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# ABSTRACTS OF PRESENTATIONS

*at the 19th Annual conference of the Society of Ethnobiology*
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Plants in Mexican Folk-Art, Alamos, Sonora: *ADAMS, Karen R. Crow Canyon Archaeological Center.*

A trip to the old mining town of Alamos in southern Sonora, Mexico, turned up some interesting folk-art. Hispanic women and their families in the small nearby village of La Aduana are making a wide variety of items, primarily from locally available materials, to sell to tourists. Their crafts include necklaces, bracelets, rosaries, wreaths, dried flower arrangements, corn husk dolls, carved wooden animals, and insects with innovative wings. This folk-art is both pleasing to the eye and easy on the earth.

Latest News on Old Bones: Interactions Between Humans and Mammoths in North America (keynote address): *AGENBROAD, Larry, Dept. of Geology, Quaternary Studies Program, Northern Arizona University.*

Mammoths existed on the North American continent from 1.7 million years ago to 11,000 years ago. In that interval they radiated-geographically and biologically-to occupy nearly every habitat on the continent, north of the tropical rain forests. Humans were contemporary with New World mammoths for at least ±500 years (11,500-11,000 yr B.P.) prior to their extinction. Were they a causal factor in extinction, or did they deliver the coup de grace to a population already in stress?

Cultural Aspects of Maize Com in the Central Mainland of Mexico: *ALVAREZ DEL CASTILLO, Carlos, National School of Anthropology and History and RODRIGUEZ CHAVEZ, Juan Manuel, School of Sciences, National Autonomous University of Mexico.*

Field studies were carried out on the oral traditions related to maize in four states: Guerrero, Mexico, Michoacan and Morelos. The main topics on which research was focused were: rites of creation and passage, rain ceremonies, and offerings to tender and dry ears of com. Mexican culture was analyzed using the best known bibliographical sources and all the data gathered among contemporary ethnic groups. Field works consisted in tracking sites where wild maize-known as teozintle-is still extant. This sort of maize is considered to be the ancestor of our tamed brand of maize. In order to assess the survival of cultures' values, polls were performed in four states and 201 ears of corn were collected. As it happened, all of them were identified as belonging to one or another of eight well-defined strains: Maiz Anco, Pepitilla, Conejo, Tuxpefto, Vandefto, Cacahuacintle, C6nieo and Zamorano, as well as two races of teozintle, known as Balsas and Valles Altos *(Zea mays* ssp. *parviglumis* and Z. *mays* ssp. *mexicana).*

Tribal Horticulture, Maintenance of Biodiversity, and Park Boundary Issues: *ANDERSON, M. Kat, American Indian Studies, University of California, Los Angeles.*

Many national parks and protected areas have been designated without regard to the role that indigenous people played in modifying the landscapes that are being preserved: many of these areas do not fit the definition of a pristine, unaltered wilderness. Native Americans influenced the structure, composition, distribution, and extent of many vegetation types in different geographic regions, acting as agents of environmental change through plant dispersal, habitat modification, and genetic modification. They influenced biological diversity in wildlands by maintaining ecosystem diversity, patchy environments, and habitats for rare and endangered plant species. Several horticultural techniques employed by California peoples will be discussed using examples from Southern Sierra Miwok, Foothill Yokuts, and Western Mono peoples. These will be compared with examples showing the ecological consequences of managing protected areas with a "hands-off" approach. It is argued that the folk scientific knowledge of native people is an important component which conservation biology has overlooked. Both the application of native wildland management methods and the preservation of long-term ecological associations between native people and wildland environments are valuable complements to other strategies for preserving biodiversity. Indigenous land management and use patterns should be considered when designating new park boundaries.

Seasonality of Catfish Procurement in the American Southwest: *ARNTZEN, Kristen R, University of Michigan, Ann Arbor and SPETH, John* O, *University of Michigan, Ann Arbor.*

Recent excavations at the Henderson Site, a small 13th-century AD farming village near Roswell in southeastern New Mexico, yielded over 2,000 well-preserved fish bones, including many pectoral spines of the channel catfish *(Ictalurus punctatus).* Studies by wildlife specialists have demonstrated that the season of death of catfish can be estimated from the annual growth increments seen in thin-sections of the pectoral spines. Analysis of a preliminary sample of the Henderson spines suggests that fishing was confined to a relatively brief period in the late summer *andl* or early fall. Seasonality data derived from five other animal species (bison, antelope, jackrabbit, cottontail, and prairie dog) yield comparable results, indicating that most, and perhaps all, hunting and fishing at Henderson took place between approximately early spring and early fall. These results suggest that Henderson was occupied for only part of each year probably being abandoned shortly after the harvest and reoccupied again the following spring.

