Indian hemp dogbane
Other common names throughout the United States: Black hemp, Black Indian hemp, Canadian hemp, American hemp, Amy-root, Bowmans root, Bitterroot, Indian-physic, Rheumatism weed, Milkweed, Wild cotton, Choctaw-root, and General Marion's Weed.

Leaves: Entire margins (meaning the leaf's edges are smooth, not notched or toothed), ovate or elliptic, 2-5 inches long, 0.5-1.5 inches wide, and arranged oppositely along the stem. Leaves have short petioles (stems) and are sparingly pubescent or lacking hairs beneath. The lower leaves have stems while the upper leaves may not. The leaves turn yellow in the fall, then drop off.

Stems: Lack hairs, often have a reddish-brown tint when mature, become woody at the base, and are much-branched in the upper portions of the plant.

Roots: These plants may be found growing as colonies due to a long horizontal rootstock that develops from an initial taproot.

Flowers: Small, white to greenish-white, and produced in terminal clusters (cymes). The flower size is 1/4 inch wide. Blooms first appear in late spring and continue into late summer. The flowers are borne in dense heads followed later by the slender, pointed pods which are about 4 inches in length.
Many small insect pollinators, such as wasps and flies, pollinate the flowers.

Fruit: Long (5 inches or more), narrow follicles produced in pairs (one from each ovary) that turn reddish-brown when mature and develop into two long pods containing numerous seed with tufts of silky white hairs at their ends.

Identifying Characteristics: Stems and leaves secrete a milky sap when broken. Sprouts emerging from the underground horizontal rootstock may be confused with Common Milkweed (Asclepias syriaca) emerging shoots. But note that they are not related to milkweeds, despite the milky sap and the similar leaf shape and growth habit. The flower shape is quite unlike that of milkweed flowers and the leaves of hemp dogbane are much smaller than those of common milkweed. When mature, these weeds may be distinguished by the branching in the upper portions of the plant that occurs in hemp dogbane, and also the smaller size of hemp dogbane compared to Common milkweed.

Habitat and range: Widespread in temperate areas from New England to Florida, parts of the southeast, Texas to California and north to British Columbia. Dogbane is a native of this country and may be found in thickets and along the borders of odd fields throughout the United States. Hemp dogbane occurs under moist conditions. Grows in average, dry to medium wet, well-drained soil in full sun. Commonly is found in gravelly or sandy fields, riparian areas, in meadows, along creek beds, irrigation ditches, hillside seeps, and fence lines in cultivated pastures. New plants begin growing in late spring or early summer.

Elevation: Between 0 and 7,000 feet

Notes:
Cymarin, a chemical found in the plant's roots, was used as a cardiac stimulant, and was listed until 1952 in the medicinal text United States Pharmacopoeia. The milky sap contains cardiac glycosides (a chemical compound derived from a simple sugar and is often of medicinal importance) that have physiologic actions similar to digitoxin.
The toxic sap deters herbivores from feeding on the plant. Normally, animals avoid hemp dogbane because of its bitter, sticky, milk-white juice. Sheep are more frequently affected than other animals, as they will eat large quantities of hemp dogbane leaves and tops if other forages are not available. This most often occurs when animals are turned onto harvested fields or on fall ranges when forage is scarce. Poisoning can also occur when livestock are trailed from summer to winter ranges and other forages are not available.
Although this plant is considered toxic to humans, the roots were commonly harvested in the 19th and early 20th centuries for a variety of folk medicine and medical purposes.

Uses: Hemp dogbane is known for its use as cordage. Before domestic cotton was introduced and cultivated in the Southwest, around 700 A.D., leaf and stem fibers, hair or wool from dogs or wild animals, bird feathers, animal skins, or human hair were used to create prehistoric cordage. Dogbane fibers have been found in some archeological sites thousands of years old.

The native people from many nations in North America produced various useful items from the hemp fibers. They made cordage and thread from the plant with no other equipment than their hands and thighs. Fibers of the dogbane plant were rolled together to make a functional material stronger than cotton. The twine was excellent for making fishing lines and nets because it keeps its strength under water and does not shrink. It was also used in the manufacture of many other items, including deer and rabbit nets, slings for hunting small game, nooses for snaring grouse and other game birds, hide stretchers, bowstrings, moccasins, clothing, straps and tumplines, woven bedding for baby cradles, wheels used in a type of dart game, carrying nets, and cat-tail mats.

The stems were harvested late fall, after frosts have caused the sap to drop into the plant's perennial rootbase, and the leaves turn to yellow and fall from the stem. At this stage, the reddish-brown stalk becomes stiff and can easily be clipped from the rootbase flush to the ground. Dogbane stalks were also collected in winter, when the stalks are dry and brittle. Dry stalks are easiest to work, but if allowed to stand in the field through the winter and into spring, the fibers weaken. The harvested plants were bundled by the lower ends for carrying.

The cordage fibers are found in a layer between the thin outer skin and the woody, hollow center of the stem. Carefully scraping with an obsidian flake, chert spall, or deer rib removed the outer bark from the fibers. The top spreading branches were trimmed off and the stems were flattened between the fingers into four pieces. They were then split open from bottom to top. The length of brittle, woody core was broken into 2 inch pieces and pulled off the fibers by hand until all of the

woody material was removed. Then the process of rubbing and rolling the hemp between the hands helped clear away any other skin that still clinged to the fibers. Not everyone scraped the dogbane first. Paiute people and others simply split and broke the dry stalks without scraping, and removed all the outer bark by rubbing. Dogbane and other bast fibers can also be soaked (called "retting") to release the fibers. Retting was used when the bark adhered more tightly to the fibers.

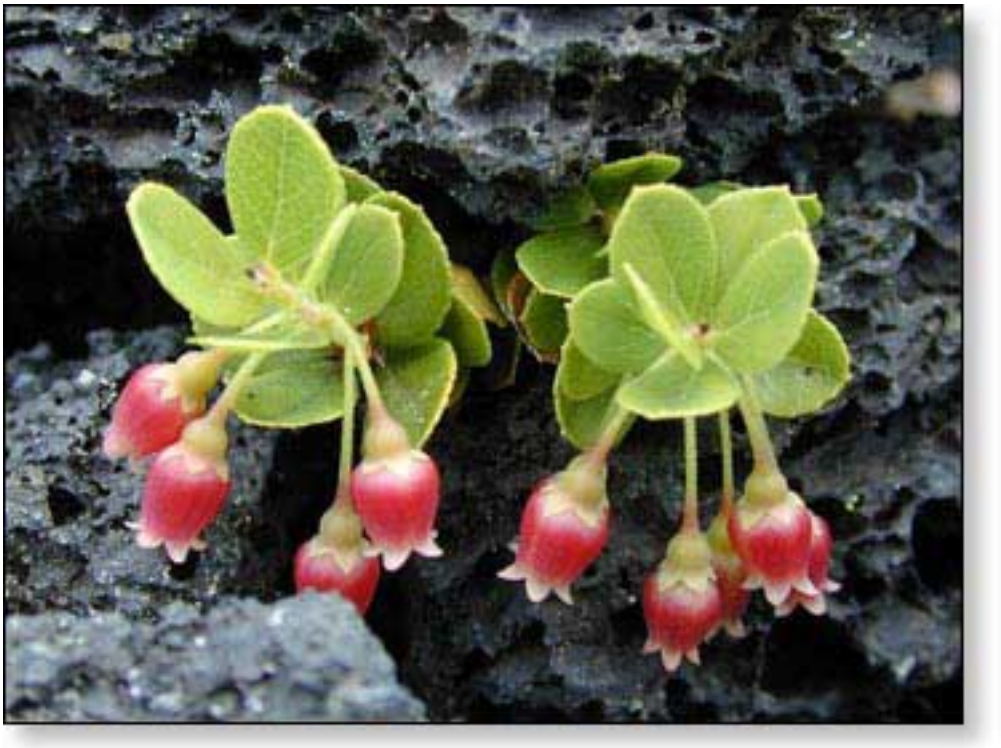
The dogbane fibers were made into twine by twisting and rolling them with the hand on the bare thigh. The hands were kept damp to increase the friction. More stem fibers were joined together by splicing. The short end that needed splicing was overlapped with the new addition of fibers, then rolled together until they were intertwined. An average plant yields about 2 1/2 feet of fiber, but one fourth of this is lost in the splicing process. By splicing the stems together, a continuous length of twine could be produced. A strong rope could be made by plying several lengths of twine together. A good Indian hemp rope is said to have the equivalent strength of a modern hemp rope with a breaking point of several hundred pounds. The twine would keep for many years if stored in a dry place.

In drier, more open areas, dogbane grows shorter (two or three feet), with more branches. In dense streambank thickets, the stems grow much longer and with fewer side branches, and are therefore more desirable for cordage. Different sizes of stalks and different growing conditions yield different colored fibers.

Information compiled by Dino Labiste

Plants on the Big Island of Hawaii

by Bob Gillis



Ohelo berries *(Vaccinium* species) flowering.

Ohelo berries taste like sweet cranberries.

Pods of the Papala kepau (*Pisonia* species).

The pod produces a sticky substance that the native Hawaiians used to coat branches to trap birds.

E-mail your comments to "Bob Gillis" at shelter@best.com

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Bull Whip Kelp

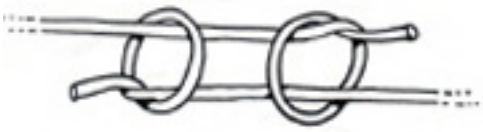
by Dino Labiste

While walking along the northern California beaches after a storm, you may encounter what looks like a long, snake like sea creature with a bulbous head and green blades of hair. This unusual specimen is not the remains of an animal, but a seaweed called Nereocystis luetkeana. It's commonly called the Bull whip kelp or Ribbon kelp. This seaweed is made up of a round, hollow bulb, from which ribbon like blades emerge from the top of the bulb. The air trapped in the bulb pulls the kelp up so that the blades float close to the surface and receive adequate sunlight. Blades of mature plants are shiny and leathery, while younger plants have thinner, shinier brown blades. Attached to the air bladder is a stipe. The stipe is a hollow tube up to 120 feet long. The lower end of the stipe is solid, which the root like structure tenaciously clings to a rock on the bottom sea floor.

The Bull whip kelp grows in large fields or beds far out from shore and far deeper than any tide lays bare. The beds are located in rocky areas in the subtidal zone and to a depth of several fathoms. Individual bull whip kelp are occasionally torn loose and tossed onto the northern

California shoreline by the waves or after a storm.

The Bull whip kelp was utilized by the Pacific Northwest Coast Indians for their fishing gear and storage containers. The bulb and parts of the stipe were used to steam bend branches of fir for their bentwood halibut hooks. The fir sticks were shaved to the right thickness and shape, placed in the kelp tubes, water was added and the ends were plugged with a wad of moss. The kelp tubes were buried in hot ashes of a dying fire and left to steam all night. The next morning, the kelp was split open and the steamed fir sticks were bent to shape and pressed into a wooden mold to cool. A lightweight storage container for eulachon oil was also made from the long kelp stems and bulb. The blades were trimmed off and the lower end was cut off to provide an opening in which to fill the long stems with oil. A funnel was made from another kelp bulb to pour the oil into the stem . The open end was plugged with a wooden stopper and tied tightly into place.



The solid part of the stem was used for fish lines after being soaked in fresh water, stretched, and twisted for extra strength. Length of these were joined together with a fisherman's knot to give the Pacific Northwest Coast Indians a long line of great strength.

All coastal First Peoples of British Columbia made fishing lines, nets, ropes, harpoon lines and anchor lines from Bull whip kelp. They dried and cured the long, rope like stalks, then spliced or plaited them together. Nancy J. Turner writes about the various curing methods for the kelp in her book, *Plant Technology of First Peoples in British Columbia*.

> "Curing methods varied: some Coast Salish peoples alternately soaked the kelp in fresh water and dried it over a smoking fire; the Nuu-chah-nulth dried the kelp and soaked it in dogfish or whale oil. Kelp lines were dried for storage, but had to be soaked in water before use, or they were too brittle. After soaking they became

strong and flexible once again."

Turner also mentions other aboriginal uses of Bull whip kelp.

> "Some Nuu-chah-nulth groups used fresh kelp floats as moulds for deer suet. They poured the melted fat in through the hollow stem, allowed it to harden, then broke the kelp away, leaving a bulb of suet ready for storage. People sometimes made a salve of Cottonwood buds boiled in deer fat. They poured the mixture in a kelp bulb and let it harden: the result was a fragrant ointment for protecting the skin from sunburn and windburn.
> . . . . the Straits Salish placed the ends of Yew-wood bows inside lengths of kelp and steamed them to mould and bend to the desired shape. Squamish fisherman used kelp blades to keep fish fresh and moist in the canoe. The Comox used them to line steam pits to flavour the food and help generate steam."

The bulb and stem sections were also pickled and eaten. Young, fresh kelp should be used for consumption. Bend the stem and if it snaps crisply in two, the kelp is fresh. If it bends like soft rubber, it is old. You may also substitute chopped Bull whip kelp stems for fruit or vegetables in chutney, carrot cake, and curry recipes.

Commercial companies use the Bull whip kelp in the preparation of pharmaceutical supplies, dairy products, poultry feeds, and glazing and finishing agents. It is an excellent source of potash salts.

Various musical instruments can also be made from the Bull whip kelp. One of the instruments is a rattle.

Find a small Bull whip kelp.

Cut off the bulbous section and part of the stem. The dried blades make decorative attachments to the rattle.

Fill the cut bulb and stem with sand to retain its shape as the kelp dries.

After the kelp has dried, pour out the sand and shake out any excess sand that may be clinging onto the inside of the bulb.

Fill the dried bulb with any rattle sounding material, like rice, seeds, pebbles, etc. Attach a stick to the open end of your kelp stem and lash it with cordage. You now have a kelp rattle. The finished rattle in the photo has a small gourd with pebbles attached to the other end of the stick.

Continued

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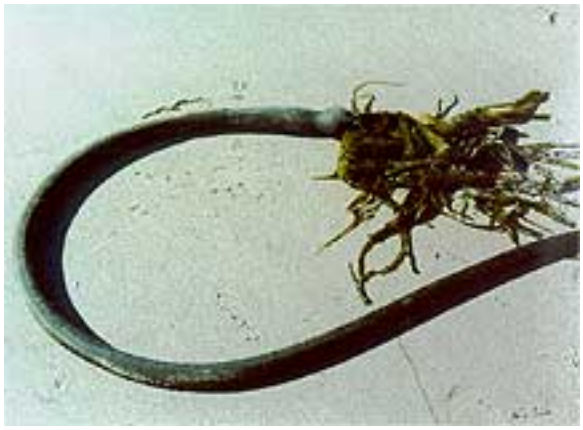
Bull Whip Kelp

Another musical instrument made from the Bull whip kelp is a simple horn.



