Technology, Renewable Resources, and American Crafts

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Preface

This background paper is part of the Office of Technology Assessment's (OTA's) ongoing monitoring of renewable resource/technology issues for Congress. It was stimulated by discussions with Congressman Sidney R. Yates' staff. Mr. Yates chairs the Interior Subcommittee, House Appropriations Committee, the subcommittee with jurisdiction over the National Endowment for the Arts, which is the major U.S. fine and folk arts agency, and the Department of the Interior, which is the major U.S. natural resource management agency.

The paper summarizes technology's effects on crafts (some of which are folk and fine art) that use renewable resources as raw materials. Technology's effects on other types of art, such as the performing arts, and on other types of crafts, such as ceramics, also are significant. They are not discussed here, however, because nonrenewable resource supplies are outside the purview of the OTA Food and Renewable Resources Program.

The OTA exploratory work included staff research and extensive conversations with more than 50 craft and renewable resource specialists. A half-day workshop involving six Washington experts provided important additional information; its results are summarized separately in appendix A.

This paper was prepared by OTA Project Director Phyllis Windle. OTA wishes to acknowledge the workshop participants, reviewers, and others who provided generous assistance.

Techology, Renewable Resources, and American crafts
OTA Workshop, July 12, 1983

Jan Halkett
Agricultural Cooperative Service
U.S. Department of Agriculture
Washington, D.C. ***20250***

Robert Hart
Indian Arts and Crafts Board
U.S. Department of the Interior
Room 4004
Washington, D.C. 20240

Mary Hufford
American Folklife Center
Library of Congress
Washington, D.C. ***20540***

Linda McMahan
TRAFFIC-U.S.
World Wildlife Fund
1601 Connecticut Ave., N.W.
Washington, D.C. 20009

Robert Teske
Folkarts Program
National Endowment for the Arts
1100 Pennsylvania Ave., N.W.
Washington, D.C. ***20506***

John Thomas
Division of Law Enforcement
U.S. Fish and Wildlife Service
P.O. Box ***28006***
Washington, D.C. ***20005***

Additional Reviewers

Each of the participants in the OTA workshop reviewed the draft of this Background Paper and provided comments. The following persons also suggested revisions based on their special expertise.

Charles Camp
State Folklorist
Maryland State Arts Council
15 West Mulberry St.
Baltimore, Md. ***21201***

W. Hardy Eshbaugh
President, The Society for Economic Botany
Department of Botany
Miami University
Oxford, Ohio ***45056***

Robert W. Gray
Director Emeritus
Southern Highlands Handicraft Guild
P.O. Box 9545
Asheville, N.C. 28815

Ann Haas
Division of Law Enforcement
U.S. Fish and Wildlife Service
P.O. Box ***28006***
Washington, D.C. ***20005***

Francis M. Hueber
Curator, Department of Paleobiology
National Museum of Natural History
Smithsonian Institution
Washington, D.C. ***20560***

Thomas McIntyre
Office of Protected Species and Habitat Conservation
National Marine Fisheries Service
U.S. Department of Commerce
Washington, D.C. ***20235***

OTA Sfaff on Technology, Renewable Resources and American Crafts

H. David Banta* and Roger Herdman, ** *Assistant Director, OTA Health and Life Sciences Division*

Walter E. Parham, *Program Manager Food and Renewable Resources Program*

Analytical Staff
Phyllis N. Windle, Ecologist and Project Director

Administrative Staff
Phyllis Balan, Administrative Assistant

Nellie Hammond, Secretary

Carolyn Swann, Secretary

*Until August **1983.**
**From Dec. 26, 1983.

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FINDINGS

- Technology's effects on craftworkers and craft supplies are variable and sometimes inequitable.
- Traditional craftspeople more often are adversely affected by technological change; contemporary craftworkers more often benefit.
- U.S. concern is increasing about diminishing renewable resource availability for crafts-and the concern appears justified.
- Precise data on the types and amount of resources involved are lacking; it may be several years before better data are available and compiling that data will be difficult.
- Undertaking a full-scale assessment of technology, renewable resources, and crafts seems unwarranted now.
- Development of more consistent Federal policies for managing renewable resources while supporting crafts need not await more information.

Craft and natural resource experts identified for OTA a number of important issues, Agencies exist that have the authority to address these concerns in the absence of further OTA involvement. Congressional action will continue to affect crafts that depend on renewable resources. The 1984 renewal of the Marine Mammal Protection Act is among the more relevant legislation (Buck, 1983), since it controls the availability of certain ivory to Alaskan natives and other craftworkers.

Important Issues Affecting the Craft Community

	Potential action agency (ies)
General Issues	
Health hazards of art/craft supplies	National Institutes of Health Bureau of Standards
Design theft	Justice Department
Economic contribution of crafts	National Endowment for the Arts General Accounting Office Interior, Commerce, Agriculture Departments
Industrial/craft cooperation	Commerce, Labor Departments
Role of craft cooperatives	Agriculture Department Small Business Administration
Legislative and governmental review	Interagency Crafts Committee
Renewable resource issues	
Illegal traffic in wildlife	Interior, Commerce, State Departments
Resource supplies needed for crafts	Interior, Agriculture Departments
Resource losses in developing countries	State Department/Agency for International Development Interior Department
Education and craft training	National Endowment for the Arts National Science Foundation

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INTRODUCTION

Crafts and Technology: A History of Tension and Cooperation

The relationship of crafts to technology, like that of art to science, has often been intimate but never constant. Until the 17th century, many craftworkers and artists also were scientists and inventors, and many technical discoveries evolved from their work. Pioneering research by Smith shows that:

- craftworkers are often the first to understand the basic properties of their craft materials;
- the beauty and desirability of craft objects in some cases has inspired scientific research; and
- the technical knowledge of artists and craftworkers has at time; been directly applicable to science (Eklund, 1978).

Abundant examples of these interactions have been cataloged for ceramics and metalwork (Smith, 1980) but the use of renewable resources by craftspeople and artists also benefited early science and industry. The first textile dyes, for example, were derived from plants and animals. Weavers in Phoenicia, Mesopotamia, South America, and Aztec Mexico collected or grew herbs, shells, and insects and extracted their dyes. Increasing mechanization of the European textile industry in the 1700's stimulated an unprecedented demand for natural dyes. The search for synthetic fixatives for dyes created the first large-scale chemical industry (Rhodes, 1980). The natural dye industry flourished until 1856, when the first substitute was synthesized. Organic chemistry blossomed as the-search for chemical analogs and replacements expanded (Baranyovits, 1978).



Photo credit: Mark Skinner

The skilled hands of Magdalena Ruak weaving a coconut leaf bird in the Mariana Islands

The development of medicine and botany also was linked closely with arts and crafts. painters, drafters, and engravers recorded plants and animals in intricate detail. As early as the 16th century, their work was used to train medical students in human anatomy. Traditional plant lore was preserved in printed herbals. More recent botanical illustrations were based on scientific accuracy and visual realism, traits that persist in the later insect and bird paintings of Maria Merian and John Audubon (Rhodes, 1980).

The close partnership between the arts and science did not last.

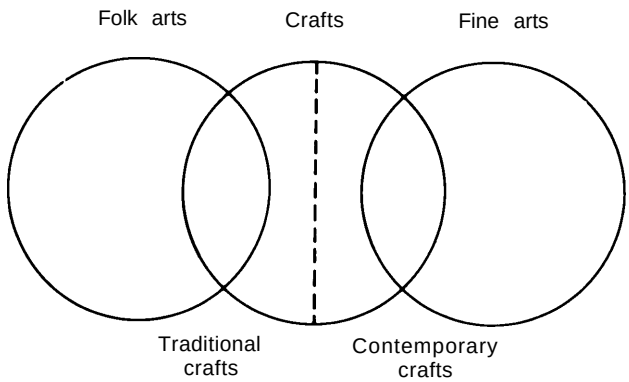
> "Despite occasional attempts at reconciliation, the separation of science and art was so complete by the 20th century that C. P. Snow was able to define them accurately as two separate worlds" (Meeker, 1978, p. 187).

After World War II, science and technology began to change American lives in important and apparently ever-faster ways. Artists often responded defensively, and their uneasiness was not lessened by suggestions that the visual arts were irrelevant to technological society (Bornstein, 1981) or that industrial processes could not, by definition, apply to any of the arts.

Some experts feel that the period of greatest tension is past (Meeker, 1978). As evidence, they cite the use of technology by certain fine artists and craftspeople to solve unique problems. These technologies include new methods to conserve and authenticate works, new tools and materials, and hundreds of uses for small and large computers (Hours, 1981; Shore, 1982).

Much of the literature of the 1970's examined these changes, often from a theoretical viewpoint (see Topper and Holloway, 1980). Few writers, however, focused explicitly on the role of technology in crafts. Sometimes generalities were obscured by the failure to distinguish between traditional and contemporary crafts (fig. 1). Traditional craftworkers, some of whose work can be considered folk art, emphasize perfecting old forms drawn from their community. Therefore, technological innovation may either be rejected or slowly incorporated.

Figure I.— Relationships Among Crafts, Folk Art, and Fine Art



DEFINITIONS:

Craft: An object produced **with the help of** only **such devices as allow the manual skill of the maker to condition the shape and design of each individual product. (Adapted from 25 Code of Federal** Regulations 308.3a)

Traditional draftsperson: A **craftworker who accepts and depends on a communal esthetic shaped over time, who perfects older forms, and who receives information and training by informal means. (Adapted from** Teske, 1982-83)

Contemporary craftsperson **A craftworker who expresses an individual esthetic, who seeks to create new forms, and who has often received formal education and training. (Adapted from** Teske, 1982-83)

Tachnology: **Equipment (e.g., tools, implements, machines, and devices) and organizational forms; "hardware" and "software."**

SOURCE: **Office of Technology Assessment**

Contemporary craftspeople are more closely akin to fine artists. They express an individual esthetic that prizes uniqueness, and often they have been formally schooled in advanced technology. Contemporary craftspeople are more likely to benefit directly from technological change. Both types of craftworkers may benefit indirectly from the longing for the handmade that accompanies "high-tech" societies (Greene, 1980; Paz, 1974). Demand for crafts and craft classes may increase.

Crafts in the United States: A Valued Activity

The U. S. Congress officially encouraged American crafts with the establishment of the Indian Arts and Crafts Board, the National Endowment for the Arts, and the American Folklife Center. These actions recognized the importance of crafts in U.S. culture. The craft tradition gives meaning to everyday objects,

linking them to history and contemporary life. Crafts may also be "the focal point or gathering place for a cluster of ideas which may derive from some of the most important philosophical perspectives in the experience of a group of people" (Toelken, 1983). As such, craftwork fills an abiding need to create with the hands. According to a 1974 Harris poll, 40 percent of all Americans engage in craft activities and another 20 percent would like to become involved (Glassman, 1975).

American craft traditions also have certain tangible benefits. A large number of people and businesses are involved, and their products make a substantial contribution to individual and collective economies. The size of a major annual week-long craft fair, held until 1984 in Rhinebeck, N. Y., indicates the magnitude of these contributions. At least $6 million of crafts were sold in 1983, a volume triple that of 1976 (Greene, 1980), and complementary events added almost another $2 million. Some 3,000 wholesale businesses sent buyers to the fair and 35,350 retail visitors attended (The Craft Report, 1983). Local merchants estimate that they take in another $3.5 million during the course of the fair (The Washington Post, 1983).

Crafts have also entered department stores. The Hecht Co., in metropolitan Washington, D. C., sold $42,000 worth of crafts during its 10-day "West Virginia, USA" promotion in 1981. Bloomingdales spent $25 million in 1982 to add 800 new craftworkers to their "America the Beautiful" series (The Washington Post, 1982).

Crafts are important to the economies of several States, especially in the Northeast. Vermont crafts have a larger impact on the economy than the maple syrup industry (Halkett, 1983). Crafts' contribution is $10 million to $11 million, a figure equalled in New Hampshire and Mississippi (Hart, 1983).

Additional craft-specific information on the economic contribution of crafts is difficult to obtain and often relies on crude estimates. For example, American quiltmaking is a $50 million to $100 million business annually, and antique quilts bring prices as high as $10,000 (Ricci, 1982). Yet the number of quilters involved and their annual income is unknown. Probably each quilter earns less than the minimum wage for long hours of painstaking work (Ricci, 1982). Industry sources may keep specific information on individual crafts because they supply large numbers of avocational craftworkers with leather kits, dyes, yarns, etc.

Traditional craftspeople sometimes choose not to market their work, or they may use channels different from those of contemporary craftspeople. Their contribution, therefore, is not included in most estimates above. No way exists to value their products precisely. The Indian Arts and Crafts Board, for example, estimates the annual retail sales of Native American arts and crafts is several hundred million dollars but admits that this estimate is too crude even for planning purposes (Hart, 1983).

Individual income from craftwork may be low but nevertheless vitally important. Crafts provide a unique source of money for some elderly or housebound people and are especially valuable for individual income in certain areas of high unemployment (Halkett, 1983; Southern Highlands Handicraft Guild, 1975). Consequently, State governments and regional organizations use crafts for local development. The Southern Highlands Handicraft Guild and the States of West Virginia and Kentucky have been among the first to do so. They have successfully promoted their crafts in major national department stores, guild craft centers, and State park gift shops. Economic goals often are combined with others: preserving traditional crafts, encouraging an appreciation of local culture, and providing nonfinancial services for members and citizens.

Negative aspects of the craft business also exist. Department stores and wholesalers sometimes are insensitive to craftworkers' problems. The store operators may be unwilling to depart from high-sales-volume procedures and may stock inexpensive imported crafts in "American" displays (Teske, 1983). The effects of guilds and State craft stores are controversial; their benefits may not be equitably distributed among all craftworkers and economic improve-

ment sometimes may decrease cultural well-being (Camp, 1983).