Plant Foods and Ceramic Production: What Can One Tell Us About the Other?: *ATTARIAN, Christopher J, Dept. of Anthropology, University of California, Los Angeles.*

Recent disagreements over the degree of political complexity of the Mochica culture postulate either a system of local chiefdoms or a developed agrarian state. The method of production of staple goods is seen as a variable with which degrees of political complexity can be measured. Using a data set of botanical remains at a Moche IV-V (AD 500-750) ceramic production site in the Chicama Valley, Peru, variation within the diet of craft specialists is correlated to different degrees of production intensity. Two questions are asked: (1) can seasonal occupation be determined from the botanical remains? And, (2) are different provisioning techniques evident, and if so, can they be correlated to different degrees of management over

production by a controlling institution? From this information an association is drawn from production to managing institutions to the degree of political complexity such institutions imply.

Measuring the Importance of Coast Miwok Use Plants Using the Turner Index: *BECKWITH, Brenda R, California State University, Sacramento.*

Ethnobotanical research with the Federated Coast Miwok (California) centered on a locality of cultural significance. Dr. Nancy Turner's Index of Cultural Significance was modified to measure the importance of plants used. Data were compiled from literary sources and from interviews. The abundance of culturally significant plants was determined by vegetation surveys. Combining these approaches and resulting data, continuity of plant use was demonstrated and the distribution of use plants was mapped. This study has shown that the Turner Index is an important ethnobotanical method and can be easily adapted to a diversity of contemporary Native peoples.

The La Venta Olmec Subsistence Project: *BRADFORD, Katherine, Dept. of Anthropology, California State University, Northridge.*

While Olmec art and architecture have received much attention during the last half-century, Olmec subsistence economies remain poorly understood. This project is designed to investigate the development of settlement and subsistence patterns in the La Venta support area. Work conducted during 1994 and 1995 resulted in the recovery of cultural materials dating to the Early and Middle Formative periods. A comprehensive sampling strategy, incorporating collection of 50-liter samples, was employed. Remains recovered from a house floor include charred maize, squash, beans, and palm nuts.

Trial and Error in the Choice of Medicinal Plants: *BRETT, John A, University of Colorado, Denver.*

A widely held and intuitively attractive explanation for the identification of medicinal plants in prehistory and by indigenous peoples states that "useful plants" are identified through a process of "trial and error." This paper will demonstrate the fallacy of this approach. Specifically, deciding which plants are suitable for trial, and recognizing an "error" can only proceed when there are cultural criteria by which the value or usefulness of a particular plant can be assessed. The value or usefulness of a plant is not based on a random process of sampling, but rather assessed via a thorough knowledge of the environment and clear expectations on what a particular kind of plant should do when consumed or applied in the context of health, illness, and curing.

Why Coprolite and Trace Elemental Studies of Mummies Conflict: *BREWER, Melissa L, University of Nebraska, Lincoln.*

The strontium-based trace elemental analysis of Chinchorro mummies from Chile indicate that this ancient, preagricultural society obtained 90% of its food from the ocean. Previous coprolite analysis showed 50% of the dietary components were from terrestrial plants. An ongoing weight quantification of the coprolites attempts reconciliation of these reconstructions. It appears that the authors of the strontium analysis did not consider that Chinchorro ate mollusk shell and fish bone which are high in strontium. It appears that visual analysis of copro-

lites underestimates the contribution of meat because meat is completely digested. A realistic dietary reconstruction will result from understanding the biases of different types of dietary analysis.

Wild Plum =IlLittle Peach": A U.S. Southeast Linguistic Trait: *BROWN, Cecil* H, *Northern Illinois University, DeKalb.*

Across the U.s. Southeast, Native American languages have linguistically accommodated the European introduced peach by referring to it through use of respective terms for the native plum. This has taken the form of marking reversals in which native words originally designating plum have shifted in reference to peach, with modified (overtly marked) "peach" terms used to denote plum (e.g., "little peach" = plum). Marking reversals were motivated throughout the region by a radical change in the relative cultural importance of the two referents, wherein, the introduced peach surpassed the native plum in salience. Since this lexical flip-flop occurs only infrequently and sporadically in other North American languages, it is clearly a Southeast areal trait. Its distribution is probably accountable both to diffusion (facilitated by area *lingua francas* such as Mobilian Jargon) and to independent development.