Find a large Bull whip kelp.

Cut the bulb in half.

Cut off part of the stem.

Pucker your lips and blow into the open end of the stem.

Back to the beginning

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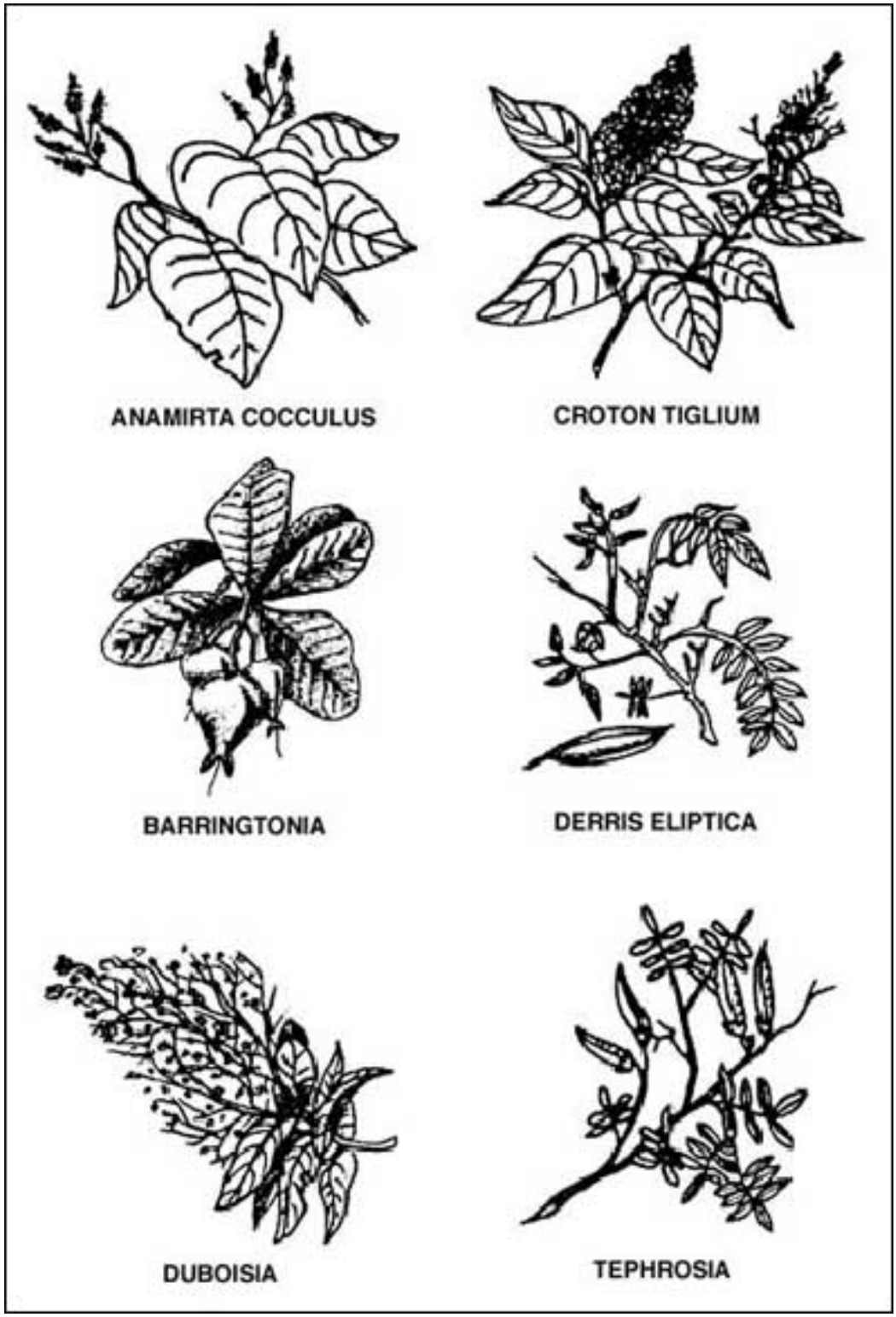
Fishing with Poisons

By Chuck Kritzon

In my studies of California Native Cultures, I was often surprised to keep coming upon plant-use references documenting "fish poisons". In widening my search, I became aware that most indigenous cultures across the Americas and indeed on all continents in the temperate areas of the world, used poisonous plants to catch fish. Below is a small sample of fish poisons and the indigenous peoples who used them. Further study will present the reader with a much greater breadth of information.



Fish poison plant families of the world.

Most fish poisons, also called icthyotoxins or piscicides, occur in several related plant species. A variety of chemicals found in these plants will stun fish when it passes through the gills or in some cases ingested. The fish then floats to the surface for easy capture.

The active ingredient is released by mashing the appropriate plant parts, which are then introduced to the water environment. Poisoning was generally done in stagnant pools or slow-flowing streams and rivers, that allow the pounded bark, leaf, seed, root or fruit, to concentrate its power without being washed away or diluted by a strong current. Sometimes streams would be partly blocked to slow down the water flow. Gathering the fish was usually done by hand, but baskets, spears and nets were sometimes employed.

Although primarily used in fresh water areas, Australian Aborigines and Californian Indians also used this technique in saltwater environments for octopus and low-tide shellfish fishing as well as for catching fish trapped in inter-tidal pools.

This ethnological report from Cape York Peninsula, Queensland, Australia, shows that with some Native Peoples, the cultural and material world was not separated:

> *A secret, sacred song of the Pascoe River bora (initiation cult) was sung by 60-year-old George Morton accompanying himself with his own drum. The singer was born a Kandyu but married a Wutati woman who was the daughter of one of the great Wutati bora singers who handed down the entire repertory of ancient bora songs to him. This song tells of a turtle that used a medicinal vine as a poison to catch fish in a rock pool at low tide.*

The use of plant poisons to catch fish is still used in many places in the world today. In Guyana, fishers pound the root of Lonchocarpus on logs fallen across a stream and allow the juices to drip down into the water. Brazilian gold miners, who probably learned the technique from the displaced Yanomami Indians of the Amazon, also toss pulped plant material into a very slow moving stream where the fish would surface down stream and be washed into a net set in place by the fishermen.

Grating Barringtonia seeds on the island of Tanna for use as fish poison.

The Carib Indians, who live along the Barama River also in Guyana, use a modified technique. A ball of bait is made from baked Cassava (Manihot esculenta) mixed with the pounded toxin-laced leaves of Clibadium. The small balls are thrown into the river where the fish swallow the balls whole. As with the previous methods, the stupefied fish floats to the surface for easy capture.

H.E. Anthony reported another example of fish poison use in South America in 1921.

> *"Another poison which is extensively employed by the Jivaros is barbasco (a common name for any plant used as fish poison), a jungle vine or creeper, which is put into the rivers to secure fish. A great pile of the plant is beaten up on the rocks until it is a pulp, and after the Indians have stationed themselves down-stream, some of their number throw 2-3 hundred pounds of mash into the river and the fishing begins. The fish are killed and float down, belly up, to be gathered in by the Jivaros, who see them as they pass.*
>
> *So potent is this juice that large streams may be poisoned by this relatively small amount of barbasco and under favorable circumstances fish are stricken for a distance of three miles down-stream."*

The pandemic need to find plants that work well as a soap, i.e. the ability to make lather and suds when agitated with water, has been pursued by most native cultures. The experience of using various plants selected for their soap like properties, led to the universal discovery that chemicals from these plants would also stun fish when used in a specific circumstance.

The two primary chemicals that occur in most plants used for stunning fish are saponin and rotenone.

SAPONINS

Saponins normally break down in the digestive system and must enter the bloodstream to be toxic, but fish take in saponins directly into their bloodstream through their gills. The toxin acts on the respiratory organs of the fish without affecting their edibility. Saponins also cause the breakdown of red blood cells that help the toxin to spread quickly. Even though the effects of the poison are powerful, they are not usually fatal. Fish that are washed away into untainted water revive, and canreturn to their pre-toxic condition. Because of this, the fishermen would have to gather the stunned fish quickly as they floated to the surface.

Saponins are one of a group of glucosides found in many plant species with known foaming properties when mixed with water. Saponins lower the surface tension of water allowing the formation of small stable bubbles. The amount of foam created by a crushed plant sample, shaken

with water in a jar, is a good indication of the amount of saponins present.

Saponins have been used in modern times in the manufacture of fire extinguisher foam, toothpaste, shampoos, liquid soaps, and cosmetics and to increase the foaming of beer and soft drinks.

Plant Families that contain significant saponins are: Amaryllidaceae, Convolvulaceae, Dioscoreaceae, Lamiaceae, Lecythidaceae, Liliaceae, Loganiaceae, Meliaeae, Menispermacea, Papilionaceae, Solanaceae, Sapindaceae, Sapotaceae, Scrophulariaceae, Solanaceae, Verbenaceae.

ROTENONES

Plants containing rotenones are the second most utilized as a fish poison. Rotenone is an alkaloid toxin, in a group called flavonoids and stuns fish by impairing their oxygen consumption. The plant is toxic only to cold-blooded creatures and is found almost exclusively among the family comprised of legumes (Papilionaceae, Mimosaceae, Cesalpiniaceae). Rotenone is also used today as an insecticide.

Fish Poison Wattle *(Acacia holosericea)*

Fish Poison Tree seedpod *(Acacia ditricha)*
Leaves are used for fish poison.

Below is a short list of indigenous peoples and the plants they used to poison fish:

Location or Tribe / Common Name, (*Latin Name*) / Part used

UNITED STATES

Catawba, Cherokee, and Delaware / **Black Walnut**, (*Juglans nigra*) / **Bark and green nut husk**

Yuchi and Creek / **Devil's Shoestring**, (*Symphoricarpos orbiculatus*) / **Roots**

Horse Chestnut, (*Aesculus hippocastanum L*) / **Fruit, twigs and buds**

Cherokee / **Polk Sallet**, **Polkweed**, (*Phytolacca americana*) / **Berries**

Central and coastal California / **Turkey-Mullein**, (*Eremocarpus setigerus*) / **Leaves**

California Buckeye, (Aesculus California) / **Nut or fruit**

Soap plant, **soap root**, (*Chlorogalum pomeridianum*) / **Bulb**

Indian hemp, (*Apocynum cannabinum*) / **Stalk, leaves**

Pokeweed, **Polk sallet**, (*Phytolacca americana*) / **Leaves**

Indian Turnip, (*Arisaema triphyllum*) / **Leaves**

Wild cucumber, **Manroot**, (*Marah fabaceus*) / **Seeds**

SOUTH AMERICA

Mexico / **Lechuguilla**, (*Agave lechuguilla*) / **Leaves**

Venezuela / **Soapberry**, (*Sapindus drummondii*) / **Berries**

Mexican Buckeye, (*Ungnadia speciosa*) / **Nut or fruit**

Ecuador / Barbasco, (*Jacquinia sprucei*) / **Bark, roots**

Barbasco, (*Tephrosia toxicofera*) / **Bark**

Barbasco, (*Lonchocarpus nicou*) / **Roots**

Acariquara, (*Minquartia guianensis*) / **Bark**

Brazil / **Fish poison leaves**, (*Euforbia cotinifolia*) / **Leaves**

PACIFIC ISLANDS

Rarotonga, Moorea / **Fish poison tree**, (*Barringtonia asiatica*) / **Seeds and leaves**

Hawai'i / **'Auhuhu**, (*Tephrosia Purpurea*) / **Roots and bark**

'Äkia, **The fish poison plant**, (*Wikstroemia uva-ursi*) / **Roots, bark and leaves**

AUSTRLIA

Pituri, (*Duboisia hopwoodii*) / **Cured leaves**

Austral Indigo, (*Indigofera australis*)

Wild Indigo, (*Austral Indigo*) / *Leaves and fruits*

Fish Killer Tree, (*Barringtonia asiatica*) / **Seeds and leaves**

Fish Poison Tree, (*Acacia ditricha*) / **Leaves**

Fish Poison Tree, (*Barringtonia racemosa*) / **Seeds and leaves**

Fish Poison-wood, (*Barringtonia vitiflora*) / **Seeds and leaves**

Fish Poison Wattle

Soapy Wattle, (*Acacia holosericea*) / **Leaves**

INDIA

Pongam, **Indian Beech**, **Derris**, (*Pongamia pinnata*) / **Seeds**

Fish Berries, (*Anamirta cocculus*) / **Seeds**

Bloodflower, **Curassavian**

Swallowwort, (*Asclepias curassavica*) / **Roots**

AFRICA

Pencil tree, **Milk bush**, (*Euphorbia tirucalli*) / **Leaves, sap**

Guele, **Ironwood**, (*Prosopis africana*) / **Dry fruits**

Common Mullein
(Verbascum thapsus)

Turkey Mullein or Dove Weed
(Eremocarpus setigerus)

Ecological Responsibility

Professionals today, to control fish populations or to eliminate alien or destructive species, use the same plant toxins: saponin and rotenone. Practicing primitives may be eager to experiment with the techniques listed above, but great care must be used, as the toxins are not selective and will eliminate all fish in the water where it is introduced. Keep in mind what is down stream and may be affected by these poisons. These chemicals will generally break down in sunlight. If you choose to use this technique, be aware that fishing with poison (even natural poison) is illegal in most states. Check your local laws.

A Lesson From the Amazon

Professor Sir Ghillean Prance relates this story from an expedition in which he was a member in the 1960's:

> *"The Maku Indians of the upper Rio Negro region of Brazil are well known for their fish feasts, where they go to a small river and catch a large number of fish by using fish poisons. The time I arranged to watch one of these, we were told that we must set out into the forest early in the morning. After two hours of a very fast walk we came to a small stream and I was glad to have arrived, but our leader said 'not here'. We came to another stream an hour later just to be informed the same again. This process*

continued for about eight hours when finally the chief proclaimed that this was the correct stream.

We were almost too exhausted to observe the preparations as the men built a frame over the stream and placed their sacks of the fish poison leaves (Euphorbia cotinifolia). Meanwhile the women stirred up the muddy stream and the men began to beat the leaves so that the plant juices dripped down into the water. Very soon fish began to float to the surface and were gathered up by excited women and children.

We had a banquet as all the fish were roasted on fires and eaten. I asked the chief why we had to walk so far to carry out this operation. The answer I received was that they had poisoned fish in the first stream two moons ago, in the second five moons ago etc., until I got a complete description of when each stream had been used. He then informed me that if they poisoned a stream too frequently there would not be any fish left.