Crafts also are part of a large underground economy. The illegal traffic in wildlife products may total $10 million annually (The Farmington (N. M.) Daily Times, 1981), and design pirating is a constant concern of craftworkers (Halkett, 1983).

THE FEDERAL GOVERNMENT'S ROLE IN CRAFTS

The Arts Agencies

Federal Government actions touch on crafts in many ways. In certain cases, these actions and their effects have not been consistent or kindly. Involvement with Native American and rural communities sometimes has jeopardized local traditions in order to promote local development and "modernization. "

One piece of legislation was especially important in seeking to make the role of the Federal Government more benign: the 1976 American Folklife Preservation Act (Public Law 94-201). This law created the American Folklife Center in the Library of Congress and supplemented earlier laws that enabled executive branch agencies to support the crafts. These include Public Law 74-355, passed in 1935, which created the Indian Arts and Crafts Board within the Department of the Interior; the National Historic Preservation Act of 1966; and the legislation that established the Smithsonian Institution and, later, the National Endowment for the Arts.

These programs, along with economic development efforts of the Department of Agriculture and the avocational craft programs of the Department of Defense and the USDA Extension Service, are the most significant Federal craft activities. Additional related programs are scattered throughout the Government. The best summary of these activities is provided by Coe (1977). Recent agency reorganizations and severe program and budget cuts, however, have made significant parts of this information obsolete. Table 1 provides a summary of the types of agencies involved in supporting American folkarts and crafts.

Table 1 .—Federal Agencies With Craft Programs

Agency	Role(s)				
	Research[a]	Education[b]	Development[c]	Preservation[d]	Demonstrations[e]
U.S. Departments:					
Agriculture	X	—	—	—	X
Commerce	—	—	X	—	—
Defense	—	X	—	—	—
Housing and Urban Development	—	—	X	—	—
Interior	X	X	X	X	X
Labor	—	X	—	—	—
State/AID	X	·	X	X	—
Other Federal agencies:					
East-West Center	X	X	—		—
Federal Information Center	X	—	—	—	—
National Archives	X	—	—	X	—
Historic Documents Program	—	—	—	X	—
National Endowment of the Arts	X	X	—	X	—
National Endowment of the Humanities	X	X	—	X	—
National Science Foundation	X	—	—	—	—
Smithsonian Institution	X	X	—	X	X
Peace Corps	—	—	X	—	—
Library of Congress	X	—	—	X	X
Historic Preservation Trust	—	X	—	X	—
Appalachian Regional Commission	—	—	X		—

[a] Includes both direct grants to individuals and institutions as well as providing general support services.
[b] Includes support for institutions such as schools, art institutes, and museums, and grants to students
[c] Includes job training programs and assistance to cooperatives and individuals
[d] Includes collecting, preserving, and exhibiting all types of crafts
[e] Include traveling and permanent exhibits as well as interpretive programs at national parks, refuges, monuments, forests, and other public lands

MAJOR SOURCE Linda C Coe, *Folklife and the Federal Government* **(Washington, D C American Folklife Center, Library of Congress, 1977)**

The Natural Resource Agencies

The protection and management of wildlife and natural areas is relatively centralized. The Department of the Interior, for example, is the major agency responsible for monitoring endangered species, controlling domestic traffic in regulated wildlife products, and protecting resources in national parks and monuments. Both the Bureau of Land Management, within Interior, and the Forest Service, within the Department of Agriculture, are important managers of public lands. The annual Conservation Directory (National Wildlife Federation, 1982) summarizes Federal natural resource roles (table z).

Public Policy

Public policies have important effects on craftworkers. These vary from policies that eliminate availability of certain craft supplies to others that relocate people from newly designated public lands. From 1924 to 1936, for example, the Department of the Interior displaced a large craft community with the creation of Shenandoah National Park (Martin-Perdue, 1983); similar events occurred in the early days of the Tennessee Valley Authority. Some of these craftworkers received Federal assistance to continue, publicize, and sell their work.

Agency data-collection programs have the potential for supplying important information on the craft use of wildlife, but this potential is largely unrealized. Permits are not required for most small-scale harvesting for "noncommercial" purposes in national forests (Bombeck, 1983). Therefore, little documentation exists for craft uses of these public resources.

Some of the goals of the arts and resource agencies are not compatible with each other. Resource agencies generally have paid little attention to craft supplies. For example, an arts agency may encourage use of traditional grasses by basketmakers while a resource agency manages public lands to discourage grass growth (Toelken, 1983). Puerto Rico has just begun a program to replant important woodworking trees, but it has little support from foresters (Murray, 1983).

Table 2.—Federal Agencies With Resource Protection Roles

Agency	Role(s)				
	Research[a]	Education[b]	Management[c]	Policy[d]	Enforcement[e]
U.S. *Departments:*					
Agriculture	X	X	X	X	X
Commerce	X	X	X	X	X
Interior	X	X	X	X	X
Justice	—	—	—	—	X
Labor	X	X	—	—	—
State	—	—	X	—	—
Transportation	—	—	—	—	X
Treasury	—	—	—	—	X
Other agencies:					
Council on Environmental Quality	X	—	—	—	—
Environmental Protection Agency	X	X	X	X	X
Tennessee Valley Authority	X	X	X	—	—
National Science Foundation	X	—	—	—	—
International Convention Advisory Council	X	—	—	—	—

[a] Includes internal programs and external grants.
[b] Includes direct work with farmers and visitors, job training programs, and Preparation of materials.
[c] Includes responsibility for day-to-day operation of public lands and waters as well as handling of wildlife populations and preparation of management plans for private owners.
[d] Includes determining U.S. priorities for resource protection.
[e] Includes regulating commerce i, potentially harmful plants and animals and those organisms that are protected by domestic and international agreements.

MAJOR SOURCE: *Conservation Directory 1982,* **National Wildlife Federation, Washington, D. C., 27th cd., 1982.**

Making the Connection: A Pioneering Study in the New Jersey Pine Barrens

The American Folklife Center of the Library of Congress, the U.S. Department of the Interior, and several New Jersey State agencies are cooperating in a project that will provide one of the first close looks at how traditional technology, natural resources, and culture interact. This project will document activities such as crafts, folk music, seasonal festivals, and architecture. Also, it will examine traditional ways of naming and using plants and animals.

The study is being done in the new Pinelands National Reserve, a million acres of land with a unique public lands designation and governing body. The importance of this work, though, extends beyond New Jersey. It may, for example, show how arts agencies and resource agencies can cooperate with local citizens to conserve natural resources, historic artifacts, and the living cultural traditions in a region,

The pine barrens are rich in crafts such as boatbuilding and decoy carving, and local people have developed complex management technologies for conserving their raw materials. The Barnegat Bay Sneakboxes (duckboats), for example, are built of Atlantic white cedar that, unlike plywood, can be shaped in compound curves. Cedar-cutting and stand management are often family operations that rely on generations of forestry experiments. Local biologists admit that the cutter's knowledge is accurate and precise. Folklorists in the area also note the esthetic importance of management; cedar-cutters speak of "cedar music)" created by trees creaking in the wind.

The Pinelands National Reserve study will preserve this type of information in books, photographs, and an archive, Natural resource agencies will have access to local expertise on wildlife and timber; folklorists will gain information on technology and biology. This is a new synthesis. It may promote the sustainable use of resources in crafts and provide a better understanding of how people create meaning in their lives by applying technology to their natural surroundings.

SOU' RCES Mary Hufford, Folklife Center, Library of Congress, personal communication, Dec. 12, 1983; Library of Congress, "Library of Congress American Folklife Center Launches Field Survey of Pinelands National Reserve in New Jersey," *News From the Library of Congress*, PR 83-81, Sept 9, 1983; and Boris Weintraub, "Cranberry Bogs, Team a Glass Sense of Place in Jersey Pines,"' *National Geographic Society News Feature*, Nov 30, 1983

TECHNOLOGY AND THE CRAFTS PROCESS

Craftwork can be divided into several processes once the initial design has been developed. These include: obtaining and preparing the raw materials, making the materials into a product, and distributing the product. These processes are common to all craftworkers whether they use, for example, naturally occurring grasses or highly processed leather, whether they keep sales records by pencil or computer, and whether they ship items worldwide or pass them along to their families.

Technology has had an important impact on all of these stages—sometimes positive, sometimes negative. Its direct or indirect impacts seem to be increasing in all areas of craftwork. The initial design process is not immune, either. Contemporary craftworkers have available computer-assisted design tools (Bell, 1983), and science and technology, by virtue of their dominance in American culture, help shape the creative urges of those and the more traditional craftspeople.

Gathering Materials

Some craftworkers are concerned about maintaining an assured quantity and quality of materials, and both factors relate to technology. These recent concerns are different for various craft media. Two major studies identified the availability of unprocessed raw materials as a problem: the National Crafts Planning Project (McLean, 1981) and Traditional Craftmanship in America (Camp, 1983). Traditional craftworkers are most concerned:

> . . . anxiety about the continued availability of craft supplies seems to be on the rise among American craftworkers, along with a sense that little can be done to improve dim prospects for the future of a great many craft traditions. . . . The availability of materials for use in traditional craft processes may play a greater role in the health of particular traditions than any other factor . . . ." (Camp, 1983, p. 30)

Craft technology usually does not threaten renewable resources directly. There are exceptions, but information is so scarce that a definitive evaluation is not possible. Traditional craftworkers may possess a sensitivity to their environment that decreases the chance of their destructive use of resources (Toelken, 1983). Or they may have such a strong cultural need for certain resources that overuse is inevitable. The activities of craftworkers who are new to their profession may be harmful to resources, too. Inexperience may lead to misidentification of plants or animals and rare ones may be used inadvertently. In addition, their sources of supplies may be distant. Therefore, they unintentionally may encourage unscrupulous collecting by commercial suppliers. Poaching for craft supplies, by suppliers or craftspeople, can and does pose a threat to certain plant and animal populations, such as bald eagles, that have been severely decreased by other activities.

Industrial technology usually threatens craft resources more directly. Some wildlife, such as eagles and most whales, have become rare enough that the parts used for crafts are largely unavailable. This unavailability may be due to the actual disappearance of plants and animals or due to government regulation of harvests. Substitutes for these materials can be difficult or impossible to obtain for some craftworkers. Native American crafts commonly have important religious or symbolic significance, and new materials are unlikely to be substituted (Camp, 1983).

Loss of plant and animal habitat maybe just as important in altering the availability of craft resources. Several factors, such as changing landownership patterns, urbanization, and agricultural draining and filling decrease collecting areas (Camp, 1983; LaRiche, 1983). Traditional craftworkers who will not or cannot search more widely for their materials are most affected. Loss of habitat may be the major method by which plant and animal species become extinct (Fosberg, 1983). Therefore, it affects people locally but may also cause more widespread and permanant loss of plants and animals.

Craftworkers in some cases express frustration at not being able to find the right material at an affordable price (Camp, 1983). For woodworkers, this may represent the escalating price that results from the increasing scarcity of wood such as black walnut and bald cypress. This results from both the absolute scarcity of these woods due to loss of habitat—e.g., bald cypress in Florida—as well as the relative scarcity when other wood users outcompete craftworkers for supplies.

Technology sometimes can provide substitutes when desired materials become less available for whatever reason. Plastic "ivory" allows scrimshaw to continue despite tight restrictions on use and trade in natural ivory (Thomas, 1983). Plastic "ebony" in banjos (Jabbour, 1983) replaces a rare, and expensive, wood. And plastic "tortoiseshell" replaces real tortoiseshells in jewelry (Dodd, 1983). Some craftworkers have adopted unusual craft supplies—bread wrappers for rag rugs, telephone wire for baskets—which are often high-tech substitutes for materials no longer available to them (Hufford, 1983). In other cases, technology provides a refined or more quickly available product, such as artificially seasoned wood (Hart, 1983). This is an important role for technology but one that is useful to only certain craftworkers. Substitutions sometimes cannot be made without irreparably damaging the craft tradition (Camp, 1983).

Making the Craft

While some craftworkers may feel an ambivalence about adopting new technology, usually they have heartily welcomed those changes



Photo credit U S FIsh and Wildlife Service

Lucreaty Clark making a cotton basket from white oak

that made their work easier, Traditional Native American basketmakers, for example, may substitute a nail for the traditional cactus spine awl (Barrows, 1900). Many craftworkers have been quick to adopt power tools for special uses (Teske, 1983). These changes usually are made after thoughtful consideration: What is the role of technology in the craft? Will an important part of the craft be lost if machinery takes over? Will new technology enable the worker to be more or less creative? Often technology is adopted to increase productivity (Ahlborn, 1983), certainly an important factor for craftworkers whose incomes are marginal.

Where technology is carefully considered and integrated into current traditions, its effects are often positive, The adoption of steel tools, for example, by the Haida Indians of the Northwest Coast, coincided with a surge of creativity in architecture and decorative arts (Reid, 1982). Certainly new technology has been adopted enthusiastically by many contemporary craftworkers. Synthetic dyes, for example, have replaced natural ones in most fiber crafts, including basketry. Cold-molded and sheet-plywood construction are important new technologies for building wooden boats (Wilson, 1982).

These changes sometimes are painful, especially for traditional craftspeople. They may introduce dissension into a family or community. In these cases, change—such as that which occurred when Shenandoah basketmakers altered the number of splints in the bottom of woven baskets—becomes a metaphor for tradition versus adaptation in the group (Martin-Perdue, 1983). In other cases, the introduction of modern technology may add health risks to the workplace. This is true for many epoxies and other plastics used in woodworking (McCann, 1981).

Going to Market

Technology plays a large role, both directly and indirectly, in bringing crafts to market. Modern technology brings the craft traditions of many ethnic groups and localities to outsiders (Paz, 1974). Television and satellite radio, for example, bring the traditions of southwest Arizona to New York and 20th century transportation takes Midwestern vacationers to the Appalachians. This has increased the demand for craft materials, craft classes, and crafts themselves and opened new markets to craftworkers.