The Meaning of Maize in Upland Southeast Asia: *BURCH, Carmen, Connecticut College.*

Introduced to Southeast Asia over 400 years ago, maize has altered human-environment relationships and reshaped the economies of swidden cultivators throughout the region. Now, often deemed a "native" crop by those who grow it, in many cases, maize, not rice, serves as the staple food. It is tempting to interpret these transformations in positive terms, as a Southeast version of maize as "enabler"; however, local judgements, as encoded in myth, ritual, and daily practice, offer a more equivocal view of this American plant. Based on field research with the ToMaki, a Toraja people living in the interior mountains of Sulawesi, this paper considers the cultural role and meaning of maize in Toraja society. Unlike rice, a crop synonymous with food and life itself, maize is associated with death. ToMaki thinking about maize is a reminder that plants called IIfoods" have many facets, and when eaten, say many things.

Advances in the Study of Medicinal Plant Complexes of Mexico: *Toloaches (Datura)* and *Arnicas (Heterotheca): BYE, Robert, Instituto de Biologia, Universidad Nacional Aut6noma de Mexico (UNAM), LINARES, Edelmira, Instituto de Biologia, UNAM and DELGADO, Guillermo, Instituto de Quimica, UNAM.*

Medicinal plant complexes (groups of taxonomically distinct plants that share similar folk names, forms and purposes of utilization and morphological characteristics) probably have similar chemical composition or pharmacological activity. The dominant taxon (popularly accepted as the most effective) is employed outside of its area of natural distribution while the other taxa are substitutes. *Toloaches* (at least 6 species of *Datura,* Solanaceae, of arid lands) are applied to various skin ailments and have tropane alkaloids. *Arnicas* (20+ taxa, mostly Asteraceae) are used for skin ailments and to reduce inflammation and are dominated by *Heterotheca inuloides* (Asteraceae).

Fish and Fishing at Cuello, Belize: Evidence from the 1990-1993 Excavations: *CARR,* H. *Sorayya, Boston University and FRADKIN, Arlene, Florida Museum ofNatural History.*

Renewed excavations in 1990-1993 at the Maya site of Cuello provide an opportunity to expand upon insights derived from previous work, particularly regarding the Middle Preclassic period. New faunal data provide further substantive evidence for previously suggested changes over the course of the Preclassic in the quantity and kinds of fish used by this inland community. In the Middle Preclassic, fish was a minor resource procured mainly from freshwater bodies, but Cuello already had coastal contacts, as evidenced by the presence of several marine species.

Evolution of Concepts in Ethnobiological Studies: *CLEMENT, Daniel, Canadian Museum of Civilization.*

Every scientific discipline defines itself among other things by particular concepts. The history of ethnobiology which spans one century has seen its interest in traditional societies shift from utilizations of living organisms, to their classification, to knowledge people have of the same organisms. Such a shift was accompanied by the use of different concepts either in defining the subject of study or in the methods used to gather data and analyse it. With the use of concepts such as "knowledge," "natural history," "folklore" and the more recent "TEK" for "traditional ecological knowledge" and the very seldom "science" to qualify other peoples' representations of living organisms, ethnobiology has not really advanced in recognizing that other societies can have true sciences. The same conclusion stands out when one examines the evolution of studies devoted to classification: the authors very seldom use such concepts as "species" and "genus" in the Western sense to qualify other peoples' taxonomies, preferring when they are not basing themselves on a Linnean model, new terms which are more and more ambiguous and tend to hide the nature of other peoples' ordering systems. If ethnobiology wishes to evolve, it should leave ethnobiology to ethnobiologists and biology to every other society's relationship to living organisms inasmuch as these relationships are based on reason and logic (logos) which is the essence of science.

Are Farmers' Rights Contingent on Conservation?: *CLEVELAND, David A., University of California, Santa Barbara.*

Discussion of the rights of local and indigenous farmers over crop genetic resources is polarized, with one side arguing for the rights of farmers to their traditional folk crop varieties (FVS). It is often implied that farmers have inherent rights to their FVs because they conserve this biodiversity within sustainable farming systems, and that this is valuable for the world community. Those who disagree cite examples of the lack of genetic conservation and sustainability in traditional farming systems and the need for rights to genetic resources to be based on Western, industrial concepts. It is, therefore, important to understand the extent to which farmers' rights are or are not contingent on their conservation, the role of FV conservation in sustainable farming systems, and under what conditions farmers do conserve the genetic diversity of FVs. Discussion of data and values relevant for these issues is important for progress at the FAO Fourth International Conference

on Plant Genetic Resources and at the meetings of the Convention on Biological Diversity later this year.