How unlike the fisheries off the British Isles, Japan or Newfoundland where fish like cod have been mined almost to extinction. These Indians are aware that you manage such natural resources rather than over-exploit them to extinction. Could we not learn from this harmonious co-existence with nature and become better managers and less greedy about our natural resources?"

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Fishing with Hawaiian Plants

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Fishing with Hawaiian Plants

In Old Hawai'i, fish trapped in tidal pools at low tide were sometimes caught with mild toxins obtained from the 'auhuhu bush, a legume known in many parts of the Pacific, and some 'akia, a group of endemic shrubs and trees. The whole 'auhuhu plant or the root and stem bark of 'akia species were crushed into bits, either with a mortar and pestle or with rocks found by the shore. The materials were then scattered in tide pools around the base of rocks and into holes where fish might hide. In a few minutes the small fish that were present would float to the surface and could be picked up.

This effect did not last more than twenty or so minutes, depending on the size of the tide pool and the speed with which fresh seawater entered it and diluted the toxin. Any fish that were washed out of the pools or overlooked in the gathering would recover and swim away, since the toxins merely stupefied the fish rather than killing them outright. In this sense, these old "poisons" more closely resembled modern fish anesthetics than the chemical rotenone, another plant derivative used to catch fish, from which fish do not recover.

Most fish were not killed by the toxic plants, which merely stunned them and made them easy to catch. The poison had no effct on human beings. No data suggest that 'auhuhu or 'akia toxins are transferred to humans through consumption of fish caught in this way.

'Auhuhu (*Tephrosia piscattoria*)

'Akia (*Wikstroemia* species)

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Information compiled by Dino Labiste

Fishing with Poisons

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Wilderness Cuisine: The Cattail Pollen Pancake

by Susan Witmore

Searching for another food adventure, but not quite up for road kill quiche? Cattail pollen can satisfy a wild appetite without provoking the least bit of squeamishness. Its bright yellow color has eye appeal. The flavor is pleasant. Allergic to pollens? Well, there are all kinds of pollen, so if gathering the stuff doesn't cause you to take out your inhaler, you probably have nothing to worry about. Think pollen isn't a food? Remember, the expensive and esteemed spice, Saffron, is also pollen.

Step 1: Find a cattail patch. Cattails are tall reed-like plants growing in or around water. The leaf structure however is flattened, not rounded like bulrush. The "cat's tail" refers to the mature flower spike. When seed matures, it forms a tightly packed, brown cylinder. It resembles a corn

dog on a stick more than a cat's tail. If the "cat's tail" is brown, you are probably too late to gather pollen.

Step 2: Take a moment. Give some thought. This is a generous plant. Pre-contact Native American usage of the plant was extensive. The new green leaf stalks can be split out and eaten like celery. Cahuilla and Mountain Maidu Indians wove the mature leaf stalk into mats or other useful items. The male flower's edible pollen was used like flour. Immature flowers (male and female) were eaten while still sheathed. The bloom stalk can be used as a fire stick when thoroughly dry, though the Indians at San Juan De Padua were reported to construct flutes from the stalk. The same flower later produces cattail fluff, versatile as insulation, tinder, cradle board padding, and wound dressing. The root stalks (corms) are rich in starch, and can be processed as a food. Consider too the cattail's role in supporting the web of life. As we gathered the pollen, we were aware of geese and teal, muskrats, fish sheltered in the tangled roots, marsh wrens, blackbirds, and an invisible but vocal bittern. What isn't there to like about the cattail? Take a moment to say please. Take a moment to say thank you.

Step 3: Find your cattail patch at the right time of year. Spring is the time to find cattail pollen, and spring follows April on its way to the mountains. When the plant sends up its new shoots, it also produces flowers. The upper portion of the cattail spike carries the male flowers and the pollen. The part we see in dried arrangements is the female part, and it will produce seed. The male flowers are short lived, tightly clustered, and small. What they lack in size they make up for in volumes of yellow pollen. When pollen is available, the top of the cattail spike looks like a fuzzy yellow finger above the green, partially sheathed cattail. The plant is wind pollinated, and the powdery pollen is quick to disperse with the slightest disturbance from wind or from eager gatherers. Once the pollen has launched itself into the air, the male flowers fall away, leaving the upper part of the spike bare. Getting hungry thinking about those pancakes? Try nibbling the green female flowers. They taste a little like broccoli, but not as strong. If you have missed the pollen producing season, consider one of the cattail's other gifts.

Step 4: Collect the pollen. Find a male flower spike which has not yet shed its pollen. Look for bright yellow tips above the green cattail. The flowers in the area where we gathered pollen were at their best when small flies could be seen clinging to the male flowers. They must have been there to take advantage of this resource too. (Yes, they did fly off. We didn't see a one in the collecting bag.) Carefully bend the flower into a collecting sack, and then tap it to release the pollen. It was not unusual to get a tablespoon or more from a single flower. Be careful not to break the stem. If you do, the pollen explodes off the tip, and the female flowers will fail to develop seed.

Step 5: Sift out any inedible bits. When the collecting bag is sufficiently full, bounce the bag until any odd bits of flower, bugs, etc. rise to the top. Just scoop them out. If they aren't alive, or too disgusting, keep them for added fiber. (Hey, you've heard of buckwheat cakes, haven't you?)

Step 6: Make the pancakes.

RECIPE

1/2 C cattail pollen

1/2 C all purpose flour

2 tsp baking powder

1 C milk (reconstituted can be used) or use buttermilk with additional 1/2 tsp soda

1 egg or egg substitute

1/4 tsp salt

1 Tbsp sugar

2 Tbsp oil

Mix dry ingredients, then add milk and oil. Mix only until moistened. Heat griddle or pan until water drops sizzle. Pour batter on the hot griddle. Turn pancakes when they are full of bubbles, just before they break. Serve hot. Makes 10 four inch pancakes.

Need syrup? In a separate pan, mix 1/2 C brown sugar and maple flavoring, and just enough water to dissolve sugar. Heat, then reduce by boiling until syrup consistency. Watch it carefully or you may end up with taffy . . . or worse.

Step 7: **Enjoy with a friend.**

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FLORA QUIZ

Can You Name These Plants?

Plant # 1

Plant # 2

Plant # 3

Plant # 4

Plant # 5

Plant # 6

Plant # 7

E-mail your answers to "Bob Gillis" at shelter@best.com

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Thatched Ohlone Style House

by Norm Kidder

A summary from John P. Harrington's notes on the Chumash and Ohlone Indians, and the author's personal experience.

This spring and summer of 1999, we built a watertight, thatched house similar to those used by the First People of the California Bay area. We cut poles using stone tools, dug holes with sharp sticks, and learned how to bind the frame together using all natural materials. This was part of an experimental archaeology project.

1. SITE PREPARATION

After choosing a location, drive a stake into the ground to locate the center of the house floor. Tie a loop of string over the stake, and measure out the radius of the floor circle. Tie a stick to the string at that point and mark the circle on the ground. Locate the doorway away from the prevailing winds. if the floor is to be dug down below ground level, do so, then level and pack hard by pounding with stones (or feet).

Mark, then dig the two doorway pole holes about 3 feet apart, and 18 - 24 inches deep. Then mark off post holes at 18 inch intervals around the circle, adjusting as necessary. (I first divide the circle in half from the center of the doorway, through the center of the floor and to the back wall, and put one post at that spot, spreading the other posts evenly on each side). Dig these holes as with the door poles, or, if the ground is soft enough, drive in a stake, wiggle it around and pull it out, quickly placing the house pole into the hole.

TOOLS - Modern: post hole diggers, hoes, picks, shovels. Ancient: digging sticks, abalones shells or flat rocks.

2. CUTTING THE HOUSE POLES

First locate a stand of willows that are growing straight and tall, (new stands, or stands growing in canyons). Determine the size of your intended house. For a 6 foot diameter house, 8 - 10 feet tall, you will need house

poles 1 1/2 inches thick, and 12 - 14 feet tall. For a 9 foot diameter house, 11 13 feet tall, you will need house poles 2 inches thick and 15 17 feet tall. Cutting should be done in the spring or early summer, and with an attitude of appreciation for the willingness of the trees to cooperate with you in your project.

After sufficient house poles plus several extras are cut, remove the side branches and peel the bark. The bark should be removed in strips about 1 inch wide and as long as possible (it is often possible to remove the bark in one or two pieces). Save the bark. The side branches can be used for shade shelters, windbreaks, as kindling, or as binders.

Charring the ends of the house poles will help preserve them against rotting.

TOOLS - Modern: pruning saws, hand clippers and loppers. Ancient: sharp edged stone slab saws, hands.

Note: To use the stone saw, first bend the willow over as far as it will bend, then saw it half way through, then bend it back the other way, and finish sawing.

3. CUTTING THE BINDERS

Additional willow poles will be needed to form the horizontal framework which binds the thatch to the house poles. These binders are long straight willows, 3/4 - 1 1/4 inch thick at the base. Cut enough to go approximately 14 times around the house (excluding ends smaller than 3/8 inch thick). These should be cut and peeled as were the house poles.

4. CONSTRUCTING THE FRAME

Dried willow bark awaiting final preparation for use in lashing the house frame.

Assemble the cut and prepared house poles at the site, and sort them by size and flexibility into equal pairs. Select the two stiffest and strongest pairs. Place one of each pair in a doorway hole, and the other opposite it at the back of the house. The next stiffest set then goes from side to side across the house. The remaining poles are set in a balanced pattern in the remaining holes. As each pole is set, it is tamped down with a heavy pole, or tamper.

From a ladder set up inside the house, pull the house poles together in pairs to the center, and tie them. It helps to have people on the ground bending the poles in while they are tied. The height of the house is determined by the flexibility of the upper ends of the heaviest house poles. The poles can either be tied together where they meet, tied to a circle to form the smoke hole, or overlapped with their opposite to make a more rounded roof.

Beginning at the door poles, tie a horizontal binder to the inside of the house poles, about 6 inches up, using strips of bark to lash it. Tie the binder to each pole until it becomes narrower than 3/8th of an inch, then overlap the next binder pole. Begin with the thick end at the door pole on each side and work to the back of the house. Add another row of binders in the same manner at 24 inches. At 42 inches, the circle of binders will form the top of the doorway. From one of the door poles, lash a binder going across the doorway to form part of the lintel, and continue lashing as usual to each pole. From the other door pole, lash a binder to the outside of both door poles, then to the inside of the remaining poles to form the rest of the 42 inch circle. Continue adding circles of binders to the inside of the house pole frame at approximately 18 inch intervals to the top. You will want to use the thickest binders at the bottom and increasingly thinner ones toward the top.

Above the doorway, there will be a wide gap between the house poles. Reduce this by tying a light house pole between the two binders that cross above the doorway, and lash it to the binders it crosses to the top of the house. Add vertical poles in a similar manner wherever it seems necessary.

Mark the top end of the house pole opposite the doorway, then trim the ends of all the other house poles to about 4 inches above where they are tied together (unless the poles have been overlapped). The one long one will support the smoke hole cover.

TOOLS - Modern: knife, hands. Ancient: stone knife, hands.

5. CUTTING THE THATCH

The hearty crew in front of one hour worth of tule cutting.

Deer scapulae saws with notched edges used to cut tules.

The thatching material is most often thought as being tule (Scirpus spp.), but was realistically whatever was locally ,abundant - cattails, reeds, grasses, ferns, brush, or whatever. It is also possible to mix cattail and tule together in the same house. Before you start cutting, make sure there is a large supply of your chosen material reasonably near at hand, as you will end up needing more than you thought. Because cattail and tule are the most abundant today, and were commonly used, I will stick to these two to describe (they're also the only ones I've used myself). The other materials were used much like cattails, with adaptations for differences in length and texture.
TULES - There are several members of the genus Scirpus that can be used for thatching a house, but Common Tule (Scirpus acutus) and California Bulrush (Scirpus californicus) are the largest and most abundant. Of the two, Common Tule is tougher, and therefore preferred, although California Bulrush is green and harvestable throughout the year while Tule is only cut from June through October. When cutting in a large stand of tules, it is best to "tunnel" through them rather than clear cutting large areas, as cattails will tend to invade the tule beds.

Five truckloads of tule set out to dry.

Tules should be cut as close to the ground as possible, and handled with care so the stems do not become bent and broken. I prefer to cut them with a. Japanese hand sickle, but serrated kitchen knives and linoleum knives both work well. Saws made from the shoulder blade of a deer were used prior to European arrival. As the tules are cut, I carefully stack them, with the cut ends together, leaning against uncut tules I have bent over to form a stand. When I have cut enough to make a bundle about 8 - 10 inches thick, I tie the bundle with binder twine at the middle, and near each end so that they may be carried without breaking. The bundles are then placed on a drying rack a foot or more off the ground, and one bundle thick, to allow good air circulation. The rack should be in partial to full shade, and the bundles should be rotated for even drying. If no place is available to lay the tules flat, they can be dried vertically against a building or fence, but care must be given that they don't get knocked over, and broken. Tules need to be dried before using as they will shrink up to half their original diameter, and come loose. They are dry when they are pale green, or straw color.

CATTAILS - Cattails need to be handled with care, but can be handled without being tied in bundles as long as they are kept with the cut ends together, and not crossed and broken. When carrying cattails (or tule bundles), always hold them at near the cut ends, with the rest of the plant trailing behind. Drying cattails is similar to tules, except that they can be closer to the ground and in full sun.

TOOLS - Modern: Japanese hand sickle, linoleum knife, serrated knife, machete. Ancient: deer scapula saw, or obsidian knife.

6. THATCHING

Eight 8-foot tule mats ready to be tied onto the house frame.

Three thatching methods are here described as being for either cattail or tule, although either method will also work (though not as well) for the other material.

TULES - Tules were most often applied at least partially twined into mats. Temporary, portable structures are described that were able to be rolled up and carried away, being made of well woven tule mats. In permanent, waterproof houses, completely woven mats would take too much time to make and would be more likely to leak. These winter houses are described below.

Begin by soaking cattail leaves, or split tules in water for the twining. Next, spread out a bundle of dried tules on a clear piece of ground as thick as the mat is to be (2 - 3 inches). Taking three or four strands of wet twining material, twist it into a single ply, then fold this over a 2 - 3 inch bunch of tules 1/3rd of the way along the twiner, and about 6 inches above the cut ends of the tules. Twine each bunch together tightly, as you work your way down the tules. Each bunch should be the thickness that you plan for the mat. Keep adding into the twining material as necessary until the mat is complete. As I twine the mat, it is convenient to roll the finished section up as I go, stopping the mat when the roll becomes difficult to work over (roughly 18 - 24 inches thick). I end the twining by making about 18 inches of rope beyond the edge of the mat. This rope is useful in tying the mat to the house frame. This one row of twining is sufficient to keep the tules from slipping, once on the house.