Technology also directly affects craft marketing. Some workers, researchers, and organizations use computers for recordkeeping, word-processing, and communicating among themselves, The National Crafts Planning Board is undertaking one of the latest of these projects, an information system that will become operational in 1984 (American Craft Council, 1983). Other types of technology also have an impact. For example, new photographic tools and lightweight construction materials help craftworkers prepare for shows. Improved transportation equipment and systems move people, materials, and finished goods.

Many of these technological changes have little relevance to traditional craftspeople. Sometimes they market locally, do not take part in major craft shows, and do not join craft organizations.

Contemporary craftworkers often face problems more common among fine artists: protection of unique designs. Traditional craftworkers face similar problems when legal supplies of resources cannot be authenticated and their own work cannot be distinguished from inexpensive foreign mass-productions. New technology for copyrighting material and identifying work may solve some of these problems. The Canadian Government, for example, designates authentic native crafts with stick-on labels (Teske, 1983). Some U.S. craft guilds and cooperatives have developed their own trademarks (Jabbour, 1982). New marking methods can nondestructively identify ivory that may be legally sold (McMahan, 1983).

AN INVENTORY OF CRAFT RESOURCES

No comprehensive inventory of the natural resources used in crafts exists in the United States or elsewhere in the world. Information is fragmentary, inconsistent, and often unreliable. Even such a fundamental tool as a flora of the United States does not exist (Jenkins, 1983). With such problems, it is impossible to estimate the amount of material in the craft trade or its economic and ecological significance. The Organization of American States (OAS) International Meeting of Craft Development Agencies and Programs (September 1983) made two relevant recommendations:

- that OAS promote development of an inventory and registry of natural resources used by craftworkers; and
- that a study be conducted, based on this inventory, of the supplies, conditions, and ecology of the resources.

Before such a thorough assessment is made, however, scattered data can be used to piece together preliminary evaluations such as those below. These data cannot be considered definitive, however, since many rely on intuitive judgments of experts.

Ivory and Tortoiseshell

Several marine mammals and sea turtles continue to be used for crafts. Ivory from walrus tusks, sperm whale teeth, seal skins and guts, and sea turtle skins, leather, and shells are some of the raw materials involved.

Several of these animal species declined drastically due to over-harvesting in the 19th and 20th centuries. Therefore, much of their current harvest is strictly controlled and several public and private groups monitor the results. These groups' data on legitimate and black-market trade provide an estimate of overall use of the animals. The craft use of such materials alone cannot be separated but is probably substantial and unique to each species. Sale of many of these items is prohibited; therefore, estimates of illegal trafficking, which are often crude, provide one way of measuring the magnitude of trade.

Illegal trafficking is known to be extensive. Approximately 10,000 lb of walrus ivory were seized in one Alaskan raid, part of a trade worth several million dollars (U.S. Department of the Interior, 1981). There are 3,000 to 4,000 narwhale tusks thought to be in storage; 8,000 sperm whale teeth were confiscated in 1974-75 (McIntyre, 1983); and an estimated 6,000 walrus tusks are illegally traded.

Sea turtles were once a major food in coastal Georgia and South Carolina (McIntyre, 1983). The mainland United States never had sea turtle crafts, but they existed in Puerto Rico, the Virgin Islands, and the Trust Territory of the Pacific Islands (Dodd, 1983). The Convention on International Trade in Endangered Species (CITES), which restricts trade in sea turtles, has effectively reduced commercial trade. The United States does not now trade in these products, but other countries do. Japan, which appears to be the major importer, imported about 75,000 kg of leather, skins, and tortoiseshell in 1981. The proportion of the local and international trade that is craft-related is unknown.

Status of the Resource—All species of marine mammals are protected under the Marine Mammal Protection Act and some are also protected by the Endangered Species Act and CITES. "Taking," importing, exporting, possessing, and selling protected animals are generally prohibited. Exceptions may be made for specimens obtained before regulation in 1972 and for educational/scientific uses. Alaskan Natives are qualified for another important exception. They may take marine mammals for subsistence or for the production of handicrafts. Authentic native articles generally may be sold in interstate commerce (U.S. Department of the Interior, May 1982, August 1982).

Controversy exists regarding the effect of the Native American marine mammal harvests. Some experts feel that it is large enough to threaten marine mammal populations and that it tends to be abused. Others feel that marine mammals can be sustainably harvested if present guidelines are followed. Still others feel that the continued use of marine mammals can be



Photo credit: U.S. Fish and Wildlife Service

Walruses, such as these animals on a beach, are among the marine mammals protected by Federal law. A multi-million dollar trade in illegal ivory continues despite protection. The U.S. Fish and Wildlife Service confiscated these items during several years; all are from endangered species

justified on cultural grounds even if animal populations do suffer. The situation is further complicated because marine mammal populations are shared by many nations. Some countries do not control marine mammal harvests; other nations—e.g., Canada—regulate subsistence harvest and export quite differently than does the United States; and the international harvest quotas are subject to political pressure (McIntyre, 1983).

Craft use of marine mammal ivory did not cause the original decline in these species, although it may slow their current recovery. Crafts that used elephant ivory probably did contribute to the endangerment of that animal (paradise, 1983). Poaching continues to be a problem because of the high prices that ivory brings. The price of sperm whale teeth, for examp]e, increased from $20 to almost $1,000 per tooth when it became known as an endangered species (McIntyre, 1983).

The status of the seven species of sea turtles is so precarious that all are given maximum protection by CITES. Substantial trade continues, though, and many feel that it threatens the survival of these animals. As a result, the World Conference on Sea Turtle Conservation recommended that:

> "The trade in tortoise shell should cease in those countries where it has no special traditional cultural significance. Those countries where tortoise shell has a cultural value (e.g., in marriage ceremonies) should be encouraged to preserve and recycle antique supplies, to promote the use of synthetic substances, and with all dispatch to phase out the importation of new material. " (Mack, 1983, p. 11).

Effects on Crafts—Problems in obtaining marine mammal products for crafts became chronic, especially for Native Americans in Alaska, with tight regulation (Camp, 1983). Acrimonious debates among craftworkers, hunters, conservationists, and regulators sometimes occur when quotas for subsistence harvest are set. Legislation provides for only Native American craft use of new ivory supplies. Therefore, controversy also arises when other craftworkers are not allowed access to material.

Some craftworkers prefer to avoid any possibility of using illegal materials. They obtain what is known as "pre-act" (Endangered Species Act and Marine Mammal Protection Act) ivory from suppliers, Questions about the age of this ivory persist, and much may not be qualified for legal trade. The technology for dating material, whiIe developing rapidly, does not yet allow fine distinctions to be made (McIntyre, 1983). Other craftspeople have converted to using caribou bone, especially for sales outside of Alaska (Hueber, 1983).

Considerable amounts of seized ivory remain in storage, and some advocate releasing it to craftworkers. Others fear that this will provide an incentive for continued illegal taking.

Tortoiseshell has been prized for centuries and it has important traditional cultural uses in some communities (Mack, 1983). U.S. tortoiseshell crafts in Puerto Rico probably have declined with the virtual elimination of trade, but this is undocumented. Some countries propose either breeding sea turtles in captivity or ranching wild populations under the provisions of CITES that encourage developing alternative supplies. These operations, if successful, may provide new sources of craft material.

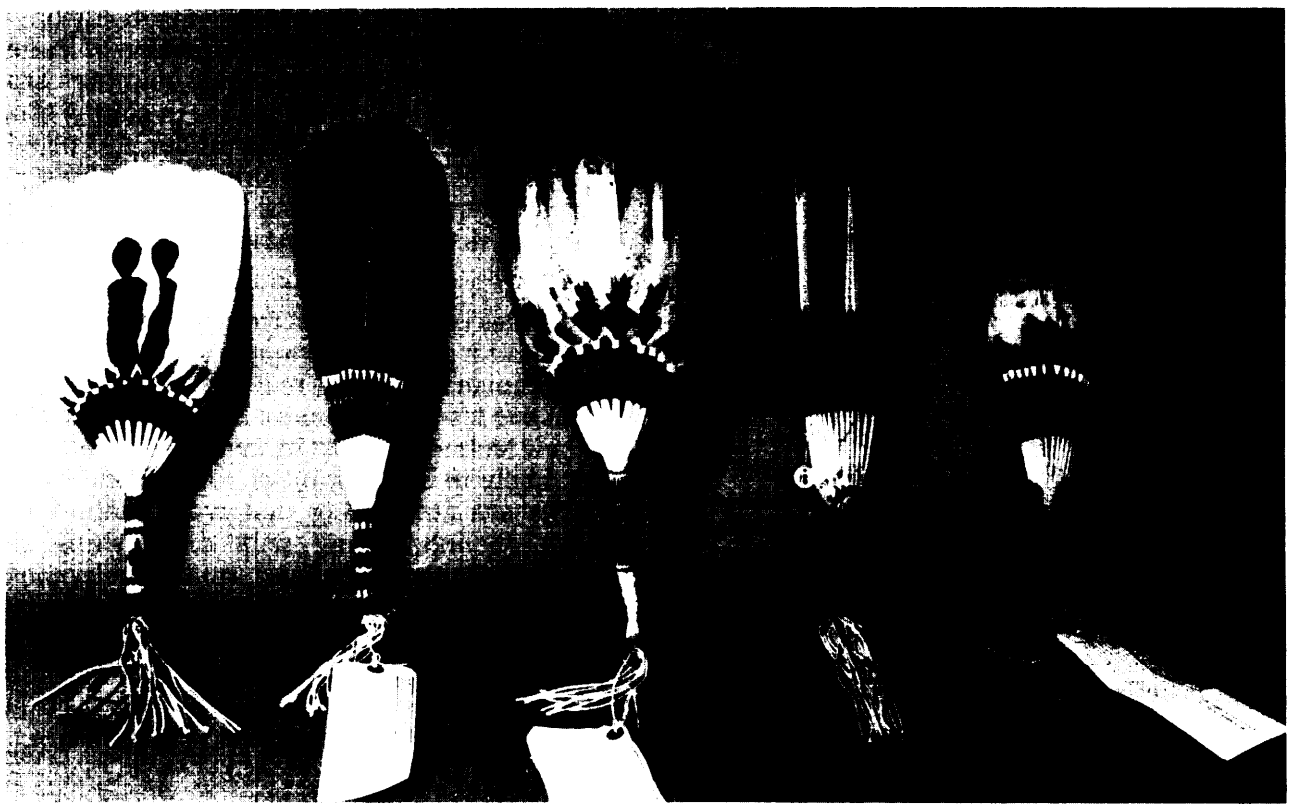
plastics can mimic sperm whale, walrus and elephant ivory, and tortoiseshell. They are indistinguishable from real ivory without destructive tests or expensive X-ray analysis. This is new technology, and its impacts on craft uses are likely to be substantial. On the one hand, crafts are continuing that would otherwise have declined along with diminishing resources. On the other hand, some jewelry-makers suffered when plastic turquoise became readily available. Many retailers stopped carrying turquoise rather than risk selling imitation jewelry (Halkett, 1983). A similar situation may arise with other plastic substitutes.

Feathers

Feathers have been used extensively in crafts. They were the main supply for Hawaiian feathercapes and feathergods (Belshe, 1983). They are still used in fly tying (Hornblower, 1983)

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and many Native American crafts such as headdresses, clubs, kachina dolls, and fans (Stuart, 1981).

Supplies of many species are severely curtailed, forcing craftworkers to use substitutes. Estimates of the total use of feathers in crafts do not exist. A fraction of the use can be identified by legal and illegal demand for eagle feathers.

Bald and golden eagles are protected under the Bald Eagle Protection Act, The Migratory Bird Treaty Act protects all wild birds except: 1) resident game birds such as pheasant and grouse, 2) starlings, 3) feral pigeons, and 4) English sparrows (U.S. Department of the Interior, undated). The Endangered Species Act also protects a large number of birds (U.S. Department of the Interior, May 1982).

Native Americans may use special provisions of these acts to obtain parts of eagles for religious ceremonies. Therefore, facilities for storing contraband and accidentally killed eagles were established in Idaho for handling this distribution. A long waiting list exists for these birds (Frederick, 1983).

The U.S. Fish and Wildlife Service has intensified its investigation into trafficking in eagles and other migratory birds and has developed the forensic skill to identify most bird parts to species. Based on its information, a substantial number of birds are being used illegally for crafts. Officials have estimated that illegal trade in bird feathers approaches at least $1 million annually, about one-tenth of the total trade in illegal wildlife (The Farmington (N. M.) Daily Times, 1981). For example, enforcement agents in 1981 seized feathers and craft items worth almost $500,000 from 35 individuals in New Mexico and Oklahoma and more than 30 businesses in Arizona. This raid included at least 4,000 scissor-tailed flycatchers, 155 eagles, and hundreds of woodpeckers, hawks, owls, and other protected birds (Stuart, 1981). A 1983 raid resulted in arrest warrants in eight States for about 50 people accused of trafficking in eagle and other bird parts. Officials estimated from this evidence that about 100 eagles are killed annually for the black-market trade in Native American artifacts (Shabecoff, 1983).

Status of the Resource—The pressure on bird populations from these activities is significant. Parts of Oklahoma that once supported hundreds of scissor-tailed flycatchers per acre now have only a few (Stuart, 1981). About 1,200 nesting pairs of eagles exist in the contiguous United States, but the population rises to more than 10,000 birds during the winter migration from Alaska and Canada. Experts feel that harvests of hundreds of birds are cause for concern under these conditions.

Though feather crafts alone are not thought to have caused the large-scale extinctions of tropical Hawaiian birds in the 1800's, they may have been one factor. The introduction of cats and poultry diseases probably contributed more to the decimation of Hawaiian bird populations (Fosberg, 1983).