Northern Sinagua Diet and Subsistence: An Evaluation of Current Models of Sociopolitical Organization and Settlement Pattern: *CONRAD-REINGOLD, Bruce G., Northern Arizona University.*

Until recently little paleoethnobotanical research had been conducted on diet and subsistence among the Northern Sinagua of the post Sunset-Crater eruption Angell, Padre, Elden, and Turkey Hill phases in the Flagstaff locality of the Colorado Plateau. Building on Hunter's research, quantified data obtained from analysis of macrobotanical remains from three roughly contemporary habitation sites of varying size is used to evaluate competing models of Northern Sinagua sociopolitical organization and settlement pattern proposed by Pilles (sedentary chiefdom society, hierarchical settlement pattern, intensive agricultural production, complex trade networks) and Kamp and Whittaker (semi-sedentary egalitarian society, dispersed non-hierarchical settlement pattern, mixed subsistence).

Tooth Tartar as a Clue to Diet: *CUMMINGS, Linda Scott, Paleo Research Labs and MAGENNIS, Ann, Colorado State University.*

Diet often is reconstructed based on indirect evidence. Human tooth tartar traps food particles, preserving a record of food consumed. Dental calculus removed from primary and secondary burials at Kichpanha, a lowland Maya site in north central Belize, was examined to identify imbedded phytoliths, starch granules and debris as indicators of diet. Kichpanha is a small, peripheral site occupied from the Preclassic to the Early Postclassic (900 Be - 900 AD).

Giraffe Meets Llama and Wallaroo: Animals in Rock Art on Three Continents of the Southern Hemisphere (poster): *DEAL, Nan, Santa Barbara Museum ofNatural History.*

This photographic poster presentation examines the relationships of humans with animals among the hunting peoples of Tanzania and Northern Australia through their rock paintings, and among the pastoralists of Northern Chile through their immense geoglyphs.

The Biogeography of Mesoamerican Textiles (poster): *DeAVILA, Alejandro, University of California, Berkeley, and SERBO, A.c.*

Spinning, dyeing and weaving represent the most diversified technology in the material culture of contemporary Mesoamerican peoples. This paper examines the traditional use of textile fibers and dyestuffs of plant and animal origin in Mexico and Guatemala in relation to the geographical patterns of biological diversity in this region. Based on fieldwork in several areas of Mexico and a review of the literature, I map out the distribution of fibers and dyes in nine broad subregions. The number of species used in textile manufacture, as well as the size of the repertory of fabric structures, correlates well with the relative magnitude of the estimated total flora and fauna of each area, and with the number of languages spoken there, as a measure of cultural diversity. Two regions stand out in this survey: Oaxaca and the Maya lowlands as the areas of respectively greatest and lowest diversity. I trace the biogeographic affinities of salient plants used as fibers and dyes, and find a greater representation of lineages of neotropical origin than

might be expected by chance. In addition to the maps, I include a listing of species documented for different regions, and brief descriptions of the traditional use in Oaxaca of two plant colorants and a mollusc dye not previously recorded, as well as two bark fibers and a wild silk formerly gathered to be netted or woven.

Developing Curriculum in Ethnobotany: *ELOHEIMO, Marja, The Evergreen State College, Olympia.*

Students are seeking and educators are designing curriculum in etlmobotany. This paper describes one undergraduate level year-long "Series in Etlmobotany." Discussion includes: growth and change of curricular content; value of a regional approach; academic and institutional contexts; role of involvement in community-based projects such as campus and museum ethnobotanical gardens, regional American Indian basketrnakers' gatherings, and a Tribal medicinal native plant garden; the addressing of intercultural and environmental complexities; and consideration of instructional philosophy and goals.

The Creation and Maintenance of Soil Fertility in a Subsistence Agriculture in Portugal: *ESTABROOK, G.F., University of Michigan.*

Eastern Central Portugal contains an area of soft, precambrian shales that have eroded into steep-sided hills with sparse soil, very low in nutrients and available water capacity, and readily eroded during seasonal rains. In the 13th Century, some people left the fertile soils of basaltic origin nearby to settle in these infertile shale hills (perhaps to escape plague or economic suppression). The agricultural technology they developed, based on cycling large quantities of organic matter, has sustained human life for six centuries. Data sources for this paper include: 300 years of church records, five months' personal interviews and observations, and laboratory analysis.