While enough mats are being made to go around the house 4 to 6 times (depending on the size of the house and how well you want it to shed rain), begin thatching. The first row of thatch sits directly on the ground, so it does not need to be made from mats. Instead, tie a binder pole to one of the doorway poles opposite the 24 and 42 inch horizontals of the frame. Tie it loosely, so that 4 - 6 inches of tule (or cattail) can be packed between it and the house frame. Hold the binder away from the house as you pack in the thatch, with the cut ends on the ground. When about a foot of the circumference of the house has been covered, press the binders against the thatch and tie them to the house frame binders, keeping the thatch an even thickness. If you have enough tules (or cattails), make this first layer as thick as possible (up to a foot thick).

The first layer of thatch is loose tules, not mats, bound to the frame with binder poles. Subsequent layers of thatch are added as mats, with the binder poles tied through the twining.

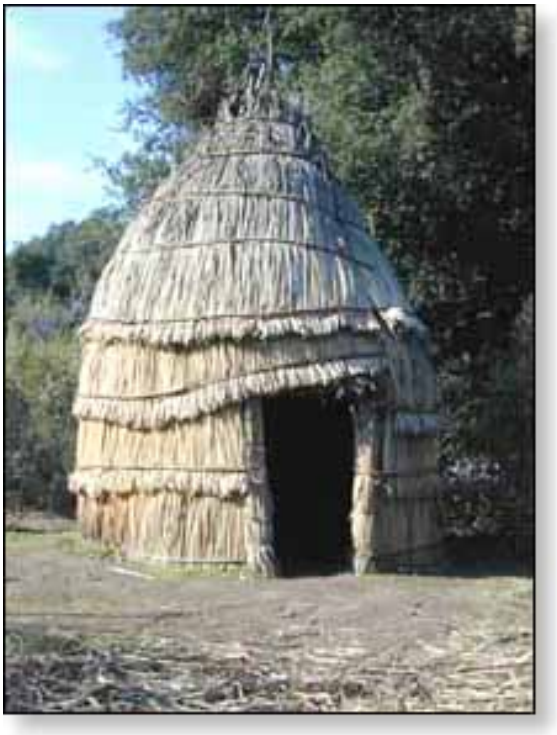
When this first row has been completed to the other side of the door, take two bundles of tules as thick as the first layer, and tie one to each door pole so that the-ends of the binders are covered. Use a thatching needle if necessary to firmly wrap the bundle to the door pole. Bend the top of the tow bundles together to for a single bundle over the top of the doorway and trim to fit. It should hide the wood at the top as the side bundles do below. This top bundle also serves as a platform for thatching. Attach a short binder to one of the door poles where the 60 inch binder crosses it. Pack tules (or cattails) in as was done for the ground level layer, supported by the tule bundle lintel.

Once the foundation layer is complete, begin at your favorite door pole, and tie the exposed end of a rolled tule mat to the house frame at the 24 inch binder (using the tule rope extending from the mat if you did this). Tie a binder on at the same level, and proceed to unroll the mat around the house, with people holding it so that the row of twining stays at the 24 inch level. Tie the binder to the binder pole on the outside of the foundation layer beneath it. Attach a second binder at the 42 inch level and tie this through to the house frame using a thatching needle if necessary.

Proceed around the house in this manner at each 18 inch level, tying a binder over the twining and to the outside binder, and one level higher, tying a second binder through to the inside frame binder. The mat that goes directly above the doorway should be doubled over to compensate for one missing layer. (If 6 layers of mats are being used, they should go between the mats above and below the doorway). Before adding the last two mats, tie binders over the existing thatch to the smokehole. The last to mats should be tied to the outside binders, rather than to the house frame. Finally, trim the tules around the smokehole, and make sure the are tied down well. A smokehole cover may be added at this time if desired - a thick tule mat, of a deerskin, tied over the house pole that was left long for this purpose.

CATTAILS - Cattail thatching begins exactly like tule thatching up to rolling on mats. Cattails can be applied loose. Once the foundation layer -has been completed, and the tule bundles tied to the door frame, tie a binder to the house frame at door top height (or one level lower if the cattails are short, or the door tall) and opposite a frame binder. Leave the binder loose as when adding the foundation layer. As one person holds the binder away from the house, others bring in handfuls of cattails, with the cut ends up, and packs them between the house and the binder, with someone assigned to hold it in place. The cut ends of the cattails should extend about a foot above the binder. Every foot or so, the binder is tied to the house frame using a thatching needle. As this process continues around the house, a second binder is added below the first, and tied to the outside binder holding down the foundation layer (eliminating leaks). This process is repeated at each binder level up to the smokehole. When completed, each layer of thatch is trimmed off below the bottom binder.

Finish by cleaning up, trimming, adding a smokehole cover, a tule mat for a door, or other additions. The fire should be built between the door and the center of the house floor, leaving the back half of the floor for sleeping space.
TOOLS - Modern: thatching needle, clippers, knife. Ancient: thatching needle, bone saw, stone saw.



As complete as it's going to get this year. It still needs one more layer (truck load). Next June, 2000, we will add the last layer of mats.

E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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My First Scout Pit

by Bill Scherer

Every year at the Rattlesnake Rendezvous I try different types of bedding. This year's arrangement was a modified "Scout Pit" as I had read about them in a few different books and magazines. (For a good article on the subject, check out Wilderness Way magazine Volume 2, issue 3 pp. 43-44 article by Kevin F. Duffy.) The scout pit is basically a camouflaged and insulated trench in the ground used for sleeping. Properly constructed, it can be used in all types of weather for extended periods of time and will be almost invisible to anyone walking by. Since I was planning on using it for a only a few days in warm weather and did not want to hide it from by fellow campers, it was not as deep or camouflaged as it might have been.

I found a place that looked like it might not have too many tree roots and started digging. I used a small shovel and an abalone shell. Getting through the sod layer with the shell was almost impossible, but after that, the shell worked fine. I dug a hole about crotch-deep, about a foot longer than my height, and the width was about six inches wider than my shoulders.

Next, it was off to collect leaves. Fortunately there were lots of maple leaves nearby. I collected two ponchos full of leaves, which filled the trench. Next, I laid a grass mat on top of the leaves, and compressed the whole thing with my body weight. Then another grass mat, and another layer (two poncho loads) of leaves. Finally, I dropped my poncho on top of the filled trench, and laid a few branches on top to keep the wind from blowing things about. Construction done for today! I had intended to make a roof of sticks and earth, but I was tired at this point, and figured the poncho would suffice.

That night at bedtime, I crawled between the grass mats fully clothed and went to sleep. I soon discovered that I should have brought a pillow to bed with me. I tend to sleep on my side, and as a result my head was at an angle. I woke up the next morning with a crick in my neck, but warm and dry. The poncho was very wet with dew. The leaves had compressed overnight, so I collected more leaves before the next nightfall, and also made a pillow out of a stuffed sack. The next night's sleep was comfortable, and very warm. At one point I had to deliberately expose my upper body to cool off a bit. I had also placed a gourd canteen within arms reach in case I woke up thirsty.

The final morning, the mats were removed, and the soil put back into the trench. I found the scout pit to be a warm, dry and pleasant way to sleep. The only negative point was the amount of time and work to get it dug for only two nights. If I were going to use it for a long period of time or for repeated used, the setup time would be more justifiable. Since it was one of the few chances for me to try the scout pit, it was well worth the effort.

See ya in the woods!

E-mail your comments to "Bill Scherer" at scherer_william@hotmail.com

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The Primitive Sauna

by Bill Scherer

The sauna, in its most original form, is a small room with some water thrown on to hot rocks. It has existed in northern Europe long before recorded history. The nomads of what later became Scandinavia probably used a portable sauna similar to those seen among modern nomadic tribes of central Asia. They dug a pit in the ground and built a fire outside of the pit. Rocks were placed into the blazing firewood. The hot rocks were then tossed into the center of the pit, the bathers gathered around the heated stones, and a tarp enclosed the bathers and the pit to create a warm place for steam bathing. Water was poured onto the rocks to produce steam. The bath ended with a plunge into cold water or, for the hardy, into snow.

The primitive sauna evolved into the smoke sauna or "savusauna". It was a small shed with a massive fireplace and no chimney. After the fire had died, the smoke was released through a small hatch on the wall. The benches were then scrubbed due to the soot from the smoke.The fireplace radiated plenty of heat for many hours. Smoke saunas are almost non-existent these days, as they tend to burn down easily. The few surviving smoke saunas that I have seen have been converted to stove type saunas.

The early European sauna was somewhat similar to the Native American sweat lodge. Other cultures have had their own version: the Russian bania, the Turkish hamam, and the Swedish badstuga.

During the Middle Ages sweat bathing was popular in many parts of Europe. However, the church forced the demise of sweat bathing in most of Europe. They were not successful in forcing the stubborn Finns to give up their saunas.

The Finns used their saunas for more than mere bathing. The sauna was a warm, germ-free place with plenty of water. The savusauna's smoke contained tannic acid that sterilized the bench surfaces. The old Finnish proverb, "Sauna on köyhän apteekk", says "The sauna is the poor man's pharmacy". Minor medical procedures were carried out there. The sauna was where children were born. In my hometown in northern Minnesota there are a few old timers who boast of being born in the sauna. Women went through a purification ritual before marriage in the sauna. Old folks often dragged themselves into the sauna to die.

It was common for neighbors to take turns preparing the saunas. In the old days, when the sauna was hot, there would be a knock on the neighbors' doors and the shout, "The sauna is ready!" Today the same thing happens in northern Minnesota, albeit with a phone call.

I have been fortunate to have the sauna tradition as a part of my life. My father built a luxury sauna on our farm in northern Minnesota. It came complete with electric lights, dressing room, wood stove, hot and cold running water. My hunting buddies built a small sauna at our deer camp. No running water, but some snow tossed onto the hot rocks worked quite well. Before it was built, the guys would leave the camp after a few days just so they could get clean. After it was built, they would stay for a week or more.

An old Finnish folk tale told of a farmer who enjoyed the sauna heat so much the Devil made a trip to meet him "I hear you like the heat of a sauna," said the Devil. "I do." replied the farmer. So, the Devil invited him to a place where it is so hot that "you'll be begging me to stop it." Hearing this, the farmer went willingly. When they arrived in Hell, the Devil shouted to his demons to throw more coal on the fire. "More heat!" yelled the Devil. "We have a farmer here who loves the heat." Soon Hell was blazing with fire. It was so hot on earth that volcanoes began to erupt. The farmer smiled. "More heat!" the Devil yelled. "More heat for this dumb farmer!" By this time all the residents of Hell had gathered to watch. Then they began to chant. "Heat, heat, heat!" The Devil was mighty embarrassed; for Hell was Heaven for the farmer. The farmer smiled again, and thanked him for such a wonderful heat. Finally the exasperated devil screamed, "Get out! I never want to see you down here again." So, the farmer returned to Finland, sad to lose the wonderful heat, but knowing his fate was secure.

For the last few years, we have been setting up a primitive sauna on the banks of the creek at the annual Rattlesnake Rendezvous. It is usually one of the final activities at the end of the weekend.


The frame is a simple structure of willow saplings, using the sapling's stripped off bark to tie the frame together.



The structure is then covered with whatever we have available, in our case, a couple of tarps and a parachute. Inside we have some grass mats, a wooden bowel, a ladle, some willow switches, and a small pit in the middle.


A fire is built outside. Rocks are put into the fire and more firewood is added.When the stones are hot, the bathers get into the bathhouse, and the hot rocks are moved into the center pit.


The door flap is closed and water is sprinkled onto the glowing, hot rocks. The steam that is produced will fill the sauna. When the stones have cooled and no longer produce steam, the door flap is opened and a quick dowsing in the water finishes the bath. **"After a sauna like this, a man could wrestle a bear and win!"**

Photos by John Atwood

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E-mail your comments to "Bill Scherer" at scherer_william@hotmail.com

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I Belong To This Country

by Dick Baugh (January 26, 2002)

I expressed to our travel agent my desire to learn about Aboriginal culture on the trip to Australia we were planning for August-September, 1999. She connected me with the Aboriginal Bush University and Wedgetails Tours. We flew west from Darwin, NT to Kununurra, Western Australia, a small town with a ten shop shopping mall, a caravan park and an airfield. We stayed the night in a bungalow in the caravan park. Next morning Marcia, my wife, remained in Kununurra while I, Jillian and Margaret, the other two participants, boarded a single engine airplane and flew about 100 miles due west into the Kimberlies. We flew over a huge meandering brown river with lush green banks. Beyond the river banks we saw rolling hills dotted with small trees. All the hills looked the same and all the trees were the same size and shape. Not a place to get lost.

The plane landed at a bush airstrip and we were met by Graham and Judy, proprietors of Wedgetails Tours. Margaret and Jillian were old friends of theirs, lived in the same town in Victoria and had been on previous Wedgetails Tours excursions. Walking to the Wedgetails Tours bus we were introduced to Paddy N, Paddy W, Lucy W and Biddy D, all elders of the Ngarinyan tribe of Western Australia. Paddy N, with a razor sharp gray mustache, was Paddy #1 on this trip because we were visiting territory with which he was very familiar. He was both traditional and a man of the world since he had visited Lascaux in France to see the famous cave paintings. Paddy W gave us a great big smile and stuck out his hand. He was wearing shorts, exposing the parallel initiation scars on both thighs. If I were ever lost here these were the two men I would want with me. Lucy was a shy, slim woman, her very dark skin accentuating her thick, wavy gray-blond hair. Biddy shook my hand vigorously and told us "I belong to this country." I liked that. The land didn't belong to them but visa-versa. There is a lesson here. Biddy was going to be my "Mom" on this trip, even though she was only a few years older than me. "See that tree over there? Get out your camera and take a picture of it. That tree has medicine. Show the picture to people back home where you live." Okay Biddy.

Into the vehicle and onto the dirt road. We took a detour to an old camp site frequented by Paddy #1 in his younger days. There we were introduced to some different forms of bush tucker (wild foods). There was wild taro growing in the mud that surrounded a small spring. I pulled some up,

hoping that we could prepare it back at camp. They told me it was too "cheeky", meaning it was astringent and didn't taste very good. Next, Paddy W poured water into a large enamel cup, walked over to a bush which had a large cluster of leaves formed into a ball about the size of a baseball. Quickly, he grabbed the cluster, plunged it into the water and squeezed vigorously to crush the green ants which had formed the leafy nest. A couple more green ant nests were added to the brew before we tasted the "green ant lemonade". Sour! Formic acid, the sour stuff in ants, is the strongest organic acid. Usually this drink is sweetened with sugar bag honey, produced by the local stingless bees.