Effects **on** Crafts—Some feather crafts are relegated to history because of the restrictions on obtaining, possessing, and selling feathers. Items such as feathercapes, which required feathers from thousands of tropical birds, probably will not be made again. Controversy exists over displaying these items and whether rare birds may still be jeopardized by exhibition (Shetler, 1983).

Some people who worked with feathers used ones that are now controlled. Some have substituted new supplies for illegal ones. Kachina dolls, for example, continue to be made and sold but without eagle feathers. Concern exists that substitutions threaten important traditional aspects of the craft (Camp, 1983). But the role of change in traditional crafts has always been subject to lively debate (Ahlborn, 1983), and there is no consensus on whether crafts are permanently damaged by involuntary substitutions.

Fibers and Dyes

A wide variety of plants is used for basketry, fish traps, and dying. Usually these plants are collected from wild populations. A few, such

as pandanus and coconut, are propagated and grown in the Pacific islands to provide ready craft supplies (Fosberg, 1983). Some of these plants occur throughout the United States. Others, such as devil's claw, grow in much smaller geographic areas and are vital to unique local crafts. A few of the common natural dyes are imported. Indigo, madder, and fustic are among these. (See app. B for scientific names.)

Status of the Resource—Wild plants generally do not seem to be threatened by craft use (Duke, ***1983;*** Soderstrom, 1983). Usually such large amounts are required that only "weedy" plants are used (Hueber, 1983). There are exceptions, however. Appendix B lists almost 600 basketry and dye plants, of which 89 are rare enough to be of concern to conservationists (The Nature Conservancy, unpublished information). Some plants, such as bloodroot, have been widely used in traditional crafts and now are rare enough to be protected by State regulation (Eshbaugh, 1983).

Lichens have been important sources of natural dyes; they provided both the unique colors and fragrances of Harris tweeds. They are more vulnerable to overcollection than most plants because they grow so slowly. Unscrupulous collecting may threaten local lichen colonies (Hueber, 1983). Like other resources, lichens are threatened more directly by effects of industrial technology: they are among plants most sensitive to air pollution.

Misidentification may pose a problem for the sustainable use of plants in crafts. Certain members of large plant groups such as willows and birches, for example, are uncommon. One variety of sweet birch is on the U.S. endangered or threatened species list (U.S. Department of the Interior, January 1982). Almost one-fourth of the plants in appendix B have close relatives that are either listed or under review for listing as threatened or endangered. Therefore, craftworkers who are not certain about correct identification of their material may collect rare plants along with more common ones.

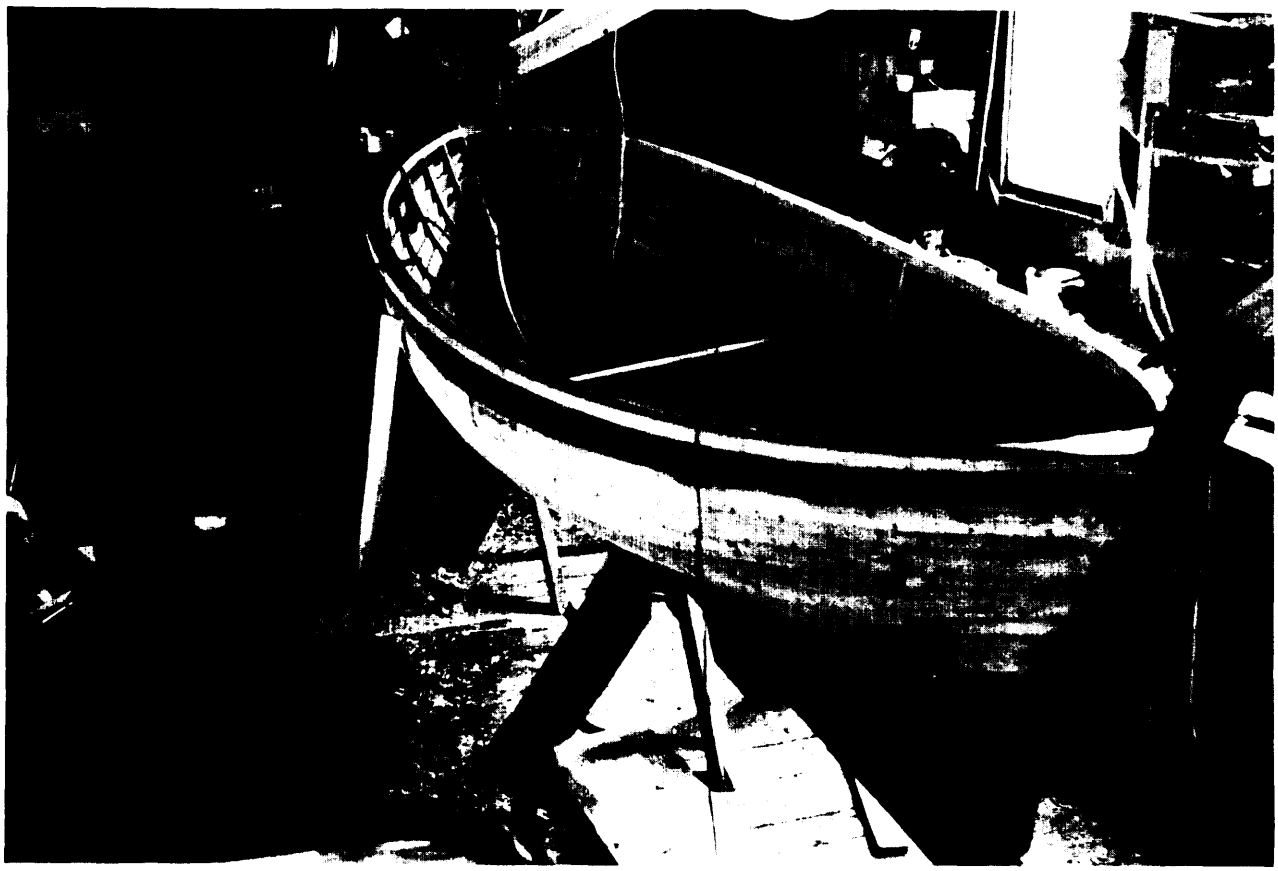
Effects on Crafts—Craftworkers face few legal restrictions in obtaining plants. They may face limitations imposed by other factors. The loss of wetlands eliminates some basketry plants (LaRiche, 1983). So much indigo is required for denim that craftworkers have been essentially excluded from the market (Hueber, 1983).

Dying with plants has decreased dramatically with the availability of commercial dyes. Naturally dyed items generally still command higher prices, as much as 80 percent higher for Navaho rugs (Eshbaugh, 1983). Concern exists, however, that the dyer's botanical knowledge is slipping away (Eshbaugh, 1983; Hueber, 1983). Protection of information maybe just as important as protection of the resource in this case.

Wood and Tree Fern Trunks

Native and imported woods supply builders and makers of musical instruments, boats, and furniture. Some records exist of U.S. forest resources, but they do not provide a good indication of the amount of wood used in crafts. The U.S. Forest Service, for example, maintains records of forest stock and annual timber harvests on Federal lands. Only certain important woodworking trees are included in their figures. Some, such as black walnut, are specifically excluded because of their rarity. For these reasons, only local, comprehensive State, or private woodlot records are likely to show changes in craft wood availability and use. Such records have not been compiled yet, and their synthesis would be a formidable task.

Status of the Resource—Little concern exists that commercially important continental American trees are endangered, although there are a few exceptions. In some cases, the specialty woods used by craftworkers are being lost as native forests are replaced by pine plantations (McMahan, 1983). Tree ferns are among the few rare plants in international trade that are included under CITES (McBride, 1983). Their trunks are used in the commercial green-



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house industry and a smaller number are used in crafts. In 1982, 2,770 bags of fiber and 40 cubic meters of other material were imported from Guatemala, and 6,000 kg of pieces of "wood" came from New Zealand. These imports probably are a fraction of the total volume (McMahan, 1983).

Commercial use of tree ferns is too recent to have depleted their populations. Much of the material comes from forests already destroyed; in other cases, people are selectively removing the tree ferns. It should be noted, however, that the commercial greenhouse market for tree ferns developed largeIy due to the increasing scarcity of *Osmunda* ferns that were overharvested for the same use. Many tropical forests are being rapidly destroyed (Office of Technology Assessment, 1984) and tree ferns are among the potential victims.

Effects on Crafts—Craftworkers are noticing the depletion of local woodworking supplies., This may indicate the beginning of new problems. Makers of kachina dolls, for example, are forced to travel longer distances to find suitable cottonwood (Eshbaugh, 1983). A 50-year-old splint basketmaker has seen a decrease in the local availability of different oaks (Camp, 1983).

Woodworkers, more than other craftspeople, are concerned about the availability of good supplies and rising prices when they are available (Nickerson, undated). These concerns cannot be documented with readily accessible

data. Concern seems warranted, however, based on cases where wood availability changed sharply and craft traditions and local economies suffered substantially. This happened on a regional scale in the 1920's when the chestnut blight destroyed much of the economy of the Shenandoah Mountains (Reeder, 1978).

Woodworkers are also concerned about wood quality, a trait more difficult to document. Some boatbuilders note the declining quality of marine plywood (Phillips, 1983). Others have turned to curing their own wood, since commercial curing may not produce suitable wood for boatbuilding or making fine musical instruments. In other cases, lumber may be cut too short for some craftworkers, in effect making it unavailable.

Shells and Coral

Shells and skeletons of marine, freshwater, and terrestrial invertebrates are used in large amounts in crafts. Many are used whole as ornamentals; others are ground into a variety of products including pottery glazes. There are about 5,000 kinds of shells that are large enough for sale. Few of these now come from U.S. waters, but this may change as international trade is more strictly regulated by CITES.

The vast majority of shell imports enters the United States through Florida, California, New York, and Oregon. The United States is one of the largest importers of ornamental shells, and imports have escalated in the last few years. About 4 million kg of shells and 500,000 kg of coral are imported annually, worth about $11 million. These amounts comprise only a small percentage of the world shell population. The major use of shellfish, but not of coral, is for food, and harvest for ornamental shells represents a fraction of the food catch (Abbott, 1980; Wells, 1981).

Status of the Resource–Industrial technology threatens some of these invertebrates. Some coral reefs are dynamited for fishing and for construction material (Wells, 1981). The continuing destruction of tropical forests has caused the extinction of a number of tree snails in Hawaii and Asia. Spills of toxic materials similarly have eliminated freshwater shells in certain places in the United States and elsewhere. Such destruction of habitat can eliminate populations that cannot be depleted by intensive collecting.

Marine biologists generally agree that the craft and souvenir trade does not pose a similar threat (Abbott, 1980), but increasingly tighter regulation reflects continuing concern. Therefore, conservationists urge caution in exploiting shells and coral. It is particularly appropriate in harvesting coral. Both white and black coral populations are thought to be threatened, but pink, or precious, corals probably are not. Coral grows very slowly; collecting could destroy reefs weakened by dredging, pollution, and siltation. Deep sea fishing technology is developing rapidly and greater accessibility makes overcollection more probable. Sustainable management of shell populations remains an elusive goal (Wells, 1981), especially in tropical waters where fishing for craft purposes is prominent.

Effects on Crafts—Shell collecting is regulated in some places, such as Florida, to protect shells that were previously overcollected. Few countries provide similar protection for purely ornamental species, although most control harvest of edible mollusks (Wells, 1981). Some expect that shell regulation will increase as more countries become parties to CITES and additional species are added to its appended lists of controlled species, Two species of giant clams, for example, recently have been added to Appendix 2 of CITES, since craft and decorative uses of their shells have been increasing (McIntyre, 1983). No evidence exists on how these changes are affecting craftspeople. The situation is analogous to marine mammal regulation in some ways; so the future may see similar substitutions, illegal trade, and confusion. Some crafts may face economic endangerment if retailers fear selling illegal products.

Hides

The United States produces large numbers of cow, calf, goat, and sheep hides from the livestock industry, Smaller numbers of alligator, snake, frog, lizard, and turtle skins also are used to produce leather. Louisiana has a legal alligator hunting season and about 16,000 to 20,000 alligators are killed annually (Cook, 1980). Few hides are processed in the United States; most are shipped to Europe or Japan for curing and, often, finishing. In 1980, almost 24 million animal hides and skins were exported (U.S. Department of Agriculture, 1981). The proportion of these hides used in crafts is not known.

Status of the Resource—Alligators are protected by the Endangered Species Act in several States, and the Lacey Act precludes the transportation of illegally taken specimens in interstate or foreign commerce, Poaching remains a problem, but officials feel that current regulations are effectively protecting alligators (Cook, 1980), Too little is known about leather from snakes, frogs, and lizards to evaluate their status.

Effects on Crafts—Most U.S. leatherworkers turn to jobbers for their supplies, with varying results, Some face problems obtaining high-quality hides. Others find that the diversity of leather curing processes used, especially in Europe, makes available to them a very broad range of products,

Hide supplies can be unstable. Alligators in the Southeast have been overhunted, then strictly protected, then hunted again in the last decades. Management of most natural populations must be this dynamic, but craftwork is difficult when supplies cannot be ensured, One goal of CITES is development of alternative supplies. Plans for alligator and sea turtle ranches or breeding programs may stabilize supplies.

Leatherworkers are vulnerable to large price fluctuations; prices have as much as tripled in one year (Ahlborn, 1983). This is due to changes in the international hide market, The United States imports a large number of hides —at least 10 million in 1980 (U.S. Department of Agriculture, 1981). Officials would like to encourage more American leatherwork to avoid the high “value added” that these hides often include,

SUMMARY

Technology rapidly is changing some aspects of the craft process. Only some craftworkers want or are able to take advantage of these changes. This is cause for concern, since the traditional crafts usually are more negatively affected by technological change.