Gender in Maya Plant Taxonomy: A Cultural Logic (poster): *FAUST, Betty* B., *Secci6n de Ecologfa Humana,Unidad Merida, Mexico.*

Research with a Maya hmèen (a priest-shaman, expert in ritual practice, traditional knowledge, and healing) in Campeche, Mexico (1992-95), has revealed that Maya definitions of plant gender provide a mechanism for distinguishing species of similar appearance which grow in the same habitat. The definitions of gender are not related to those used by botanists, but rather to characteristics of human gender in Maya culture. These characteristics form a set of binary oppositions used to differentiate similar species, in many cases differentiating plants most useful for medicine from those which closely resemble them but are less effective. The logic of gendered differentiation extends beyond the cases where the distinction is useful in plant medicine to a set of general rules applicable to all plants; however in practice, the reference to gender occurs almost exclusively in situations involving the procurement of plants for medicine.

Paleo-Indian Diet in the Southern San Joaquin Valley: *FENENGA, Gerritt, California State University, Bakersfield.*

Archaeological research in the Tulare Lake Basin of the Southern San Joaquin Valley of central California is beginning to provide a picture of early human ecological adaptation in this region. Data recovered from lakeside sites containing fluted projectile points and other diagnostic early artifacts suggest the inhabitants

exploited a broad spectrum of resources. These include a variety of lacustrine species such as fishes, turtles, and birds. Shellfish, although present, do not appear to have been utilized. Terrestrial species were also used, and these range from micromammals to large extinct game, including *Bison* and *Mammuthus.* The diversified nature of faunal assemblages from these early sites indicates Paleo-Indian diet was not unlike that of later opportunistic hunter-gatherers. The lack of shellfish suggests it is unlikely that early lacustrine adaptations of Paleo-Indian groups in the interior of western North America were a pre-adaptation for coastal shellfish exploitation, if these populations later migrated to coastal areas as some scholars have suggested.

A Multi-Cultural Perspective on Prehistoric Agriculture: *FISH, Suzanne K., University of Arizona and FISH, Paul* R, *University of Arizona.*

As part of a recent archaeological project in central Arizona, five Native American traditional farmers evaluated the productive potential of a designated study area and the prehistoric agricultural remains within it. Because indigenous cultivators did not occupy the area during post-contact times, these consultants carne from surrounding regions of the Southwest and were of four different cultural affiliations. Although they agreed on aspects of agricultural practice and potential, none were able to effectively assess local variables critical to cropping, such as the timing of frosts and precipitation. The backgrounds of these individuals also differ in social and technological repertoires related to farming. Consultant comments underscore the importance of highly localized knowledge and suggest factors that should be considered when studying population movements of agriculturalists in the past.

Retention vs. Loss of Ethnobotanical Knowledge: A Northern Paiute Example: *FOWLER, Catherine 5., University of Nevada, Reno.*

Without doubt, present-day Northern Paiute people know less about their natural worlds than did their ancestors. There are some obvious reasons for this: changes in subsistence and settlement, patterns of knowledge transmission, loss of language, etc. But the exact process still remains to be better documented. Through the analysis of museum collections, early vocabularies and field notes, and more recent fieldwork, an attempt is made to quantify some of the rates of loss among Northern Paiute peoples, and to discuss why some of the data pattern as they do.

Pollen Washes and Archaeological Inference: *GEIB, Phil* R, *Navajo Nation Archaeology Department, and SMITH, Susan J., Laboratory of Paleoecology, Northern Arizona University.*

It is common practice in archaeology to collect pollen from grinding tools to make inferences about plant use. Adequate interpretation of pollen wash data depends upon understanding how pollen becomes deposited on grinding tools. Pollen may indeed be present on edible plant portions, but does it survive various preparation techniques such as roasting and parching? If pollen survives, how much would become deposited upon grinding tools? To help answer these queries, we conducted a series of experiments designed to provide an independent frame of reference between the processing of various seeds and the deposition of

pollen. We winnowed, parched, and ground seeds of various grasses and weeds commonly exploited by prehistoric people of the Colorado Plateau. *Zea mays* was also processed. The seeds were washed for pollen before and after parching, and pollen washes were collected after grinding both raw and parched seeds. The results of our experiments are detailed and implications presented regarding the interpretation of pollen washes from archaeological grinding tools.