I attempted to enlighten my Aboriginal hosts by telling them how, as a young boy, I and my father had accompanied a friend in gathering wild honey in the Pacific Northwest. We arrived with a jar containing a small portion of dilute honey at an area known to contain wild beehives . We would catch a wild bee and put it into the jar. It would drink its fill of the honey solution and then fly in a "bee line" towards its hive. After doing this in several locations we were able to triangulate exactly to the location of the hive. The Aboriginals smiled indulgently at me and then told me how they had been finding wild honey for the last 40,000 years. "You catch a wild bee and then use a tiny bit of bees wax to fasten a small feather on the bee's hind end. Then you feed the bee a little bit of honey and let him go. The feather slows him down so you can just walk along and follow him to his hive." I've got to try that when I get home.

Near the spring there were several pandanus trees. Pandanus is common throughout the Pacific from Hawaii south. We were instructed to break off a sector from one of the fruits which had fallen and eat the tender sweet morsels from the tip. Delicious! The tiny bit of edible material tasted like pumpkin pie. The remainder was hard and fibrous. Jillian, a retired nurse, handed me a pandanus fruit and said "Smell this." I did and said to her "I won't tell you what it smells like if you don't tell me what you think it is." After we came home from Australia I told our son, the biochemist, about the peculiar aroma of pandanus fruit. He said the aroma came from either spermene or spermidene, a couple of aromatic organic chemicals which are present in both the animal and plant kingdoms. I also remember this aroma emanating from shrubs near our home in Palo Alto.

Our camp for the night was an open spot surrounded by rolling hills. In the middle of camp there was a campfire fueled with cypress pine, an incredibly resinous, fragrant wood, unrelated to pine or cypress but something unique to Australia. As the sun headed for the horizon Graham told us that the Aboriginals tell their children "When you see the sun in the crotch of the trees it's time to come home." As near to the equator as we are there is very little twilight. The sun plunges below the horizon very quickly, unlike an Alaskan summer where the sun takes for ever to set. After dinner the two Paddies put their swags on the ground half way between the camp fire and the bus. A swag is a heavy waterproof canvas contraption you put your bedding into in the Australian outback. It is waterproof and can sport an internal foam pad for the delicate of back.

Liking my privacy I carried my swag about 30 yards away on the opposite side of the campfire. I was getting settled there when Biddy came over to me and said ""Old Fellah, you go sleep with the

boys." I had received my "nom de camp". From then on I was "Old Fellah". These people don't seem to use names the way we do. I would guess that Paddy, Paddy, Lucy and Biddy were the names that the outside world knew but they also had more personal names among their own tribe. Margaret, very diminutive, was called "Shorty". Graham said that the year before there was a visitor who was post-polio. She became "The Crippled Lady". Not meant as a pejorative, just a unique feature. Furthermore, if someone named Sam died then everyone else named Sam in that community would change their names. . . .

"If you are interested in reading the full account of Dick Baugh's Australian adventure and looking at some of the photos, then join the Society of Primitive Technology and read the SPT Bulletin #23 - Spring 2002 for the rest of the story. Support the Society of Primitive Technology and receive the bi-annual SPT Bulletin magazine. Call (208) 359-2400 or email Dave Wescott at dwescott@aol.com. Also visit the Society of Primitive Technology website at http//:www.primitive.org to become a member."

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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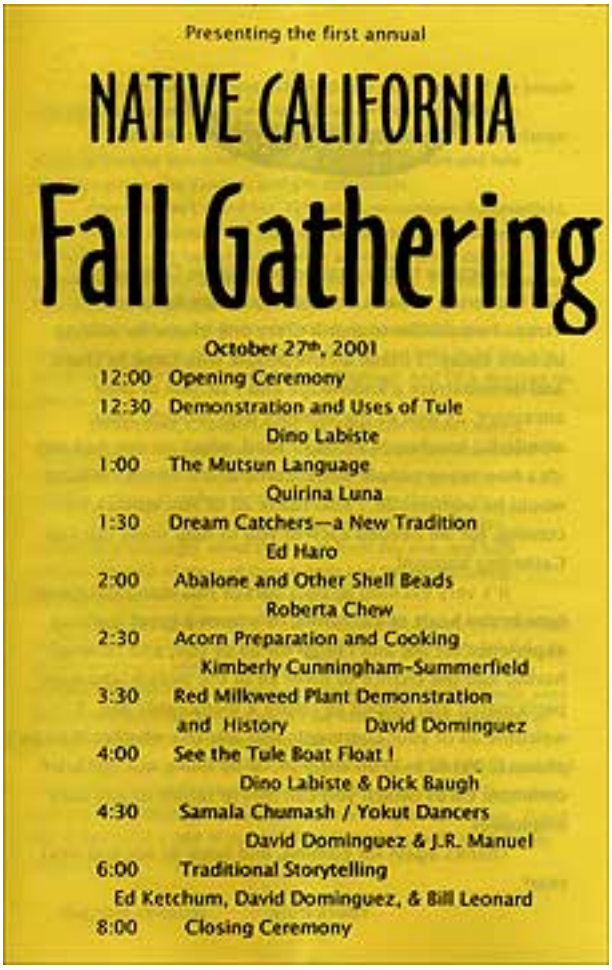
Native California Fall Gathering

at San Luis Reservoir State Recreation Area

On October 27, 2001, Dino Labiste and Dick Baugh were invited by Interpretive Specialist, Jennifer Morgan, to participate in the First Annual Native California Fall Gathering at San Luis Reservoir State Recreation Area . We were to demonstrate the many uses of Tule and construct two tule boats (also called tule balsas) made out of the versatile and buoyant reeds.

On Friday, the day before the event, Dino and Dick, along with Kimberly and Ben Cunningham-Summerfield, demonstrated to 115 school children from Los Banos and Gustine the native skills of the California Indians that lived in the Valley centuries before the kids were born. Dino and Dick taught the children how to make little tule boats. Kimberly, who is on the Indian cultural staff at Yosemite National Park, demonstrated the preparation of acorns, from the grinding process through cooking.

On Saturday, the day of the event, two single-person tule boats were built. At 4 pm, the tule boats were put into the water as Dino and Dick paddled around the San Luis Forebay.



The Fall Gathering itinerary of events.

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Native California Fall Gathering

at San Luis Reservoir State Recreation Area

Dick is roping one bundle of tules.

Dino is holding up two roped bundles of tule.
The two bundles will be roped together to form one tule boat.

Dick is forming the upward curve on the prow of the tule boat.

The two completed tule boats. All that needs to be done is to trim the ends.

Continued

Native California Fall Gathering
at San Luis Reservior State Recreation Area

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Native California Fall Gathering

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Dick and Dino taking the tule boats on their maiden voyage.

Dino is paddling one of the tule boats on the San Luis Forebay.

Everyone wanted to try out the tule boats.

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Kimberly and Ben Cunningham-Summerfield demonstrated the preparation of acorns, from the grinding process through cooking with a basket and hot rocks.

Kimberly is leaching the tannins from the acorn meal with water. Under the cloth is a depression of sand.

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The soaproot brush was not only used to brush the acorn meal in the stone mortar, but other soaproot brushes were made into hair brushes. Dick is holding one of the soaproot brushes.
Kimberly demonstrated the use of the soaproot hair brush.

Everyone got a chance to try out the soaproot hair brush.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com or to "Richard A. Baugh" at dick_baugh@compuserve.com

Native California Fall Gathering
at San Luis Reservior State Recreation Area

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Australian Aborigine Flint Knapping

by Dick Baugh (December 11, 1999)

"I Belong to This Country"

It began with a single motor plane ride to an Aboriginal community in the northeastern corner of Western Australia to an Aboriginal University class. Biddie said "I belong to this country." Interesting contrast to white/European outlook "This land belongs to me!" "Old Fellah! You come with us girls. We're going to show you some bush tucker. How does it feel to be treated like a

child? Don't leave camp without one of us.

As part of Marcia's and my visit to Australia I enrolled in an "Aboriginal Bush University" hosted by the Ngarinyan tribe of northern Western Australia. After a 1 hour ride in a small single engine plane we landed in the Kimberly district of Western Australia. The land consisted of rolling hills, mostly small trees with fire blackened trunks. Here the Aboriginals practice 'firestick farming'. Annually they burn off all the grass and underbrush. This encourages the growth of plants which game animals like. It also means there are NEVER any big destructive fires. This is savannah land and in early September it is the end of the 'dry', the six month period of absolutely no rain. This will be followed by the 'wet', six months of almost constant rainfall.

During this adventure we (two Australians of European decent, myself and two Aboriginal elders (Paddy N. and Paddy W.) took off early in the morning in a Landcruiser to find an old campsite that Paddy N. remembered from long ago. I was almost immediately disoriented. To my eyes this land is literally featureless. All the trees look the same. There are no trails or roads. The first instructions the Aboriginals gave us was "Don't leave camp without one of us to accompany you." "Yeah, yeah," I thought to myself. I'm an outdoor survival expert. Don't treat me like a child. After a few hours of roaming even our Aboriginal guides admit they are lost. I was living every primitive living skills aficionado's dream: Getting lost in the Australian outback with two Aboriginal elders. There was plenty of water and earlier Jeff, the Landcruiser driver had bagged two bush turkeys. We parked the Landcruiser at the bottom of a hill with the intention of climbing to the top to look for landmarks.

A little way from the top I realized that this was no ordinary hill. On the ground there were unusual looking tooth-shaped quartz crystallites. Most of them were about an inch long but a few were maybe 5 times larger. Also strewn on the ground were spalls of reddish chert. This is/was an Aboriginal knapping site where stone tools and weapons were fashioned. I picked up one of the larger spalls and asked Paddy N. if he knew how to make stone spear points. "Oh yes, but I really

don't have the proper tools here." He then proceeded to knap out a small spear point using only an ill-shaped chunk of granite as a hammerstone. He used all the techniques one would see at a contemporary American knap-in: abrading and removal of small flakes to prepare a striking platform, shifting of the margin closer to the surface from which the flake is to be removed and profound apologies because he didn't have a piece of wire with which to do the final pressure flaking.

After this little diversion we got out the contour map and looked around. Paddy N. said "We're right here." and he pointed to a spot on the map. Not to be outdone, Jeff pulled out his GPS receiver, turned it on and set it on a flat rock. Five minutes later the GPS receiver confirmed Paddy's navigation skills. "Of course I know where I am. I'm an Aborigine."

On the way back to camp we stopped at a river to refresh ourselves. Jeff said that all the water you find in this part of the Kimberlys is good to drink without need for purification.

Yes, we did find our way back to camp.

People ask me where the spear point is that Paddy made. I don't know. I didn't take anything away from that hill except photos. Those spalls and crystallites belonged on that hill the same way that Paddy N. and Paddy W. belonged there.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Primitive Field Day at Stanford University

Brain tanned hides and furs

Obsidian knapping

Fire-by-friction

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The Shade Tree Knife Mechanic

by Dick Baugh (May 23, 2000)

The shade tree auto mechanic was a good ol' boy with a box full of old tools who rejuvenated beat up cars with a minimum of fuss. I'm trying to take the same approach to knife making. I'd like to tell you how to transform a piece of appropriately chosen scrap steel into an excellent cutting tool without using a lot of expensive power tools. Even if you never use this information to make your own knife, I hope that it will give you a greater awareness of what constitutes a good knife.

Staying Sharp

The ability of a knife to maintain a sharp edge after extensive use is a very valuable characteristic. I grit my teeth when I read or hear "Don't make the steel too hard because then it will be difficult to sharpen." What nonsense! Yes, there is a tradeoff between edge holding ability (hardness) and toughness but once you use a knife which stays sharp you will never want to use anything else."

There are two principal mechanisms which cause a knife to become dull, mechanical abrasion and chemical etching. Mechanical abrasion is the main dulling mechanism in carving dry wood. Both mechanical abrasion and chemical etching are important in meat cutting and shaving. Stainless steel razor blades last longer than the old plain carbon steel ones because they are more resistant to attack by the chemicals in the shaving cream.

Edge holding is also intimately connected with the hardness of the blade. Hardness, defined as resistance to penetration, is a measurable quantity. One qualitative measure of hardness is the Rockwell C scale, based on an instrument which presses a diamond stylus with a specific force into the material being tested. The size of the indentation indicates the hardness. Cheap knives and most stainless steel knives have a hardness value of RC 56 to 58. better knives, such as the laminated Swedish Mora blades have a hardness of Rc 58 to 60. Many Japanese woodworking tools have edges with hardness of RC 62 to 64. The difference between edge holding properties of Rc 56 and Rc 62 is ENORMOUS. I try to temper blades to Rc 62. Yes, the steel is more brittle than if it were softer but remember this is a knife, not a pry bar. One consequence of increased edge hardness is that it takes longer to sharpen. With blades of very hard steel you should avoid using 'Crock Stick' or other cylindrical sharpening devices. Excessive pressure on a cylindrical sharpening stone with

break out a series of little tiny chips from the cutting edge. Use flat whetstones instead.
Raw Materials

Most of my experience has been with plain carbon steel, type 1095, .05 inch thick. The reasons for using 1095, in no particular order, are:
a. That's what I have available from making Bowscraper blades.
b. It is relatively inexpensive.
c. It is easy to heat treat.
d. It has excellent edge holding properties for wood carving.

1095 can be obtained from Precision Steel Warehouse (http://www.precisionsteel.com) (1-800-323-0740) or Admiral Steel (http://www.admiralsteel.com). Worn out files are another source of high carbon steel similar to 1095. 1095 steel consists predominantly of iron atoms with approximately 0.95 % carbon by weight. Since carbon atoms are lighter than iron atoms (ratio 12/56) 4.5 % of the atoms are carbon and 95.5 % are iron. Another way of looking at it: Every 23'd atom is carbon. An additional small amount of manganese is added to make the steel easier to harden.

Another type of steel, readily available in old saw blades, is L6. Look for an old crosscut saw (misery whip) or Sawzall blades. This is a high carbon steel with some nickel added. The heat treatment procedure for L6 is similar to that for 1095. L6 is slightly less hard and more tough than 1095 for a given heat treating cycle.

One can also buy knife steel from mail order houses that specialize in knife making supplies.
The shade tree knife mechanic should avoid using high-speed steel saw blades or fancy alloys for knife construction. The procedure for heat treating high-speed steel and higher alloy knife steels is much more complicated, involving very high temperatures, exact temperature control and reducing atmospheres to protect the blade from oxidation. That isn't shade tree any more.