Natural resource supplies for crafts vary greatly in their availability, quality, and sustainability. Many craftworkers face problems in obtaining enough high-quality raw materials at affordable prices, These problems are likely to increase. The reliability of such an assessment is decreased, however, by the lack of information on U.S. and worldwide use of renewable resources, An inventory of the kinds and amounts of organisms used in crafts is urgently needed. Resources in developing countries need priority appraisal, since they are being depleted more quickly.

The Federal Government plays an important role in supporting American crafts, protecting renewable resources, and developing technology. The connections among these activities have not been made explicit, however, and ineffective policies sometimes result, The intentional and the inadvertent results of activities in these three arenas have been examined in only a general way. A more rigorous examination is needed,

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Appendixes

Appendix A

Summary of the Technology, Renewable Resources, and American Crafts OTA Workshop, July 12, 1983

American crafts play important economic and cultural roles. The economic impact is difficult to document, but several hundred thousand people are directly involved, and retail sales are known to total about $10 million in each of several States. For some people, including isolated elderly workers, the unemployed, and the underemployed, craftwork provides an irreplaceable source of income. For others, it is more important culturally than economically. Crafts symbolize important community values, distinguish among traditions, and initiate newcomers into a common heritage.

Many crafts—for example, scrimshaw, woodworking, basketry, and leatherworking—use renewable natural resources for raw materials. The total amount of materials used or needed largely is unknown, but some craftworkers increasingly express concern about decreasing material availability, A variety of factors affect availability: legal restrictions, changing technology, destruction of wild plant and animal habitat, and demand for other products.

Technology's role usually has not been analyzed, but in some cases it is significant, Small-scale buyers, such as craftspeople, may be unable to influence technology when changes are geared to major buyers, such as new lumber processing for the construction industry. These technological changes may be beneficial or detrimental to craftspeople. In either case, craftworkers such as makers of musical instruments and boatbuilders must choose to substitute new materials, adapt to new technology, or stop practicing their craft. Technology has also been important in protecting natural populations. Synthetic materials are replacing ivory in some crafts; improved marking systems allow legitimate sources of ivory to be used; and international management systems have been developed to limit illegal traffic.

Legislative remedies have been applied to problems such as these. Demand for items such as ivory, feathers, and coral is high enough to create a black market and deplete natural populations. Illegal traffic in animal products may reach *$2o* million annually. The popularity of American crafts has other negative aspects: craft income may be intentionally underreported, design theft may take place, and inexpensive foreign reproductions may be mass-produced and marketed.

A large number of areas remain for clarification and analysis and many have relevance to public policies. These include:

- health hazards of craft materials;
- industrial/craft cooperation;
- potential for craft cooperatives in economic development;
- review of legislation;
- renewable resource needs of craftworkers;
- technologies to protect craft designs;
- future of technology in crafts; and
- impacts of crafts in America.

Appendix B

Sample Plant List: Plants Used in Crafts

These trees, shrubs, and other plants are used in crafts according to published sources. No effort has been made to identify or eliminate scientific synonyms or to locate all sources. (Source numbers are keyed to attached bibliography.)

Scientific name/ common name	Plant part(s) used	Craft use	Source
Abronia spp. Wild-four o'clock	plants	brown/yellow dyes	1
Abutilon hybridum Red flowering maple	petals	blue dye	4
Acacia baileyana Acacia	pods, bark	dye	6
A. catechu Cutch	wood, pods	brown dye	6, 13
Acacia spp. Acacia	flowers, stems	yellow dye	4
Acer macrophyllum Big-leaf maple	stem, wood, bark	basket warp, woof, wrap	9
A. palmatum Japanese maple	leaves	blue dye	8
A. platanoides Norway maple	wood	brown dye	13
A. rubrum Red maple	—	gray/green dyes	8
Acer spp. Maple	—	colonial dye	6
Achillea lanulosa Yarrow	plants	yellow/brown/green dyes	1
A. millefolium Yarrow	flowers	yellow/green dyes	4
Actinea gaillardia Single-flowered actinea	leaves	Navajo yellow dye	14
A. leptoclada Several-flowered actinea	plant	Navajo yellow dye	14
Adiantum pedatum	stems	Yurok basket weft	10
Maidenhair fern	stems	Calif. Indian basket design	9
Adiantum spp. Maidenhair fern	stems	Calif, Indian basket design	9
Agave desertii Desert agave	leaves	Calif. Indian baskets	9
A. ixtli Sisal hemp, henequen	—	ropes	5
Aesculus spp. Buckeye	—	basketry	5
Agaricus silvaticus Mushroom	—	dye	12
Agrimonia eupatoria Agrimony	plants	yellow dye	13
A. odorata Fragrant agrimony	plants	yellow dye	13
Agyrophora lyngei Lichen	—	dye	8
Alectoria ochrileuca Greenbeard lichen	—	dye	8

Scientific name/ common name	Plant part(s) used	Craft use	Source
A. sarmentosa Lichen	—	green-yellow dye	6
Allium cepa Onion	skins	yellow dye	13
Allium spp.	—	yellow dye	6
Yellow onion	skins	yellow/orange dyes	4
Red onion	skins	dye	4
Alnus glutinosa Black alder	bark	black and dark dyes	6, 13
A. incana var. virescens Black alder	bark	Navajo red dye	11
A. oregana Red alder	roots	Yurok basket weft	10
A. rhombifolia	bark	Yurok basket weft dye	10
White alder	bark	Calif. Indian baskets	9
A. rubra Red alder	root	Calif. Indian baskets	9
A. tenuifolia	bark	Navajo brown dye	14
Alder	twigs, leaves, fruit	brown/yellow/green dyes	1
Mountain alder	—	dye	8
Alnus spp.	—	Shasta brown dye	5
Alder		European black and dark dye	6
		Indian dye	7
Althea rosea Hollyhock	petals	purple/black/brown dyes	4, 6, 8
Amanita muscaria	—	dye	12
Amaranths retroflexus Redroot pigweed	plants	yellow/grey dyes	1
Amaranths spp. Pigweed	plants	green dye	4
Ambrosia tomentosa Povertyweed	plants	green dye	1
A. trifida Giant ragweed	—	brown/yellow/green dyes	1
Ambrosia spp. Ragweed	plants	yellow/green dyes	1, 8
Anaphalis margaritacea Pearly everlasting	—	yellow dye	4
Anchusa tinctoria Alkanet	roots	red dye	6, 13
Andropogon virginicus	—	dye	6
Broom sedge		yellow dye	8, 13
Anemone spp. Blue anemone	flowers	blue/green dye	4
Anthemis cotula Fetid chamomile, stinkweed	—	gold dye	4
A. nobilis Chamomile	flowers	yellow dye	4, 6
A. tinctoria Golden Marguerite	—	yellow dye	6
Anthemis spp.	—	dye	8
Antirrhinum majus Snapdragon	flowers	green/gold dyes	4
Arbutus menziesii Madrone	bark	brown dye	4
Arceuthobium spp. Mistletoe	plants	yellow/brown dyes	1

Scientific name/ common name	Plant part(s) used	Craft use	Source
Arctium minus Burdock	plants	yellow/brown/green dyes	1
Arctostaphylos alpina	—	dye	8
A. uva-ursi	plants	yellow/green/brown dyes	1
Kinnikinnick	plants	dye	8
Arctostaphylos spp.	leaves, wood	brown dye	4
Manzanita		Calif. Indian black dye. awl	9
Arctotis spp. African daisy	flowers	green dye	4
Areca catechu Cutch	wood, pods	brown dye	6
Argemone polyanthemos Prickle poppy	plants	green dye	1
Artemisia frigida Sage	leaves	yellow/green dyes	1
A. ludoviciana Wormwood	stems	Calif. Indian baskets	9
A. tilesia Wormwood	—	dye	8
A. tridentata Basin sagebrush	leaves, twigs	Navajo yellow/green dyes	1, 14
Arundinaria macrosperma Cane	—	dye	6
Asclepias speciosa	plants	green dye	4
Showy milkweed	plants	yellow/brown/green dyes	1
A. tuberosa Butterfly weed	—	yellow-brown dye	6
Asparagus officinalis Asparagus	plants	yellow/green dyes	1
Asperula odorata Sweet woodruff	plants	green/brown dyes	4
Aster porteri White aster	plants	yellow dye	1
Aster spp. Purple aster	plants	yellow/green/orange dyes	1
Astragalus alpinus	—	dye	8
A triplex canescens Saltbush	plants	Navajo yellow dye	14
Baphia nitida Barwood	wood	commercial red dye	7
Baptisia tinctoria Wild indigo	leaves	dye	6
Berberis aquifolium	root	Navajo yellow dye	14
Oregon grape	—	Calif. Indian basket dye	9
B. ***fremontii*** Barberry	berries	purple Indian dye	7
B. nervosa Oregon grape	bark	Calif. Indian basket dye	9
B. vulgaris American barberry		yellow/brown dyes	6, 13
Berberis spp. Barberry	leaves, stems	green/brown dyes	4
Betula glandulosa Ground birch		dye	8
B. ***lenta*** Sweet birch		brown/black dyes	6

Scientific name/ common name	plant part(s) used	Craft use	Source
B. lutea Yellow birch		brown/black dyes	6
B. papyrifera	—	brown/black dyes	6
Paper birch	—	dye	8
B. pendula (B. populifolia ?) Silver Birch	bark, leaves	yellow dye	13
Betula spp.	—	colonial dye	6
Bixa orellana Annato	seeds	yellow/orange dyes	7
Boletus edulis King boletus		dye	12
B, ***eastwoodii***	—	dye	12
B. elegans	—	dye	12
Brassica oleracea var. capitata Purple cabbage	leaves	blue dye	4
Brickellia grandiflora Tassel-flower	stems	yellow/brown dyes	1
Bromeʃia sylvestris Silkgrass, pita		basketry	5
Bryum cryophilum Moss		dye	8
Buddlejia davidii Butterfly bush	flowers/leaves/stems	green/brown dyes	4
Bulgaria inquinans	—	dye	12
Cactaceae	—	Papago rope, carved dolls,	3
		Indian basketry awls	3, 10
Caesalpinia echinata Brazilwood	wood	red dye	4
Calamus spp. East Indian rattan	—	basketry	5
Calceolaria angustifolia ***Yellow*** lady's purse	flowers	yellow/orange dyes	4
Callistemon spp. Bottle-brush	flowers, leaves	brown dye	4
Callistephus chinensis China aster	—	dye	6
Caltha palustris Marsh marigold	petals	yellow dye	6
Calluna vulgaris Heather		dye	8
Calluna spp. Heather	leaves, stems	dye	6
Calycanthus occidentals	flowers, stems, bark	brown dye	4
Spice-bush		Calif. Indian baskets	9
Camellia japonica Camellia		dye	8
Camellia spp.	leaves	dye	6
Camellia	flowers	gray dye	4
Campanula medium Canterbury bells	flowers	green/blue dyes	4
C. ***rapunculoides*** Creeping harebell	plants	brown dye	1
Cantharellus (?) clavatus Pig ears		dye	12
Canthareulus (?) cibarius	—	dye	12
C. infundiduliformis	—	dye	12

Scientific name/ common name	Plant part(s) used	Craft use	Source
Cardamine pratensis var. angustifolia Bittercress	—	dye	8
Carduus nutans Musk thistle	flowers	brown/yellow/green dyes	1
Cartharnus tinctorius Safflower	flowers	red/yellow dyes	7, 13
Carex ***barbarae*** Slough grass	root, bark	Porno basket weft Calif. Indian basket woof	10 9
C. ***mendocinoensis*** Sedge	root	Porno baskets Calif. Indian basket wrapping	5 9
Carex spp. Sedge	plants	green/brown/yellow dyes	1
Carya tomentosa Mockernut	bark	yellow/brown dye	6, 13
Carya illinoensis Pecan	bark	yellow/brown dye	6
Cassiope tetragona Arctic white heather	—	dye	8
Castanea dentata Chestnut	—	dye	8
Castilleja integra Indian paintbrush	flowers, plants, roots	Navajo tan/yellow dyes	7, 14
C. ***miniata*** Indian paintbrush	plants	yellow/green dyes	1
Ceanothus americanus ***New*** Jersey tea	roots, leaves	dye	6
C. ***integerrimus*** Deer brush	stems	Calif. Indian basket foundation, warp	9
Ceanothus spp. California lilac	flowers	green dye	4
Centaurea cyanus Cornflower	petals	blue dye	6
C. ***repens*** Knapweed	plants	yellow dye	1
Cercis occidentals Redbud	bark	Porno basket weft waterproof baskets Calif. Indian basket warp woof, wrap, foundation	10 5 9
Cercocarpus betulifolius Mountain mahogany	root	Navaho basket weft, dye	10
C. ***breviflorus var eximius*** Mountain mahogany		dye	2
C. ***montanus*** Mountain mahogany		Navaho brown dye brown dye	14 1
C. ***parviflorus*** Mountain mahogany	— root, bark	Indian dye Navajo brown dye	7 11
Ceropteris triangularis Goldenback fern	stems	Calif. Indian basket design	9
Cetraria cucullata Caribou lichen		dye	8
C. ***glauca*** Lichen		yellow dye	6
C. ***nivilis*** Caribou lichen	—	dye	8
C. ***tilesii*** Yellow lichen		dye	8