Blade design
The knives I make have fairly short blades. This is because of the experience I had with a laminated Mora knife with a 3 3/4 inch blade, a gift from my late mother in law. It had excellent edge holding properties but the parts of the blade that needed sharpening most frequently were the first 2 inches of the blade and the tip. The middle part of the blade never got dull. From this I concluded that I rarely used the middle portion of the blade so why not eliminate it? Make the blade no more than 3 inches long. I use a tapered tang that fits snugly into a slot in the handle.

Cutting out the blade
Wear safety glasses dammit! It seems to work best when I make the handle first. This is particularly important when making one-of-a- kind handles from antler. After finishing the handle, including the slot for the tang I make a cardboard template of the proposed blade shape to see how it looks in the handle. Next I use an indelible marking pen to transfer the blade shape to the steel. A vice to hold the steel and a hand-held hacksaw can be used to cut out the blade if the steel is in the soft annealed state. Now I use the power jigsaw with a high speed blade to cut the blade to shape. I

use the highest speed setting on the saw and stop frequently to lubricate the blade with paraffin wax to keep it from overheating. Some touch-up work with a fine file is always needed to make the back of the blade nice and smooth.

When you are deciding on the blade thickness you are going to use remember that the amount of metal that must be removed is proportional to the length of the blade times the square of the thickness. If you want a blade that is twice as thick then you have to create a pile of metal filings which is 4 times bigger. This why I like making small knives.

Another technique is used for cutting up old annealed crosscut saw blades. 'Hot sawing' involves using a dull power jigsaw blade, no lubricant, high speed and lots of pressure. Do it at your own risk! After everything heats up and the sparks fly it will cut very quickly but not give a super smooth edge. The freshly cut edge of the blade will actually be hardened by the transient heating that accompanies the cutting. Hard steel is the sort of thing that ruins files. Consequently you will need to remove the thin hardened layer with a grinder before you do any filing.

Setup for filing the bevel

Ergonomics! If you had infinite patience and dexterity you could hold the knife blank in one hand and the file in the other while you shaped the blade. That would probably be the last knife you ever made. Good ergonomics requires clamping the knife blank at waist height so that you can apply your body weight and muscle power to the file in order to make the bevel quickly, accurately and neatly. Use both hands and apply a very great pressure to the file. I also don't like getting steel filings all over my workbench. Consequently I fasten a 2by4 to the workbench which extends out about 12 inches. I then clamp the knife blade to the 2by4 and the filings fall onto the floor.

Filing the bevel

In order to get the job done as quickly as possible use three different files. Start with a very coarse file. Try to keep a constant bevel angle over the entire edge. An included angle of 30 degrees is adequate. How do you tell 30 degrees from a handsaw? Easy. That is a 15 degree bevel on each side of the edge. A 15 degree bevel means the length of the bevel is approximately twice the thickness of the blade. over for and up 1. Do 90 % of the work with the very coarse file and finish with the medium and fine files. Keeping a constant bevel angle will pay dividends when it comes time to put a razor-sharp edge on the blade.

About steel and heat treating

This is a description of the way I heat treat 1095 carbon steel knife blades. My personal objective is to make a small knife with exceptional edge-holding properties instead of something that can be used as a crowbar. Consequently the steel near the edge is kept in a very hard state.

Light Weight Theory:
Iron atoms have a simple crystal structure. When you add carbon atoms to an iron crystal lattice the equilibrium position for the carbon atoms is in big holes in the lattice. When the carbon atoms are in the big holes, the annealed state, the properties of the iron + carbon alloy (commonly called steel) is only slightly different from the properties with no carbon. You hardly know the carbon atoms are there at all. The magic happens when you heat the steel lattice above a critical temperature (medium red heat or about 1475 degrees Fahrenheit) and then cool it quickly. Then the carbon atoms get stuck in places where they normally wouldn't fit, a non-equilibrium condition.

The crystal lattice expands slightly because the carbon atoms have pushed the iron atoms farther apart and becomes very, very much harder. The tensile strength and hardness are vastly increased.

The down side of all this is that the steel becomes very brittle. A major for this reason is thermal stress. Unless every part of the steel goes through the exact same cooling cycle there will be parts of the steel where most of the carbon atoms are pushing the iron atoms apart and regions where a smaller fraction of the carbon atoms are distorting the iron lattice. This sets up severe mechanical stress in the steel which may cause it to spontaneously crack.
As quenched the steel is probably harder and more brittle than you want. The hardened steel can be made less brittle and thermal stress relieved, tempered, by heating it to a specific temperature for a specific amount of time. Tempering is always a compromise between hardness and stress relief.

Remember, no carbon = no hardening. You cant heat treat a nail.

Heat sources
I have used three different heat sources. The first was my Weber barbecue + charcoal briquettes. I did it in the late afternoon so I could see the medium red hot color in the steel. Light up a medium size pile of briquettes, fan them to get them glowing and plunge the steel into the mass. When the steel is medium red quench it. The advantages of the Weber are that you can do large pieces, there is very little danger of overheating the blade and it provides a reducing atmosphere so there is little chance of de-carburizing the blade.

The next furnace I made, good only for small things like carving knives, was a muffle furnace heated by my Bernzomatic torch. Poke a hole in the bottom of a tin can which will accommodate the broad Bernzomatic burner head. Fill the tin can with damp dirt and then jam a 1 inch by 2 inch stick into it to
provide the furnace cavity. Pull the stick out and let the dirt dry. Light the torch and play the flame through the hole. Wait until your furnace gets hot before you put in the blade. Simple but effective.

For the two abovementioned methods do the heating in a dimly lit location so you can tell when the blade has a medium red glow. This is a fairly good indication that the correct temperature has been reached.

I also have an electric furnace with a thermocouple thermometer. This gives much better control than the other two methods but may not be as readily available.

Heat treating a blade

The blade should have as smooth a finish as you want at this stage. Remember, once it is hardened you won't be able to shape it with a file. All you'll do is ruin the file.

Have some way of holding the blade which will allow it to go from the furnace to the quenching oil. On some knives I wrap a piece of heavy wire around the tang and use that as a handle. Otherwise I use a pair of farrier's tongs. Make sure your heat source is big enough so that the entire blade is uniformly heated to the same medium red color.

a. Bring the entire blade to medium red heat (1475 deg. F). Don't leave it in the furnace any longer than necessary and to prevent grain growth don't get the steel hotter than necessary .

b. Plunge the blade edge first into the quenching bath. Keep the blade vertical. If one side of the blade cools faster than the other then the blade will warp. I use a quart of 30 weight motor oil poured into an old bread pan. Motor oil is cheap but it stinks. David Boye's book says he used olive oil at one time. Water quenches the blade more quickly than oil and gives a greater risk of warpage or cracking.

Were you successful? If you didn't get the steel hot enough before quenching it will not be hardened. Try to scratch the blade with a file. If you can scratch it then the blade didn't get hot enough. Sometimes the thermal stress created by quenching is so severe that the blade will spontaneously crack. Consequently the next step, tempering, should be done very soon after the blade has been quenched and hardened.

c. Temper the blade to get the desired hardness: in a kitchen oven at 400 deg F for about 20 minutes. The goal is Rockwell C-62.
Warning: If you put the knife blade in your wife's oven without thoroughly washing the 30 weight motor oil off you will be in BIG trouble.

Many books give a slightly different recipe for tempering carbon steel. The procedure they follow to temper a quenched and hardened blade is:
1. Polish the hardened blade with emery cloth so you see shiny metal.
2. Heat the blade slowly until you see a colored oxide form on the surface of the blade. When the color is just right plunge the blade into water. (light straw color for a knife to deep blue for a screw driver.) That's the way it was done by the village blacksmith. Welcome to the 20'th century. I don't think oxide colors are as accurate as a thermostatically controlled kitchen oven.

Differential Tempering
A differentially tempered blade has a cutting edge which is harder than the remainder of the blade. This is something I didn't do in the earliest knives I made. I do it now because it looks good but I don't know if the knife is stronger because of it. If you don't want differential tempering then skip steps c. and d.

c. Polish the blade with emery cloth so it looks like shiny metal. This is so you can see the oxide colors form on the back as you heat it up the draw some of the temper on the back of the blade.

d. Draw more temper from the back of the blade: Hold the blade in a clamp with the cutting edge in contact with a damp pad of paper towel or rag. With a Bernzomatic torch set to put out a pencil flame, play the torch on the back of the blade until a blue oxide layer forms. Ideally you should have the entire blade blue except for the edge.

This is easy to screw up. If you don't do a good job of keeping the blade edge cool with the damp

rag and the blue oxide forms on the cutting edge then there will be a soft spot which will not stay sharp. Practice your heat treating and tempering techniques on scraps until you are confident. Buena suerte.

Japanese swords are hardened and differentially tempered in one process. The un-tempered blade is coated with clay except for the cutting edge. The sword is then heated red hot and plunged into water. The clay layer slows down the cooling rate on the body of the sword and prevents it from becoming fully hard. The cutting edge, exposed directly to the water, cools very quickly and becomes very hard. I think this would take a lot of skill.

Un-heat treatment
What if you are starting with old cross cut saw blades or files which are already hard? Do yourself a favor and anneal the steel before trying to shape it. Heat it up to red heat and let it cool very slowly (hours).

The handle
There are several options for handle materials and ways of fastening the blade to the handle. I will describe what I have been doing lately. If you want other options then consult David Boye's book. I have been making handles from osage orange, yew, iron bark eucalyptus, and manzanita wood but my favorite material is reindeer antler.

Shrinkage is the biggest danger with wooden handles. If you epoxy the blade into a piece of wood with some residual moisture then the wood is liable to crack as moisture evaporates and the wood shrinks. The way to avoid this is to thoroughly dry the wood handle before mounting the blade. Leave the handle in your car for a week or so during the summer or put it in the oven set at the lowest possible temperature (150 degrees) for a few hours.

Antler seems to be dimensionally stable and not need this sort of treatment.

The blades I make have a V shaped tang which fits into a slot in the handle. In order to make the slot I first drill a 3/16 inch hole in the handle the length of the tang. Next I form the slot with my 'float'. This tool cuts a slot which is exactly the width of the tang. It is best to clamp the handle in a vice so that both hand can hold the tool for power and control.

Once the slot has been cut then you can shape the handle. I cut the slot before shaping the handle because if you accidentally get the slot off center you can shape the handle to bring it back to the center. It is also easier to hold the wood in a vice if it has parallel sides. If you shape the handle first and then cut the slot it will look bad if it isn't exactly in the middle.

I attach the blade to the handle with 30 minute epoxy.

Knives which were made using these techniques can be viewed in the PrimitiveWays Trading Post.

Tool Set

All of the operations in knife making can be done with hand tools but I am the impatient type. The power tools I use are a Bosch power jigsaw and a 1950 vintage Shopsmith which I inherited from my Dad. I use the jigsaw for cutting out the blade from annealed 1095 stock and cutting out the hardwood for the handle. The Shopsmith is set up as a horizontal drill press for drilling the hole in the handle. This insures that the hole is parallel to the sides of the handle. If you have either a good eye or low standards you can use a vice and a hand-held drill. I also use the Shopsmith's disk sander attachment for shaping the blades and handles.

Beveling the edge can either be done with a set of files or with a grinder. 'Real' knife makers use a specially constructed dual belt sander for this job. A special hand tool is used for making the slot in the handle which receives the tang of the blade. I think the traditional name for this tool is a 'float'. The float consists of a short section of saw blade mounted in a wooden handle. The thickness of the saw blade is selected to form a slot the same thickness as the knife tang. The tip of the float is ground narrow so it fits in the hole. The float is mounted so it cuts on the pull stroke. One can also make the float from the same material the blade is made from.

The following table may seem obvious but it lists various materials and the tools which can be used to shape the

|<---------- Tool---------->|

	File	Hacksaw	Power grinder	Whetstone
Material				
Annealed steel	OK	OK	OK	Why bother
Crosscut saw	OK	OK	OK	OK
Sawzall blade	NO	NO	YES	YES
"Annealed"	OK	OK	OK	OK
Hardened steel	NO	NO	YES	YES

*** David Boye's book, "Step-by-Step Knifemaking", ISBN O-87857-181-7 is an excellent

reference.

E-mail your comments to "Richard A. Baugh" at dick_baugh@compuserve.com

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Folding Pocket Saw

by Bob Gillis

Folded Saw uses Jig Saw Blade and Pop Rivet with washers.

Cut the handle. Saw a slot for the blade (note: slot does not go through the back of the handle). Pop Rivet the blade on. It is that simple.

Close-up of riveted area.

E-mail your comments to " Bob Gillis" at shelter@best.com

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Johnstone Tools

by Bob Gillis

Who could imagine using a toilet to fashion primitive tools.

Start by breaking an old toilet.

Knap the pieces to create a Johnstone blade.

E-mail your comments to "Bob Gillis" at shelter@best.com

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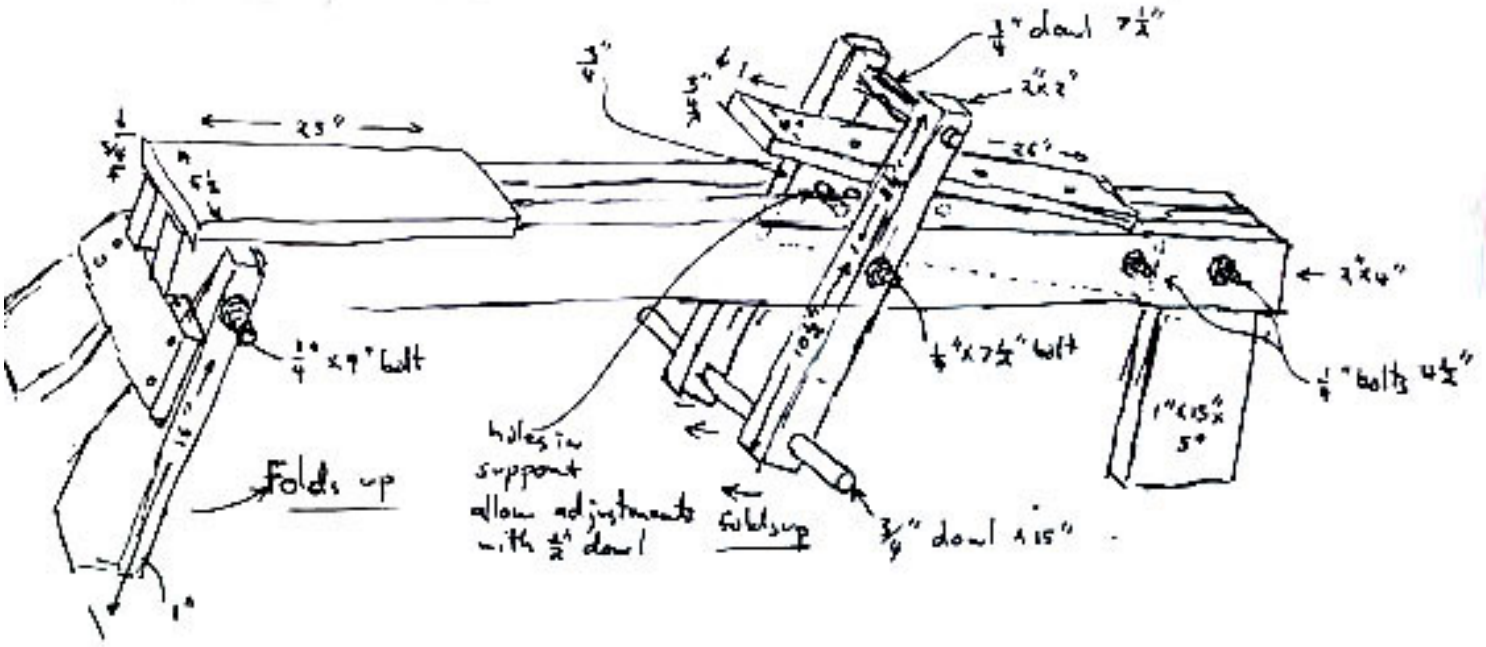
Portable Shaving Horse

by Bob Gillis

Foldable shaving horse made of 2 x 4's and scrap wood.