Scientific name/ common name	Plant Part(s) used	Craft use	Source
Chenopodium spp.	plants	green dye	4
Green goosefoot	plants	green dye	1
White goosefoot	plants	yellow dye	1
Chlorogalum pomeridianum Soaproot	juice	Calif. Indian baskets	9
Chlorophora tinctoria see Morus tinctoria			
Chondrus crispus Irish moss		dye	8
Chrysanthemum frutescent Paris daisy	flowers	gold/green dyes	4
C. ***integrifolium*** Chrysanthemum		dye	8
Chrysanthemum spp. Chrysanthemum	leaves, flowers	dye	4, 6
Chrysopsis villosa Golden wooly aster	plants	yellow dye	1
Chrysosplenium alternifolium var. tetrandrum Golden saxifrage	—	dye	8
Chrysothamnus bigelovii Small rabbitbrush	—	Navajo yellow dye	14
C. ***latisquameus*** Big rabbitbrush	flowers, twigs	Navajo yellow dye	14
Chrysothamnus spp. Rabbitbrush	flowers	dye	2
		orange dye	4
		yellow/green dyes	1, 7
Cichorium intybus Chicory	plants	yellow dye	1
Cinna macroura (Epicampes rigens californica?)	stems	Calif. Indian basket foundation	9
Cirriphyllum cirrosum	—	dye	8
Cirsium arvense Canadian thistle	plants	brown dye	1
Cladium mariscus (Carex spp. ?) Cladium	roots	Calif. Indian basket wrap	9
Cladonia impexa Lichen		pink dye	13
Clarkia spp. Goditia	flowers	gold/gray dyes	4
Clavaria (Clauria ?) aurea	—	dye	12
Clematis ligusticifolia White clematis	plants	yellow/brown/green dyes	1
Cleome serrulata Rocky mountain bee plant		Navajo yellow dye	1, 14
Clutia tranvancorica Coralline	wood	orange/brown dyes	4
Convallaria arvensis Lily-of-the-valley		green dye	4
C. ***majalis***	leaves	yellow dye	13
Lily-of-the-valley	—	dye	8
Convolvulus arvensis Bindweed	plants	gold/green dyes	1
Conyza canadensis Horsetail	stems, leaves	green/yellow dyes	1
Coprinus comatus Shaggy mane	—	dye	12
Coreopsis auriculata Coreopsis	—	orange dye	4

Scientific name/ common name	Plant part(s) used	Craft use	Source
C. calliopsidea Coreopsis	—	orange dye	4
C. ***cardaminifolia*** Coreopsis	flowers	red Indian dye	7
C. ***gigantea*** Coreopsis	—	orange dye	4
C. ***tinctoria (C. marmorata)*** Calliopsis	flowers —	dye yellow dye	6, 8 13
Coreopsis spp. Coreopsis	flowers, seeds	orange/brown dyes	4
Cornicularia divergens Blackboard lichen	—	dye	8
Corn us florida Flowering dogwood	bark, root —	red/violet dyes dye	6 8
Coronilla varia Crownvetch	plants	brown/yellow dyes	1
Cotoneaster spp. Cotoneaster	berries	tan dye	4
Cotula coronopifolia Brass-buttons		gold dye	4
Cortinarius spp.	—	dye	12
Corylus californica Hazelnut	—	Yurok basket warp	10
C. ***rostrata californica*** Hazel	stems	Calif. Indian basket warp, woof, foundation	9
Cotinus coggygria Smoke tree	root, stems	yellow-orange dye	6
Cowania mexicana Cliffrose	leaves, stems	Navajo brown dye	11
C. ***stansburiana*** Cliff rose	twigs, leaves	Navajo gold dye	14
Crataegus spp. Hawthorn	flowers	green/brown dyes	4
Crocus sativus Saffron	flowers	yellow dye	6
C. ***vernus*** Purple crocus	flowers	blue/green dyes	4
Cryptantha virgata Miner's candle	plants	green dye	1
Cupressus lawsoniana (Chamaecyparis lawsonia) Cypress	cones	brown dye	13
Curcuma longa Turmeric powder	—	yellow dye	13
Curcuma spp. Turmeric	roots	Asian yellow dye	7
Cuscuta spp. Dodder	plants	yellow dye	1, 4
Cytisus scoparius Scotch broom	— —	yellow dye dye	6 8
Cytisus spp.	—	yellow dye	13
Dactylina ramulosa Lichen	—	dye	8
Dahlia pinnatua Yellow dahlia	flowers	yellow/brown dyes	4
Dahlia spp. Dahlia	flowers	dye orange dye	6, 8, 13 4

Scientific name/ common name	Plant part(s) used	Craft use	Source
Dalea emoryi ***(Parosela emery?)***	stems	Calif. Indian basket yellow dye	9
Daucus carota Queen Anne's lace	—	dye	6, 8
Delphinium ajacis Larkspur	—	blue dye	6
D, consolida	—	dye	a
D. scaposum Wild purple larkspur	petals, stems, leaves	Navajo gray/yellow dyes	11,14
Delphinium spp.	flowers	Indian blue dye	7
Descurainia sophides Tansy mustard	—	dye	8
Dicranum elongatum Lamp moss	—	dye	8
Digitalis purpurea Purple foxglove	flowers	green dye	4
Dipsacus sylvestris Teasel	plants	green/yellow dyes	1
Dondia suffrutescens ***(Sueda suffrutescens?)*** ***Sea-blight***	stems	Calif. Indian basket dye	9
Draba glabella Mustard	flowers	dye	8
Dryas integrifolia Mountain aven	flowers	dye	8
Echinocactus polycephalus Devil's pincushion	spines	Panamint basketry needles Calif. Indian basket awls	5 9
Echinochloa crusgalli Watergrass	plants	brown/green dye	1
Empetrum nigrum Crowberry	berries	dye	8
Enteromorpha spp. Sea grass	—	dye	8
Ephedra viridis Mormon tea	twigs, leaves	Navajo tan dye gray/brown dyes	14 1
Epicampes rigens California grass	stems	Calif. Indian basket foundation	9
Epilobium angustifolium Fireweed	plants	yellow/green/brown dyes	1
E. /atifolium Broad-leaved willow		dye	8
Epiphyllum spp. Red-flowered orchid cactus	—	red dye	4
Equisetum arvense Scouring rush	stems	yellow dye	1
Equisetum spp. Horsetail	shoots	dye green dye	6, 8 13
Erica spp. Heather	shoots	yellow dye dye	13 8
Erigeron speciosus Showy daisy	plants	green/yellow dyes	1
Eriogonum umbellaturn Sulfur flower	stems, flowers	gold dye	1
Eriophyllum staechadifolium Seaside woolyaster	flowers	gold/brown dyes	4

Scientific name/ common name	Plant part(s) used	Craft use	Source
Erodium spp. Filaree	plants	green dye	4
Eschscholtzia spp. California poppy	—	dye	6
Eucalyptus coccifera Tasmanian snow-gum	leaves	gold/green dyes	4
E. globulus Blue-gum	bark, leaves, shoots	green/brown dyes	4
E. leucoxylon White-iron bark eucalyptus	leaves, pods	orange dye	4
E. polyanthemos Silver dollar	—	red dye	4
Eucalyptus spp.	—	gold dye	6
Euphorbia esula Leafy spurge	—	yellow/brown dyes	1
E. marginata Snow-on-the-mountain	plants	yellow/brown dyes	1
E. pulcherrima Poinsettia	leaves	brown dye	4
Evernia prunastri Staghorn lichen	—	brown/purple dyes dye	13 8
E. vulpina Wolf moss	plants	Calif. Indian basket dye	9
Fagus sylvatica Beech		dye	8
Festuca baffinensis Grass	—	purple dye	8
Filipendula ulmaria Meadowsweet	shoots	black dye	13
Foeniculum vulgare Fennel	roots	yellow/brown dyes	4
Forestiera neomexicana Ironwood	berries	Navajo gray dye	14
Fraxinus americana Ash	—	dye	8
Fucus Spp. Rockweed		dye	8
Gaillardia aristata Gaillardia	plants	yellow dye	1
Galium boreale Lady's bedstraw	plant, root	yellow/green/brown dyes red/yellow dyes	1 13
Galium spp. Bedstraw	—	dye	8
Garrya elliptica Silk-tassel shrub	fruits	gray dye	4
Gaultheria shallon Salal	berries	blue/green dyes	4
Gaylussacia ***baccata*** Black huckleberry	berries	purple dye	13
Genista tinctoria Dyer's broom	plants	yellow dye	6 13
Geranium robertianum Wild geranium	plants	yellow/brown dyes	4
G. ***tiscosissimum*** Sticky geranium	plants	yellow/brown dyes	1
Gnaphalium spp. Cudweed	—	yellow/green dyes	4

Scientific name/ common name	Plant part(s) used	Craft use	Source
Gomphidius glutinous	—	dye	12
Gomphus fluccosus	—	dye	12
Gossypium hopi Hopi cotton	—	weaving	2
Gossypium spp. Cotton	flowers	yellow dye	13
Grevillea robusta Silk oak	leaves	yellow/green dyes	4
Grindelia sqarrosa Gumweed	plants	yellow/green dyes	1
Grindelia spp. Gum plant	flowers, pods	yellow dye	4
Gutierrezia sarothrae Matchbrush	plants	yellow/brown dyes	1
Gymnogramma triangularis (Ceropteris triangularis?) Goldenback fern	stems	Calif. Indian basket design	9
Gymnopilus junonium (Pholiota spectabilis ?)	—	dye	12
Haematomma lapponicum Popcorn lichen	—	dye	8
Haematoxylon campechianum Logwood	wood	red/blue/purple/brown dyes	4, 6, 13
Haplopappus spinulosus Spiny goldenweed	plants	brown/yellow dyes	1
Hedera helix Ivy	berries	green/gray dyes	13
Helenium hoopesii Owl's claw	plants, flowers	Navajo yellow dye	11, 14
Helenium spp.	—	dye	6
Helianthus annuus	seed oil	yellow dye	6
Sunflower	flowers	green/brown/yellow dyes	1
H. uniflora Aspen sunflower	flowers	yellow/brown dyes	1
Helianthus spp. Sunflower	seeds	Hopi dye	2
Helichrysum petiolatum Cudweed everlasting	leaves, flowers	yellow/brown/green dyes	4
Hemerocallis spp. Day lily	flowers	yellow dye	6, 13
Hemizonia luzulaefolia Tarweed	plant	yellow/green dyes	4
Heracleum lanatum Cow parsnip	—	green/yellow/brown dyes	1
Heteromeles arbutifolia Christmas berry	leaves, stems, berries	brown/green/black dyes	4
Heuchera americana Alum plant	root	alum mordant	4
H. bracteata Navajo tea	stems	Navajo dye	11
H. cylindrical Alum plant	root	alum mordant	4
H. micrantha Alum plant	root	Porno mordant and dye	4
Hibiscus rosa-sinensis Hibiscus	—	dye	8

Scientific name/ common name	Plant part(s) used	Craft use	Source
H. syriacus Rose-of-Sharon	flowers	blue dye	4
Hibiscus spp. Rose mallow, red hibiscus	flowers	blue/green dyes	4
Hierochloe odorata Sweetgrass		baskets	10
Hyacinths orientalism Blue hyacinth	flowers	blue d)~e	4
Hyacinths spp. Hyacinth	flowers	blue dye	4
Hydrastis canadensis Goldenseal	roots	yellow Indian dye	7
Hygrophorus coccineum		dye	12
H. conicus Parrot mushroom		dye	12
H. hypotheius		dye	12
H. miniatus		dye	12
H. puniceus		dye	12
Hymenoxys metcalfei Rubberplant	leaves/stems/flowers	Navajo yellow dye	14
Hypericum calycinum Saint-John' s-wort	flowers	orange dye	4
H. perforatum Klamath weed		dye gold dye	6, 8 4
Hypericum spp. Saint-John' s-wort	shoots	yellow dye	13
Hypogymnia psychodes		brown dye	13
(Parmelia psychodes) Shield lichen		dye	8
Ilex spp. Holly		dye	8
Indigofera Zeptosepala Indigo	plants	blue Indian dye	7
1. ***tinctoria*** Indigo	leaves	dye	6, 13
Inodes palmetto Palmetto	leaves	La. Indian baskets	10
Iris germanica Purple iris	flowers	blue dye	4
I. pseudacorus Yellow flag iris	—	black dye	13
Iris spp. Iris	flowers leaves	blue/purple dyes Indian basket foundation	4 9
Isatis tinctoria Woad	leaves	blue dye	4, 7
Zva xanthifolia Marshelder	stems, leaves	brown/yellow dyes	1
Jug]ans cinerea Butternut		brown dye	6, 7
J. major Wild walnut	hulls, leaves	Navajo brown dye	14
J. nigra Black walnut	twigs, shells, leaves	Navajo brown dye	4
J, regia English walnut	leaves, flowers	brown dye	4, 13
Jug@;u;pp.	shells, twigs	Navajo brown dye	11

Scientific name/ common name	plant part(s) used	Craft use	Source
Juncus acutus Rush	leaves	Calif. Indian basket warp woof, wrap, design	9
J. bahicus Wiregrass	stems, leaves	yellow/green dyes Calif. Indian baskets	1 9
J. effusus Rush	leaves	Calif. Indian basket warp, woof	9
J. Iesenerii (J. acutus?) Reed grass	leaves	Calif, Indian basket woof	9
J. mertensianus (J. acutus?) Rush	leaves	Calif. Indian basket warp, woof, wrap, foundation	9
J. robustus (J. acutus?] Tule grass	roots, leaves	Calif. baskets Calif. Indian basket design	5 9
J. textilis Basket rush	leaves	Calif. Indian basket wrap	9
Juncus *Spp.*	leaves	Calif. Indian basket wrap, pattern	9
Juniperus monosperma One-sided juniper	needle ashes berries	Navajo mordant, dye, tan dye	14 14
J. occidentals Juniper	root, bark stems, leaves	Calif. Indian basket warp, woof Navajo brown dye	9 11
J. virginiana Cedar	—	purple dye	8
Kalmia latifolia Mountain laurel	leaves	dye yellow/gray dyes	6 13
Kalmia spp.	—	dye	8
Kochia scoparia Kochia	—	brown dye	1
Laccaria amethystima	—	dye	12
Lactarius delicious	—	dye	12
Lactuca pulchella Blue-flowered lettuce	—	brown/green/yellow dyes	1
L. scariola Prickly lettuce	—	yellow/green dyes	1
Laminaria spp. Kelp	—	dye	8
Larix spp. Larch needles	—	brown dyes dye	13 8
Lathyrus spp. Sweet pea	flowers, stems	yellow/brown dyes	1
Ledum decumens Labrador tea	—	dye	8
L. greonlandicum Labrador tea	—	dye	8
Lepidium virginicum Pepperweed	plants	yellow/brown/green dyes	1
Lepista nuda	—	dye	12
Leptospermum scoparium ***New*** Zealand tea tree	flowers, leaves, stems stems	green/black dyes	4
Letharia vulpina Staghorn moss	—	yellow dye	4
Liatris spp. Blazingstar	stems	yellow/green/brown dyes	1
Ligustrum vulgare Privet	twigs, leaves, fruits	dye	6, 8, 13
Ligustrum spp. Privet	berries, leaves	green/yellow dyes	4