The length of the 2 x 4's is 72", the seat is 24", legs are 15", pivot 19, from the center pivot to top clamp is 8", from center pivot to foot rod is 11", and the clamp board is 26".

Lag bolts are used to join it together and allow it to fold for storage or to carry.

Shaving block is adjustable by moving dowel to other holes.

E-mail your comments to "Bob Gillis" at shelter@best.com

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Urban Resources

by Dino Labiste and Bob Gillis

For those of us who desire to learn and practice primitive skills, but live in an urban environment, sometimes finding materials can be a problem. Projects that require natural resources are sometimes difficult to find, especially if the wilderness is many miles from the city. Listed below are urban resources that can be substituted for wilderness resources. The idea is to learn the skills. The real materials will appear as you pursue your interests. Teachers, instructors, and students will find the list helpful in seeking creative alternatives to obtaining the needed materials for their primitive technology classes and projects.

1. Cordage material:

a) Human hair or animal pet hair for cordage material.

b) Cordage material from plastic grocery bags.

2. Bones from the butcher shop or dried and cleaned bones from the pet food store.

3. For making an excellent substitute for home-made hide glue or commercial hide glue, use Knox Unflavored Gelatine and a small amount of water. Hide glue is basically a protein called collagen, which forms connective tissues in animals. Collagen holds tissues together in animals, including people. Knox Unflavored Gelatine is made from cattle bone chips and pork skin.






4. Old bottles, mirrors, or thick, glass window panes for knapping.

5. Cedar shingles from the lumberyard for your fire-by-friction hearthboard.

6. Dog chews for rawhide and rawhide lacing called babiche. First soak in water to soften, then unfold.
Dog chews can be purchased from the pet food store

7. Beef heel tendon from an Asian meat market for sinew.

8. From your yard and garden:

a) Ornamental plants like New Zealand flax for fiber and cordage material.

Apple shoots from pruning.

b) Saplings from various trees and shrubs for arrows and atlatl darts.

c) Bamboo garden stakes for atlatl darts.

9. Scrap wood from the dump.

a) Foldable shaving horse made out of discarded 2 x 4's and scrap wood.

10. Old non-belted tires:

a) Construct sandals from the tires.

11. Wooden dowels from the hardware store for arrow shafts (check the spine for your appropriate bow weight). Feathers for fletching from a crafts store. Empty bullet shells for arrow blunts. Cardboard tubing for the quiver.

12. PVC pipes:

a) Large PVC pipes for hide scraping logs.

b) Small PVC pipes for didjeridoos (Australian musical instrument).

13. Scrap cardboard:



a) Make cardboard sandals

14. Park your car in the sun and use it as a dehydrator or drying kiln. Dry fruit, vegetables, seaweed, or strips of meat inside the heat of your vehicle. You'll avoid flies and other insects from feasting on your food. Also, you can dry bow staves in your car. Be careful of leaving the staves inside too long to avoid over drying the wood.

15. Duct tape for fletching atlatl darts or arrows.

16. Create knapped blades using an old toilet.

17. More urban resources in Chuck Kritzon's Supplies for the Urban Abo.

Other Uses for Urban Trash
(one person's trash is another person's resource)

1. Plastic pieces from plastic trash cans:


a) Create fenders for your bicycle.

2. Soda cans and coffee cans for lanterns, eating containers, cooking pots, or stoves.


Soda can cooking stove. Clothes hanger wire was used for the pot stand.

3. Plastic trash bags:

a) Cut a hole on the bottom, then wear it as rain gear.

b) When melted, it makes a good adhesive (example: Stuff shredded trash bags into the ferrule of a metal shovel, melt the trash bag with a flame, then insert the wooden handle into the ferrule.).

4. "I have frequently used two soda cans with the tops cut off as an oven. I use the bottom 3/4 of both cans put together to make the oven. Just put in some jerky, a potato sliced into quarters, and a carrot sliced into quarters and in half. Then add a dab of butter and roast in the coals. It makes a great meal in a can. This started when I was camping and wanted to bake a potato, but did not have any tin foil. So, we improvised and have been using the can method many times. It is far superior to foil cooking. I also frequently dry extra corn on the cob and remove the kernels after they are cooked and dried. The dried corn are great to eat dry and taste good in the "canned stew" with jerky.
I have cooked fresh trout in the soda can oven. The fish is cut in half and stuffed into two seperate can ovens. If put together tightly, it will hold in all the steam and cook faster and better. Unfortunately, nowadays you can find the soda cans all over the mountains and desert in times of need."
Idea submitted by Mark Munds

What are your urban resources and its uses?
Send us your suggestions and we'll add it to the list. Inquire about how to send photo files.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com or "Bob Gillis" at shelter@best.com

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Supplies for the Urban Abo

by Chuck Kritzon

For those of us who desire to learn and practice primitive skills, but live in an urban environment, sometimes finding materials can be a problem. Eight years of facing this problem has led to seeking creative alternatives to obtaining these materials. The idea is to learn the skills. The real materials will appear as you pursue your interests. Below I share what I have found.

WHAT ARE WE LOOKING FOR?

PLANT MATERIALS:
Wood, sticks, leaves, bark, seeds, fiber, nuts, vines, moss, bamboo, sap, fungus, gourds, corn husks, galls, reeds, seaweed.
For: Fire making, light, heat, cordage, food, medicine, weapons, shafts, containers, basketry, shelter, soap, poison, glue, clothing, toys, pigments, dyes, abrasives, musical instruments, clothing, footwear.

LITHIC / MINERAL MATERIALS:
Flint, obsidian, cobbles, pebbles, slate, sandstone, concrete, pigments, soapstone, lava, asphaltum (tar), ceramics, glass, salt.
For: Knapping, grinding, sanding, pecking, cutting, drilling, engraving, straitening, painting, cooking, sealing, gluing, cooking, heating, weights, charmstones.

ANIMAL MATERIALS:
Bone, horn, antler, hoof, shell, teeth, claws, sinew, tendon, hide, fur, hair, quills, feathers, meat, brains, wool, fat, oil, blood, quills, intestines, eyes, bladders, stomachs, dung.
For: Tools, ornaments, tanning, clothing, footwear, containers, cordage, binding, food, medicine, abrasives, musical instruments, light, pitch.

INSECT MATERIALS:

Bodies, cocoons, larvae, excrement, nests, pollen.
For: Dyes, food, fiber, musical instruments, wax.

FOOD MATERIALS:
Meats, seeds, nuts, roots, corms, fruits, berries, pollens, bark, greens, bark, insects, sugars.
For: Food.

HEAT SOURCES:
BBQ, hibachi, kitchen stoves and ovens, hot plates, candles, fondue pots, molchahete.
For: heating, melting, straightening, gluing, cooking.

ADHESIVE MATERIALS / SEALANTS:
Hide glue (gelatin), asphaltum (tar), pine sap (pitch), beeswax, fish eyes, soaproot.

SOURCES

1. **CATALOGS:** See attached list.
2. **INTERNET:** Ebay, Suppliers of all kinds.
3. **NETWORKING - FRIENDS AND RELATIVES:** Materials from different geographic areas.

Here is a list of materials and items I have acquired from friends and networking:
Cedar and birch bark, basswood fiber, coir, braintan buckskin, braintan buffalo hide, whole deerskin rawhide sheets, horse hair, true tinder fungus, pine nuts, dogbane, yucca leaves, shells, deer hides, deer antlers, caribou antlers, horns, misc. lithic materials (flint, chert, obsidian, steatite, alabaster, fossil coral, dinosaur fossils), bamboo, gourds, misc. baskets and basketry materials, points, scrapers, beads, mammoth and fossil walrus ivory, feathers, bird skins, domestic and international pigment material samples, deer bones, skulls and teeth, buffalo bones, bird bones, misc. friction fire materials, basswood fiber, arrows, darts, bow staves, wood fired primitive ceramics (bowls, beads, ornaments), wonderful books, arrow plane, misc. other tools, knives, many, many directions to materials gathering sources, friendship and encouragement to keep learning!

LOOK IN THESE STORES FOR:

1. **Auto parts:** Chamois leather

2. **Glass suppliers:** Broken and scrap plate glass for knapping.
3. **Stained glass:** Hide glue used in glue chipping glass.
4. **Home and garden supplies:** Rocks (sandstone, flint, obsidian, cobbles), bamboo, cedar shingles, split cedar fence posts and fence boards, #4 copper wire for flintknapping tools, diatomaceous earth, hardwood dowels, plants.
5. **Craft stores:** Feathers, leather, shells, beeswax, soapstone, moss, fiber (raffia), reeds, bamboo.
6. **Pet stores:** Rawhide, hooves, shells.
7. **Import stores:** Primitive tools, shells, hand made fiber and crafts.
8. **Spinning and weaving supplies:** Raw unspun fiber, flax, wool, hemp, natural dyes.
9. **Lapidary supplies:** Obsidian, flint, tools.
10. **Ceramic supplies:** Clays, pigments.
11. **Restaurant supplies:** Shells, wooden ware, cochineal dye.
12. **Roofing supplies:** Asphalt \ tar, cedar shake shingles.
13. **Antique shops:** Old tools, horn, antler.

SITES AND LOCATIONS:

1. **Flea markets / Swap meets:** Antler, horn, shell, bone, hides, teeth, antique tools, tanned leather.
2. **Taxidermists:** Mammal / bird hides and parts (bones, feathers, claws, etc.).
3. **Construction / demolition sites:** Trees (bark, roots, sap, leaves, vines, nuts/ cones, needles), concrete, johnstone, roofing tar.
4. **Butchers:** Bone, sinew, brains, intestines, bladders, deer hides and parts.
5. **Animal Control Facilities:** Euthanized animals
6. **Parks and ponds:** Duck and goose feathers, tree trimmings (bark, roots, sap, leaves, vines, nuts/ cones, needles).
7. **Landfills / dumps:** Tree trimmings (bark, roots, sap, leaves, vines, nuts/ cones, needles), concrete.
8. **Arboretum / plant collections:** Exotic and native trimmings, seed, nuts, etc.
9. **City / county maintenance yards:** Tree trimmings (bark, roots, sap, leaves, vines, nuts / cones, needles) concrete, pallets.
10. **Drainage ditches:** Willow, cat tails, tules, reeds, roadkill (collecting roadkill is illegal in many states! Check your local laws before collecting any roadkill!).
11. **Loading docks:** Broken oak pallets
12. **Roads and highways:** Roadkill (collecting roadkill is illegal in many states! Check your local laws before collecting any roadkill!), miscellaneous plant materials (bark, roots, sap, leaves, vines, nuts / cones, needles).

Here is a list of materials I have acquired at flea markets and thrift stores, butchers and gem and mineral shows: 20 square feet of tanned deerskin from an old chair, elk hide capote with leggings and lined with sheepskin, dozens of deer antlers, moose antlers, kangaroo hide, donkey hide, rabbit

skin, beaver teeth, deer bones, emu leg bones and skin, drawshave, handmade cordage in the form of a hammock from Africa, emu eggshell, stone, shell, and bone beads, stone mortar and pestle, seeds, shells, plants, knives, wool blankets, sheepskins, fox hides, tanned cowhide and pigskin in the form of bags, boots, coats, upholstery, rawhide in the form of dog chews, extinct cave bear teeth, amber, porcupine hair, cow skull, horse skull.

EVENTS:

1. **Primitive Skills Gatherings**
2. **Black powder / mountain man gatherings**
3. **Pow wows**
4. **Living history / State Historic Parks**
5. **Gem and Mineral shows**

A few samples of catalogs that supply primitive skills materials:

Moscow Hide and Fur
208-882-0601
www.hideandfur.com
Provide: Antlers, horns, buckskin, leather, feathers, skulls, bones, teeth, claws, beads, taxidermy supplies and more.

Stroudsburg Fur and Leather
570-421-6704
www.furskins.com
Provide: Tanned fur and hides, bones ,skulls, beads, shells, taxidermy supplies.

Lietzau Taxidermy
612-877-7297
No web address.
Furs and hides, Trade era finished bags, books, sweetgrass, booklets, knives, small tools, buttons, clothing, trade silver, claws, teeth, bones, etc.

Karamat Wilderness Ways
403-474-5405
www.karamat.com
Provide: Moose and buffalo hide, bones, skulls. Drums, rattles and supplies. Replicas, baskets, miscellaneous supplies.

Tandy Leather
1-888-890-1611
www.tandyleather.com
Provide: Leather crafting tools and supplies. Rawhide, lacing, beads, hides, dyes.

The Caning Shop
1-800-544-3373
www.caning.com
Provide: supplies for caning, wicker and basketry. Gourds and gourd crafting. Lots of natural materials.

Kestrel Tools
360-468-2103
www.sculpturetools.com/kestrel/
Provide: Fine carving tools for northwest coast carving. Crooked Knives, straight knives, and adzes. Also holds carving classes at their wonderful shop on Lopez Island in the San Juan Islands!

Websites that are good resources:

http://www.nativetech.org/links/crafts.html
The ultimate native american skills and crafts info site.

http://ic.net/~tbailey/Primitive.html
This page offers a long list of links that are worthwhile exploring.

Don't give up! There is a world of materials to learn and practice primitive skills out there. The more you focus and look, the more will come your way! Good hunting!

NOTE: Get permission to collect and gather before obtaining materials from parks, ponds, city / county maintenance yards or private property. Also collecting roadkill is illegal in many states! Check your local laws before collecting any roadkill. Be informed of any laws and regulations in your area before gathering or purchasing supplies.

E-mail your comments to "Chuck Kritzon" at chuckk@petroglyphics.com

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Wilderness & Urban Tips

1. Pure and Natural Insect Repellant - From the kitchen of Barbara Kavanagh
This spray is so pure and good for you that you can spray it freely all over your skin, including your face. You can even safely inhale it.

In an 8 ounce spray bottle mix:
1/2 tsp. peppermint
1 tsp. cedarwood
1 tsp. eucalyptus
2 tsp. citronella
1 1/2 tsp. lemongrass

In a 24 ounce spray bottle mix:
1 tsp. peppermint
2 tsp. cedarwood
2 tsp. eucalyptus
3 tsp. citronella
3 tsp. lemongrass

Filling the remainder of the bottle with Witch Hazel. SHAKE WELL before each use and apply often.

Essential oils can be bought at health food stores. Be sure the bottle says "pure" essential oil, otherwise you are wasting your money and will not get the desired results. Treats in San Andreas, California has the best price in town for Witch Hazel.

2. Keeping Your Fish Moist
To keep your fish catch from drying out while transporting it to your cooking site, wrap the fish in grass and dip the bound bundle in creek water to moisten the fish. Field dress your fish first, if you will be traveling for a long distance. The cordage for tying the bundle was made from braided grass.


3. Gathering Fire-by-Friction Wood

When looking for a spindle or a hearthboard to use for the fire-by-friction method, gather dead wood off of the appropriate plant. The dead wood found on the plant should be completely dry and have some firmness to the structure. Disregard dead wood that is too crumbly or breaks very easily in your hands. Do not use wood that has been lying on the ground for a long time. Decomposing or punky wood do not make suitable spindle or hearthboard materials. Some large, downed dead wood that still has a firm core can still be utilized for a hearthboard. Check to see if the center is still solid and not rotted or soft.

If you are going to use the material immediately, do not gather green wood directly from the plant. Green wood can still be utilized, but only if you thoroughly dry out the moist material or the sap in the cells of the wood. Drying time depends upon the size of the wood, its age when cut (older trees have less sap), season of cutting, and climate. If you have the time, it's best to prepare your spindle and hearthboard by drying out green material.

4. Coyote Brush *(Baccharis pilularis)*


Coyote brush or coyote bush is a common shrub around riparian or creek areas in California. It tends to have a rounded shape and grows up to 8 feet tall. It is covered with small, toothed leaves that remain green year round.

Coyote brush was a useful medicinal plant for the Ohlone people who lived along the Coast Range of central California long ago. The coyote brush is still useful today as a salve for an itchy mosquito bite or the effects of Stringing Nettle. First, chew up several leaves (note: never put any plant in your mouth unless a trained professional has identified it for you and said it is all right to do so). Next, spit the chewed leaves into your hand, form a green poultice and place it on the irritation. The itching is quickly relieved as the astringent properties of the plant dry out the bite or stinging effects.

A leaf poultice for insect bites and cuts was also made from Broadleaf plantain and Narrowleaf plantain.

5. Paul Krebaum, a chemist at Molex Inc. added a dash of soap to hydrogen peroxide and baking soda, and developed the first home remedy for skunk spray.

How do you get rid of the smell that comes from two tiny but ingenious glands at the business end of a skunk? A garden hose is impotent, soap is utterly useless, and tomato juice is a quaint old wives' tale that has left many people with skunk-sprayed dogs that not only stink, but are pink.
Krebaum came up with a formula that neutralized the foul smelling thiols in skunk spray. His formula was 1 quart of 3 percent hydrogen peroxide, which costs about $2 at a drugstore, 1/4 cup of baking soda, and 1 teaspoon of liquid soap, which breaks up the oils in skunk spray and allows the other ingredients in the solution to do their stuff. The solution, after applying, should be rinsed off your pet with tap water. It works!

6. Carving with Green Wood.

Keeping a carving of green wood covered in plastic between carving sessions will prevent rapid drying and changes in stress. Splitting as the result of drying always starts from the outside of a log as the sapwood shrinks more than the heartwood. If you cannot work on your roughed out wood for a long period of time, submerge the carving in a bucket of water and add some bleach. The outer surface color will darken over time, but it can be removed with additional carving and sanding. The wood will still have it's natural color under the surface. It will be odor free and with no cracks. When you're finished with your carving, apply a coating of Saffola (pure safflower oil) or mineral oil.

If you have the time, it's best to seal the ends of the log and let it dry naturally until the wood has stabilized. This may take months to a year, depending on the type of wood and the climate.

7. Aging clay

The 12th and 13th century Japanese potters used a clay mixture of equal amounts of clay and volcanic ash. To age the clay, they placed a bit of yam peels wrapped in rags and added it to the mixture to assist in the aging process. It started bacterial growth that melted the ash and clay. The clay was aged for several months before use.

8. Fire Starting Tinder


Create your own fire starting tinder with petroleum jelly, cotton balls (100% cotton), and an empty film canister. Saturate the individual cotton balls in petroleum jelly. Then store the cotton balls in the film canister. That's all there is to it. Whenever you need a reliable tinder to ignite your campfire, take out one of the cotton balls, fuzz up the edge by pulling on the loose cotton fibers, and light it with a match. The cotton ball will burn for a long time, enabling your twigs and logs to catch on fire.

What are your wilderness or urban tips?
Send us your suggestions and we'll add it to the list. Inquire about how to send photo files.

E-mail your comments to "Dino Labiste" at dlabiste@yahoo.com

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Fire by Chemical Reaction

by Bob Gillis and Dino Labiste

Although this fire making technique is not primitive technology, it is worth mentioning in terms of survival skills. Fire can be produce by chemical reaction using potassium permanganate mixed with antifreeze from a car radiator or glycerin. Potassium permanganate used to be found in first aid kits and was utilized as a mild antiseptic. Adding a few drops of antifreeze or glycerin to potassium permanganate will cause the mixture to instantaneously burst into flames.
CAUTION: If the chemical reaction is not successful, do not neglect the mixture because it may start to burn. Always dispose of any unsuccessful attempts by burying the mixture with sand and dirt, then pouring water on the spot. Bury any flammable materials that have been in contact with the chemicals. Also pour water on the buried materials.

Mixing potassium permanganate with antifreeze from an automobile radiator:


Mixing potassium permanganate with glycerin:

E-mail your comments to "Bob Gillis" at shelter@best.com or "Dino Labiste" at dlabiste@yahoo.com

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The Info Super Highway Refugee

lyrics by Norm Kidder

Just sitting at his console
with his belly on his knees
The chair had special cutouts
for the poohs and for the pees
He hadn't been outside or
bathed since 1993
The technobody info super highway
refugee.

If he should get hungry
he would fax his favorite store
And 30 minutes later
they'd deliver to his door
He'd eat a jumbo pizza
made with seven kinds of cheese
And never think about the
fat or counting calories
When he was feeling lonely
and had needs, to be a man,
He'd surf the web for porn and
then just give himself a hand
It's better than relation-
ships that have no guarantees

For technobody info super highway
fantasies.

He did his work by e-mail
for a boss he'd never see
Programming linux, unix,
java was his specialty,
The folks he met in chat rooms
thought he was a prodigy
Another faceless member
of the dot-community,
Then one day he saw an ur-
gent e-mail on his screen
The dot-com boom had busted
not to be as it had been
The profits made by those on
top seemed really quite obscene
To a technobody info super highway
refugee.

Now without a job he had
to make a brand new start
There was hiring at MacDonalds
but he didn't have the heart
From the life that he had known
he was completely free
Just like the stock that he now
owned in his old company.
That life he'd thought was perfect
now had turned into a curse
As matters quickly went from
bad to badder and then worse
The sheriff came and took his

house and he was forced to flee
The technobody info super highway
refugee.

He waddled to the door and
felt an unfamiliar breeze
The green things in the distance
he remembered were called trees
He staggered to the woods un-
til exhausted then he sat
And lived there like a stump on
his accumulated fat
In time his body melted
into somewhat human form
With winter coming on he
needed shelter from the storm
He wandered all alone in-
to a harsh reality
The technobody info super highway
refugee

At last he hitched a ride with
folks in smokey buckskin togs
He got in back and settled
in amidst the kids and dogs
They headed off for Utah
and its salty inland sea
While watching out for roadkill
be it skunk or coyote
When he heard them talk about
the place they planned to go -
The Bunny Thumper Roundup
held in Rexburg, Idaho

They said that they would take him
there and share their old teepee
With a technobody info super
highway refugee

Once in camp he saw how peo-
ple lived outside the cage
As they had done for eons
up until the modern age
And in the future too if
that is what is meant to be
As they prepared for just such
an eventuality.
Some sat around a pit while
crafting tools right from the stone
While others took apart a
deer for meat and skin and bone
These happy low tech members of
the tribe called SPT
And the tehnobody info super
highway refugee.

Now if you want to join them
and a web link you can get
Look up primitive.org
out there on the internet
You can use both cash and plas-
tic now to pay the entry fee
Of the Society of Primitive
Technology.

E-mail your comments to "Norm Kidder" at atlatl1@aol.com

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Interesting Links

Society of Primitive Technology

Braintan.com

Tom Bailey's Prmitive Technology Link Page

Hollowtop Primitive Technology Page

Native Tech: http://www.nativetech.org/

Food Insects Newsletter: http://www.hollowtop.com/finl_html/finl.html

Photos of the Rabbitstick Rendezvous and Winter Count (Society of Primitive Technology)

Dining on the Wilds: http://www.edibleplants.com

Boulder Outdoor Survival School, Inc. (BOSS): http://www.boss-inc.com

BPS Engineering: http://www.atlatl.com/

Stickbow

Petroglyph artwork by Chuck Kritzon: http://www.petroglyphics.com

Cherokee Survival

Primitive Summer Meetings: http://summermeeting.8m.com

Wild food foraging by Steve Brill: http://www.bigfoot.com/~wildmansteve

Ainu - Japan's indigenous people: http://www.ainu-museum.or.jp/english/english.html

California Atlatl Association discussion/photo forum: http://www.communityzero.com/caa

American Indians - Cultural Resources: http://www.hanksville.org/NAresources/indices/NAculture.html

Ishi and Yahi Culture: http://www.qal.berkeley.edu/~hearst/ishi/ishihome.htm

Oceania arts and crafts: http://www.art-pacific.com/index.htm#|

Hawaiian culture: http://www.kupuna.com/

The Canoe Plants of Ancient Hawai'i: http://www.hawaii-nation.org/canoe/contents.html

Saami - northern Scandinavia's indigenous people: http://www.itv.se/boreale/samieng.htm

Wayfinding, or Non-Instrument Navigation: http://leahi.kcc.hawaii.edu/org/pvs/navigate/navigate.html

University of Pennsylvania Museum of Archaeology and Anthropology

Primitive technologists in Great Britain: http://www.bushcraft.co.uk/page2.html

An adventure in animal tracking on-line: http://dirttime.ws

Scientific American magazine: Anthropology - First Inhabitants of the New World

Wild Food Adventures - Institute for the study of edible wild plants & other foragables. Workshops, Expertise, Publications - John Kallas, Director: http://www.wildfoodadventures.com/

The Supernatural Frontier in Pomo Cosmology: http://archaeology.parks.ca.gov/RockArt/Pomo/cosmology.htm

Hawaiian Star Compass: http://leahi.kcc.hawaii.edu/org/pvs/navigate/stars.htmlstars.html

Learn about Primitive Technologies from Tamara Wilder & Steven Edholm: http://www.paleotechnics.com

West African Pottery Forming & Firing Techniques: http://www.uiowa.edu/~intl/rft/pottery.html

Ancient Skills website by Stephen Coote: http://home.clear.net.nz/pages/coote/

Flintknapping tools and products: http://www.stoneagetradingco.com

How can contemporary technology help us figure out what it is & what it's made of?
Identification of Plants, Stones, and Sites in the Traditional Hawaiian Landscape:
http://explorers.bishopmuseum.org/sciencegarden/aIdentification/index.html

The Yanomamo (also called Yanomami, and Yanomama)
are deep jungle Indians living in the Amazon basin in both Venezuela and Brazil:
http://indian-cultures.com/Cultures/yanomamo.html

E-mail your comments to "Dino Labiste" at dlabiste@hotmail.com

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Primitive Technology

Honoring Our Shared Heritiage

Drawn near to the fires of aboriginal skills, we look to the indigenous peoples of the world for inspiration and insight. From the Aborigines of Australia's Western Desert . . . to their brothers in New Guinea and north and east throughout the Pacific to Southeast Asia and Old Polynesia . . . to the Ainu in the farthest reaches of Japan . . . to the Toda herdsmen of backcountry India . . . to the Berbers of the sand of North Africa and their black brethren to the south in the jungles and savannahs of the Mother Continent . . . to the Native People of the Americas; in the rain forests, woodlands, high deserts, and great plains . . . to the Inuits, Lapps, and Siberians of the frozen tundra . . . to all the custodians of unbroken lineages wherever they may be . . . Primitive Technology is their inheritance and we honor that here.

Yet no one is from nowhere. The blood of our ancestors flows in our own veins. Our aboriginal legacy is written in the very make-up of our bodies. The ancient caves and campfires of our pasts call to us from within. Primitive Technology is our inheritance as well. It is a world heritage which knows no race, creed, or color. It is foreign to no one. It is the shared thread which links us to our prehistory and binds us together as human beings. That we honor above all.

by Steve Watts (President of the Society of Primitive Technology) -
Excerpt from the book entitled "Primitive Technology, A Book of Earth Skills"

The learning and practice of ancestral skills can help us all get in touch with our own roots -- no matter what our particular heritage may be (American Indian , European, African, Asian, etc.). Here in North America, we look to Native Americans and the ancestors of these people to teach us skills that are "native" to this place. Yet, if we go back far enough into our own pasts, we discover that we are all aboriginal peoples at some time, in some place. The "stone age" is the great common denominator of humanness. "Primitive" ("first") skills are our shared inheritance.

by Steve Watts (President of the Society of Primitive Technology) -

Excerpt from the book entitled "Primitive Technology II, Ancestral Skills"

Society of Primitive Technology - The Society of Primitive Technology is a non-profit organization dedicated to the research, practice, and teaching of primitive technology. Become a member and help support the organization by subscribing to the Bulletin of Primitive Technology.

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