Scientific name/ common name	Plant part(s) used	Craft use	Source
Linaria vulgaris Butter-and-eggs	plants	yellow/green/brown dyes	1
Lobaria pulmonaria	—	brown dye	13
(Stroba pulmonaria) Lungwort lichen	—	dye	8
Lobelia erinus Blue lobelia	flowers, stems	green dye	4
Lonicera interrupta Honeysuckle	stems	Calif. Indian basket foundations	9
L. involucrata Twinberry	berries	gray dye	4
Lupinus arboreus Yellow bush lupine	flowers	yellow dye	4
L. kingii Blue-flowered lupine	plants	Navajo yellow dye	14
Lupinus spp. Lupine	flowers	green dye	*4*
		yellow/brown/green dyes	1
		dye	*8*
Lycoperdon spp. Puffball		dye	*12*
L. caelatum	—	dye	12
Lycopodium spp.	—	alum mordant	4
Lysimachia spp. Yellow loosestrife	flowers	yellow/brown dyes	1
Maclura pomifera Osage orange	wood	yellow/orange dyes	4
			13
Mahonia aquifolium Grape holly	root, fruit	yellow dye	6
		yellow/purple dyes	13
Mahonia spp. Grape holly	fruit, leaves, roots	blue/green dyes	4
	fruit	brown/green dyes	1
Malus spp. Apple	bark	yellow dye	13
	bark	dye	8
Malva neglecta Mallow	flowers, leaves	yellow/green/brown dyes	1
Malva spp. Tree mallow	flowers, plants	blue/green dyes	4
Marrubium vulgare Common horehound	stems, leaves	green/brown dyes	1
Martynia frangrans	—	Pima basket weft	10
		Papago basket weft	10
M. louisiana ***(M. proboscidea?)*** Devil's horns	pods	Calif. Indian basket black pattern	9
M. parviflora Devil's claw	pods	Papago basket weft; rare from collecting	3
M. proboscidea Unicorn plant	pods	Panamint baskets	*5*
		Calif. Indian basket black pattern	*9*
Martynia spp. Devil's horn	pods	Calif. Indian basket black pattern	*9*
Matthiola incana Purple stock	flowers	blue dye	4
Matricaria ambigua Wild chamomile		dye	8
Medicago sativa Alfalfa		Navajo blue dye	*11*
		green dye	1

Scientific name/ common name	Plant part(s) used	Craft use	Source
Melandrium apetalum var. arcticum Bladder campion		dye	*8*
Melilotus oflicinalis Yellow sweetclover	plants	yellow/brown dyes	*1*
Menegussia pertusa Lichen	—	yellow/pink dyes	*13*
Mentha piperita Peppermint	plants	green/brown dyes	*1*
Mentzelia decapetala Eveningstar	plants	brown dye	*1*
Mercurialis perennis Dog's mercury	plants	yellow dye	*13*
Mertensia ciliata Bluebell	stems	yellow/brown dyes	*1*
Monarda menthaefolia Horsemint	plants	yellow/brown/gray dyes	*1*
Morus mesozygia Canary wood	wood	yellow/orange dyes	*4*
M. nigra Black mulberry	berries, leaves	purple/green dyes	*4*
M. tinctoria or ***Chlorophora tinctoria*** Fustic		commercial yellow imported dye Brazil, Jamaica	*6*
Myrica californica Wax-myrtle	berries	gray dye	4
M. gale Bog myrtle	leaves	yellow dye	13
M. pensylvanica Bayberry	leaves, bark, stem	red dye	6
Naemato]oma fascicu]are (Hypholoma?) Sulphur tuft mushroom		dye	12
Narcissus pseudo-narcissus Daffodil	flowers	yellow/gold dyes	4
Neowashingtonia filamentosa (Washingtonian filamentosa?)	leaves	Calif. Indian basket wrap	9
Nephrona expallidum Lichen		dye	8
Nerium oleander Oleander	flowers	green dye	4
Nicotiana spp. Maroon nicotiana	flowers	green dye	4
Nolina microcarpa Beargrass		Papago basket warp	3
Nymphaea alba Water lily		brown dye	8
N. ***polysepala*** Water lily	seed coat	Calif. Indian basket black dye	9
Ochrolechia parella (Lecanora parella) Crawfish lichen		red dye	13
O. *tartarea (Lecanora tartarea)* Cudbear lichen	—	red dye dye	*13* *8*

Scientific name/ common name	Plant part(s) used	Craft use	Source
Ocotillo spp.	.	Papago basket warp	3
Oenothera strigosa Evening primrose	plants	yellow/brown dyes	1
Olea europaea Olive	fruit, skins, leaves	red/purple/green/black/ yellow dyes	4
Opuntia missouriensis	fruit	Navajo red dye	11
O. polycantha Prickly pear	fruit	Navajo red dye	13. 14
O. ***rubusta***		red dye	4
Opuntia spp.	fruit	Navajo red dye	7
Opuntia	spines	Calif. Indian basket awl	9
Orthocarpus spp, Owl's clover	plants	yellow dye	4
Oxalis corniculata Wood sorrel	flowers	yellow/orange dyes	4
Oxyria digyna Mountain sorrel		dye	8
Oxytropis arctobia		dye	8
0. maydelliana Locoweed	—	dye	8
Papaver nudicaule Iceland poppy	petals, pods	red/brown/yellow dyes	4
P. radicatum Arctic poppy		dye	8
Parmelia caperata Lichen		yellow dye dye	13 8
P. centrifugal Lichen		red-brown dye	6
P. conspersa Lichen		brown dye	8
P. disjuncta Black sunburst lichen		dye	8
P. fraudens Lichen	—	dye	8
P. fur furacer Lichen		dye	13
P. infumata Rock lichen		dye	8
P. molluscula Ground lichen	plants	Navajo orange/tan dyes	14
P. omphalodes Lichen		brown dye red-brown dye; Harris tweed dye	6 13 8
P. perlata Lichen		dye	4, 13
P. saxatilis Lichen	—	dye	8
P. sulcata Lichen	—	dye	4, 8
P. saxati]is Lichens	—	red-brown dye Harris tweed	6 13
Parosela emoryi Parosela	—	Calif. Indian basket dye	9
Pectis angustifolia Fetid marigold	—	Hopi dye	2
Pedicularis arctica Wooly lousewort	—	dye	8

Scientific name/ common name	Plant part(s) used	Craft use	Source
P. capitata Lousewort	—	dye	8
P. lanata Lousewort	—	dye	8
Pelargonium hortorum Red geranium	flowers, leaves	brown/purple dyes	4
Peltigera canina Dog's tooth lichen	—	yellow dye	13
P. leucoplebia Lichen	—	dye	8
Penstemon spp. Penstemon	flowers	brown dye	4
Pertusaria coriacea Lichen	—	dye	8
P. dactylina Lichen	—	dye	8
Petunia spp. Petunia	flowers	green dye	4
Phaeolus schweinitzii Polyporus	—	dye	12
Phaseolus vulgaris	—		
Blue kidney bean		Hopi dye	2
Red bean		brown dye	4
Philadelphus gordonianus Syringa	stems	Calif. Indian basket warp	9
Phoradendrom flavescens Mistletoe	—	green dye	8
Phormium tenax ***New*** Zealand flax	flowers, pods	brown dye	4
Phragmites vulgaris Reed	stems	Calif. Indian basket warp/ woof/design	9
Physica caesia (Physia caesia?j Lichen	—	dye	8
Phytolacca americana Pokeweed	berries	red dye	13
Picea sitchensis Lowland spruce	roots	Calif. Indian basket woof	9
Pinus cembroides Pinyon pine	pitch	black Indian dye	7
P. edulis	pitch	Hopi dye	2
Pinyon pine		Navajo black/gray dyes	14
P. lambertinana	root	Yurok basket weft	10
Sugar pine		Calif. Indian basket woof	9
P. monophylla One-leaf pine	sap	Calif. Indian baskets	9
P. palustris Long-leaf pine	needles	basketry	5
P. ponderosa	root	Yurok basket weft	10
Ponderosa pine		brown dye	1
		Calif. Indian basket woof, foundation, wrap	9
P. sabiniana Digger pine	root	Calif. Indian basket woof, warp, wrap	9
Pinus spp.	needles, root	green dye	4
Pine		Calif. Indian basket woof	9
Pisolithus tinctorius		dye	12

Scientific name/ common name	Plant part(s) used	Craft use	Source
Pittosporum crassifolium Pittosporum	seeds	blue dye	4
Plantago lanceolata Plantain	—	brown dye	4
Plantago spp. Plantain	plants	green/yellow dyes	1
Pluteus cervinus	—	dye	12
Polygonum aviculare Knotweed	plants	yellow dye green/brG-wn/orange dyes	4 1
P. hydropiper Smartweed	plants	dyc yellow dye	6 13
Polygonum spp. Ladysthumb	plants	brown dye	1
Polyporus sulphureus Polypor mushroom	—	dye	12
Populus nigra Lombardy poplar	leaves	green dye	6, 13
P. tremuloides Quaking aspen	leaves, twigs	yellow/brown/green dyes	1
P. trichocarpa Black cottonwood	roots	Calif, Indian basket woof	9
Populus Spp. Cottonwood	branches leaves, twigs	Plains Indians yellow/brown dyes dye	10 1 8
Portulaca oleracea Purslane	plants	brown/gray dyes	1
Potentilla vahliana Cinquefoil	—	dye	8
Potentilla spp. Cinquefoil	plants	yellow/green/black dyes	1
Primula spp. Primrose	petals	yellow dye	4
Prosopis juniflora Mesquite	bark	Calif. Indian basket woof	9
Prosopis spp. Mesquite	sap	Papago pottery dye	3
Prunella vulgaris Heal-all	flowers, stems	green dye	4
Prunus americana Wild plum	roots	Navajo purple dye	14
P, demissa	—	Cascade Indian basket decoration	5
P. melanocarpa Chokecherry	bark, roots twigs, leaves	Navajo brown dye yellow/brown/orange dyes	14 1
P. padus European bird cherry	bark	pink dye	13
P. persica Peach	—	yellow dye	6
P. salicina Japanese plum	—	dye	8
P. serotina Wild cherry	bark, leaves	red/gray/green dyes	6, 8
P. spinosa Blackthorn	berries	pink dye	13
Prunus spp.			
Green plum	leaves	green dye	4
Red plum	fruit, leaves	purple/green dyes	4

Scientific name/ common name	plant part(s) used	Craft use	Source
Pseudocymopterus montanus Wild celery	plant	Navajo yellow dye	*14*
Pseudotsuga mucronata Red fir	root	Calif. Indian basket woof	*9*
P. taxifolia Douglas spruce	roots	Calif. Indian basket woof	*9*
Psilostrophe tagetina Mouse-leaf	flowers	yellow Indian dye	*7*
Psoralea macrostachya Leather root	roots	Calif. Indian basket yellow dye	*9*
P. tenuiflora Scurf pea	plants	yellow/green dyes	*1*
Pteridium aquilinum Bracken fern	shoots	dye yellow dye	*6* *13*
Pteris aquilina Brake fern	root	Calif, Indian basket design	*9*
Pterocarpus dalbergioides Padauk	wood	red dye	*4*
P. santalinus Sanders	wood	commercial Asian red dye	*7*
Pterocarpus spp. Camwood	wood	commercial African red dye	*7*
Pterospora andromedea Pinedrop	plant	Navajo tan dye	*14*
Punica granatum Pomegranate	flowers, skins, seeds	brown/orange dyes	*4*
Purshia tridentata Bitterbrush	—	yellow dye	*1*
Pyracantha angustifolia Firethorn	bark	yellow/brown dyes	*13*
Pyrus spp. Pear	bark	yellow dye	*13*
Quercus alba White oak	bark	yellow/brown dyes	*13*
Q. ***borealis*** Red oak	bark	yellow/brown dyes	*13*
Q. ***gambelii*** Gambel's oak	bark	Navajo tan dye	*14*
Q. ***lobata*** White oak	bark	Calif. Indian basket dye	*9*
Q. ***pungens*** Scrub oak galls	—	Navajo gold/tan dyes	*14*
Q. ***robur*** English oak	bark	yellow/brown dyes	*13*
Q. ***rubra*** Red oak	—	dye	*8*
Q. ***sinuosa*** Oak	—	dye	*8*
Q. ***velutina*** Black oak	bark	yellow dye commercial dye	*6* *7*
Quercus *Spp.*	bark	colonial dye	*6*
Ranunculus acris Buttercup	—	dye	*8*
R. nivalis Snow buttercup	—	dye	*8*

Scientific name/ common name	Plant part(s) used	Craft use	Source
Raphia vinifera Raffia	—	basketry	5
Raphiolepis indica India-hawthorn	fruit	blue/purple dyes	4
Raphis spp. Rattan	—	basketry	5
Reseda luteola Weld	plants	commercial yellow dye	4, 7, 8
Rhacomitrium lanuginosum Moss		dye	8
Rhamnus caroliniana Buckthorn	bark, berries, twigs	yellow dye	13
R. cathartic Buckthorn	bark, berries, twigs	brown dye	13
R. infectorius	berries	yellow European dye	7
Rhamnus spp.	—	dye	8
Rhododendron lapponicum Lapland rosebay	—	dye	8
Rhododendron spp. Rhododendron	leaves	dye green dye	6, 8 4
Rhodymenia spp. Alga		dye	8
Rhus aromatica Sumac	—	Calif. baskets	5
R. coriaria Dyer's sumac	berries	yellow-green dye	13
R. diversiloba Poison oak	stem, sap	Calif. Indian basket warp, woof, dye, foundation	9
R. glabra Sumac	—	brown/slate/yellow dyes	6
R. trilobata Three-leaved sumac	twigs, berries leaves,	Navaho basket warp, weft Panamint baskets Hopi mordant Navajo black/brown dyes yellow/green/brown dyes Calif. Indian basket warp, woof, foundation	10 5 2 14 1 9
R. typhina Staghorn sumac	—	brown dye	13
Rhus *Spp.* Aromatic sumac	twigs, leaves, berries	Navaho black dye Calif. baskets brown/yellow dyes	11 5 1
Sumac	berries	red Indian dye dye	7 8
Ribes nigrum Black currant	berries	purple dye	13
Ribes spp. Currant	twigs, leaves	brown/yellow dyes	1
Roccella fuciformis Lichen	—	dye	8
R. tinctoria Lichen	—	dye dye	13 8
Rosa spp. Wild rose	plants	green/yellow/brown dyes	1
Rosmarinus officinalis Rosemary	plants	green dye	4

Scientific name/ common name	plant part(s) used	Craft use	Source
Rubia tinctorum Madder	roots	commercial imported red dye	4, 6
Rubus vitifolius Blackberry	berries	Calif. Indian basket dye	9
R. *Spp.*	leaves, twigs, shoots	dye	6, 13
Blackberry	berries	purple dye	4, 8
Rudbeckia triloba	roots, flowers	green/yellow dyes	13
Coneflower		dye	8
Rudbeckia spp.	—	dye	6
Black-eyed Susan	flowers	green dye	4
		yellow/green dyes	1
Rumex crispus Curly dock	leaves, stems, seeds	brown/green/orange dyes	1
R. hymenosepalus Canaigre	—	Hopi dye	2
		red Indian dye	7
	roots	Navajo brown/ yellow-orange dyes	11, 14
Rumex obtusifolius Dock	roots	dye	6
Rumex spp.	roots	gold/green dyes	4
Dock		dye	8
Sabal palmetto	—	basketry	5
S. adansoni Dwarf palmetto	plants	basketry	5
Salicornia spp. Pickleweed	plants	yellow dye	4
Salix amygdalina Almond-leafed willow	—	basketry	5
S. ***argophylla*** Willow	stems	Calif. Indian basket warp	9
S. ***argyrophylla*** Willow	—	Porno basket warp	10
S. ***fluviatilis argyro-phylla (S. argophylla?)***	stems	Calif. Indian basket warp	9
S. hindsiana	leaves, stems, bark	yellow dye	4
Sandbar willow		Calif. Indian basket warp	9
S. ***lasiandra***	stems	Panamint baskets	5
Yellow willow		Calif. Indian basket warp	9
S. ***nigra***	stem, bark	Pima basket weft	10
Black willow		Papago basket	3
		Calif. Indian basket woof	9
		brown dye	13
S. reticulate Willow	—	d y e	8
S. sitchensis Velvet willow	stem	Calif. Indian basket warp, woof	9
S. ***vitellina*** Golden willow, osier	—	basketry	5
Salix spp.	—	Yurok basket warp, weft	10
Willow	—	Papago basket weft (rare)	3
	—	Havasupai baskets	5
	twigs, leaves	yellow/green dyes	1
	stems, root	Calif. Indian basket woof warf, foundation, design	9
Salsola kali Russian thistle	plants	green/brown/yellow dyes	1

Scientific name/ common name	Plant part(s) used	Craft use	Source
S. pestifer Russian thistle	plant	Navajo green dyes	14
Salvia officinalis Sage	oil	yellow dye	6
Sambucus canadensis Elderberry	leaves, berries, bark	yellow/purple/gray dyes	13
S. ***mexicana*** Elderberry	stems	Calif. Indian basket dye	9
S. ***nigra*** Elder	leaves, berries, bark	yellow/purple/gray dyes	13
		dye	8
Sam bucus spp. Elderberry	bark, leaves, berries	black/green/blue dyes	6
	berry, stems	dyes	4
		Calif. Indian basket dye	9
Sanguinaria canadensis Bloodroot	roots	red dye	6
		red Indian dye; threatened	7
Santolina chamaecyparissus Santolina		green/brown dyes	4
Saponaria officinalis Soapwort	blossoms	yellow/green dyes	1
Sassafras albidum Sassafras	bark	orange-brown dye	4, 6
Saxifraga cernua Nodding saxifrage		dye	8
S. ***hirculus var. propinqua*** Yellow marsh saxifrage		dye	8
S. ***oppositifolia*** Purple saxifrage		dye	8
S. ***tricuspidata*** Prickly saxifrage		dye	7, 8
Scabiosa atmpurpurea Pincushion flower	flowers	green dye	4
Scirpus acutus Bulrush	plants	green/brown dyes	1
S. ***lacustris***	—	basketry	5
S. lacustris occidentals Tule	leaves, roots	Calif. Indian basket warp, woof, design	9
S. ***maritimus (S. robustus?)*** Bulrush	root	Calif. Indian basket design	9
S. ***paificus*** Bullrush		Porno basket weft (scarce)	10
S, ***robustus*** Bulrush	stems	Calif. Indian basket warp, woof, foundation	9
S. *tatora* Tule	—	basketry	5
Scirpus spp. Bulrush, tule	root, stem	basketry	5
		Calif. Indian baskets	9
Senecio aureus Golden ragwort	—	dye	8
S. ***cruentus*** Florist's cineraria	petals	green/blue dyes	4
S. ***douglasii***	stems, flowers, leaves	Navajo weaving	11
S. hybridus Florist's cineraria	petals	green/blue dyes	4
S. ***jacobaea*** Ragwort	flowers	yellow dye	4
S. ***triangularis*** Arrowleaf senecio	—	green/yellow dyes	1

Scientific name/ common name	Plant part(s) used	Craft use	Source
Sequoia sempervirens Coastal redwood	roots	Calif. Indian basket woof	9
Sequoia spp. Redwood	bark	brown dye	4
Sisymbrium altissimum Tumble mustard	plants	yellow/green/brown dyes	1
Smilax californica Greenbriar	stems	Calif. Indian basket design	9
S. ***pseudochina*** Bull-brier	—	basketry	5
Solarium spp. Nightshade	plants	yellow dye	4
Solidago biglovia Goldenrod	plants	Navajo yellow dye	11
S. ***canadensis*** Goldenrod	—	yellow dye	6, 13
Solidago spp. Goldenrod	flowers	Hopi dye yellow/green dyes dye	2 1 8
Sonchus oleraceous Sow-thistle	plants	yellow/brown/green dyes	1
Spartium spp. Broom		yellow dye	13
Sporobolus spp. (Epicampes rigens californica ?) Grass	stems	Calif. Indian basket foundation	9
Stachys spp. Hedg-mettle	—	green dye	4
Stereocaulon alpinum Lichen		dye	8
Stropharia ambigua	—	dye	12
Sueada diffusa (Suaeda suffrutescens?] Sea blight	stems	Calif. Indian basket dye	9
S. ***suffrutescens*** Sea blight	plants	Calif. Indian basket dye	9
Symphoricarpos albus Snowberry	berries	yellow dye	13
Symplocos spp.	—	mordant	4
Syringa spp. Purple lilac	***flowers, twigs***	***green/yellow dyes***	4
Tagetes erecta Marigolds		dye	6
Tagetes micrantha Bitterball	plant	Navajo yellow dye	14
Tagetes spp. Marigold	flowers	gold/green dyes dye	4, 13 8
Tanacetum vulgare Tansy	flowers	yellow dye	13
Taraxacum officinaiis Dandelion	roots plants	dye brown/yellow dyes dye	6 1 8
Thalictrum polycarpum Meadow rue		yellow dye	4
Thea sinensis Black tea	leaves	dye	4

Scientific name/ common name	Plant part(s) used	Craft use	Source
Thelesperma gracilis Navajo tea	plants	Navajo orange dye	*14*
T. megapotamicum		Hopi dye	*2*
T. subnudum Navaho tea		Hopi dye	*2*
Thermopsis montana False lupine	plants	yellow dye	*1*
Thuidium abietinum Moss		dye	*8*
Torreya californica California nutmeg	root	Calif. Indian basket woof	*9*
Tragopogon pratensis Salsify	"plants	brown/yellow dyes	*1*
Tricholoma rutilans	—	dye	*12*
Trifolium spp. Trefoil clover	plants	brown/yellow dyes	*1*
Triticum spp. Wheat	—	Papago baskets	*3*
Tsuga canadensis Hemlock	bark	red/brown dye dye	*6, 13* *8*
T. caroliniania Southern hemlock	bark	brown dye	*13*
T. giganta Hemlock	—	Indian baskets	*5*
T. heterophylla Western hemlock	bark	brown dye	*13*
Tumion californicum (Torrya californica?) California nutmeg	roots	Calif. Indian basket woof	*9*
Typha angustifolia Cattail		Pima basket warp Papago basket warp	10 *3*
T. latifolia Cattail	leaves	green/brown dye Calif. Indian basket warp, woof, design	1 *9*
Ulex *europaeus* Gorse	flowers	orange dye	*4*
Umbellularia californica California laurel	fruit	green/brown dyes	*4*
U. pustulata Rock tripe lichen	—	red dye	*13*
Umbilicaria papulosa Lichen	—	red dye	*8*
U. proboscidea Lichen	—	dye	*8*
U. vellea Rock tripe	—	dye	*8*
U. virginis Lichen	—	dye	*8*
Umbilicaria spp. Brown rock lichen	—	dye	*4*
Uncaria gambir Cutch	leaves, twigs	imported brown dye	*6*
Urceolaria calarea Lichen	—	purple dye	*8*
Urtica breweri Nettle	bark	Calif. Indian basket woof	*9*

Scientific name/ common name	Plant part(s) used	Craft use	Source
U. *dioica*	shoots	dye	*6*
Nettle		green dye	*13*
Urtica spp.		dye	*8*
Nettle, Dwarf nettle			
Usnea barbata		yellow dye	*4*
Old man's beard lichen			*13*
U. *lirta*		purple dye	*13*
Lichen			
Usnea spp.		purple dye	*8*
Vaccinium myrtilloides		blue dye	*8*
Velvetleaf blueberry			
V. uliginosum var. alpinum		dye	*8*
Tundra bilberry			
V. vitis-idaea var. minus		dye	*8*
Lingonberry			
Vaccinium spp.	leaves	brown/green/yellow dyes	*1*
Blueberry	berries	purple dye	*13*
Variolaria orcina		purple dye	*8*
Lichen			
Verbascum thapsus	leaves	yellow dye	*1, 4*
Mullein			
Verbascum spp.	flowers	yellow dye	*6*
Mullein			
Vicia benghalensis	flowers	green dye	*4*
Vetch			
Vilfa rigens		Calif. baskets	*5*
Vilfa spp.	stems, roots	Calif. Indian basket foundation, design	*9*
(Epicampes rigens californica?)			
Grass			
Viola tricolor	flowers	green dye	*4*
Pansy			
Vitis californica	stems, roots	Calif. Indian basket woof, warp	*9*
Wild grape			
V. ***lambruscana***	skins	blue dye	*4*
Grape			
Vitis spp.	leaves	yellow dye	*4*
Grape	fruit	purple dye	*13*
Washingtonia filifera	leaves	Calif. Indian basket wrap	*9*
Desert palm			
Woodwardia radicans	stem	Calif. Indian basket design	*9*
(W. spinulosa?)			
Giant fern			
W. spinulosa	stem	Yurok basket weft	*10*
Giant chain fern		Calif. Indian basket design	*9*
Xanthium italicum		green/brown dyes	*1*
Cocklebur			
Xanthoria elegans	—	blue dye	*8*
Red lichen			
X. ***parietina***	—	yellow dye	*13*
Yellow wall lichen		blue dye	*8*
Xanthorhiza spp.	roots	yellow Indian dye; threatened	*7*
Yellow root			
Xerophyllum tenax	leaves	Yurok basket weft	*10*
Sourgrass		Calif. Indian basket design	5, 9

Scientific name/ common name	Plant part(s) used	Craft use	Source
Yucca arborescens (Y. brevifolia?) Tree yucca	roots	Calif. Indian basket design	9
Y. ***arizonica***	roots	Papago basket weft	3
Y. angustifolia	roots	Hopi wool soap	2
Y. baccata ***Wide-leaved soapweed***		Navajo soap	14
Y. brevifolia	roots	Panamint basket	5
Joshua tree		Calif. Indian basket design	9
Y. ***elata***	—	Papago basket weft	3
Y. glauca	—	Navajo soap	14
Narrow-leaved soapweed		yellow/green/brown dye	1
Y. ***mohavensis***	leaves	Calif. Indian basket foundation	9
Spanish bayonet			
Yucca spp.	—	Plains Indians baskets	10
	—	Hopi baskets	5
Soapweed	roots	Navajo yarn soap	11
Zea mays	—	Iroquois basket warp, weft	10
Corn husk		Cayuses, Umatillas, Nez Perces, Wascos baskets	5
Purple Indian corn		purple dye	4
Z. ***mays amylacea***	corncob	Hopi dyes	2
Purple corn			
Zinnia elegans	—	dye	6, 8
Zinnia			
Zostera spp.	—	basketry	5

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