The Use of Fresh-Water Mussel Valves in Shelling Green Com by Indians of the North American Prairies and Plains: *GRADWOHL, David* M, *Dept. of Anthropology, Iowa State University.*

This presentation discusses the contemporary, ethnographic, historic, and archaeological evidence for the use of fresh-water mussel shells as implements in shelling green corn. Today, the Mesquakie Indians of central Iowa harvest green or "milk" corn in the summer. The com is parboiled and then shelled off the cob by using clam shells collected along the Iowa River. To date, this practice is documented for eleven Native American groups in the North American Prairies and Plains extending back to the period of first observations by French explorers. Similar fresh-water mussel shell artifacts are found along the Des Moines River at archaeological sites of the Oneota Tradition (ca. 1000-1200 AD), along with evidence for the growing, harvesting, storing, and processing of corn. Comparable objects are noted in other Iowa sites, as well as some in Missouri, Kansas, Nebraska, South Dakota, and North Dakota. The documentation of this practice for nearly 1000 years into the preset is symbolic of the many continuities of Native American dietary and religious traditions in the face of so-called assimilation by Euro-Americans.

Medicinal Mushrooms: *HOBBS, Christopher, Institute for Natural Products Research.*

The cultural use of fungi for food, medicine, wound dressing and other external applications, and as a source of dye is common throughout the world. In Asia, over 200 species are mentioned as medicinal agents in the *Fungi Pharmacopeia.* A number of fungi were known to the ancient Greeks and Romans for use as medicines, some of which, such as the "panacea mushroom," *Fornes officinalis,* were official in Western pharmacopeias from the 18th and 19th centuries. Species from the family Polyporaceae like Reishi and Maitake, as well as shiitake from the Tricholomataceae are considered cultural treasures in Japan and China. Modern medicine has supported the use of a number of immunomodulators in the treatment of cancer and AIDS, among a host of other chronic diseases. Members of the genus *Psilocybe* and *Amanita muscaria,* the fly agaric, are used in parts of Europe, Mexico, and South America in healing and divinatory rituals.

A Utility Profile Analysis of Artidactyl Remains from Tommy Tucker Cave (CA-LAS-I): *HOLANDA, Kimberlelj* L., *California State University, Chico.*

Over the past two decades, the validity of body part representation as a means of assessing site function related to strategies of htmter-gatherer subsistence and settlement have been both supported and questioned. Artiodactyl remains from Tommy Tucker Cave exhibit strong patterning in the presence and absence of particular elements and element portions. Taphonomic issues, such as density mediated attrition and the activity of scavengers, are addressed and dismissed as

bearing responsibility for the observed patterning. It is suggested that the Tommy Tucker assemblage reflects decisions made by hunter-gatherers related to the differential processing, transport, and discard of carcasses. The analysis provides insight into how the cave may have functioned, particularly in relation to settlement, mobility, and hunting related logistics.

The Role of Ethnobotany as a Linkage Between the Worlds of Ecosystem Management and Native Americans: *HOUSLEY, Lucile A., Botanist, Bureau of Land Management, Lakeview, Oregon, and HANES, Richard C., Oregon State Archaeologist, Bureau of Land Management.*

In the process of the social assessment report for the Interior Columbia Basin Ecosystem Management Project, the role of cultural plant uses and recognition of plant communities was a starting point for dialog between the Government culturalland managers and the people living within tribal communities. Ecosystem management is perceived by Federal and State land agencies as a hierarchy of decision making based on a linear, one-directional model. However, the world view of natural resources by traditional American Indians is based on a mutual intercausality which can be viewed as an interconnected cycle. The key role that ethnobiology played in the process which culminated in a document will be discussed, as well as the two-way dialog which has begun to help define future land use management.

Zooarchaeological Evidence for Changes in Cervid Biogeography: Prehistoric Deer and Elk Hunting in Coastal Southern California: *HUDSON, Jeal1, Dept. of Anthropology, University of California, Los Angeles.*

Exceptional organic preservation at the archaeological site of SBA-IOIO, Barka Slough, yielded a large sample of identifiable cervid bone dating between roughly 2900 BP and 1300 BP. Taxonomic and metric analyses suggest the presence of tule elk *(Cervus elaphus nannodes)* as well as abundant California mule deer *(Odocoileus hemionus).* Some of the individual deer are of unusually large size relative to modern comparative specimens. Local environmental reconstructions suggest possible correlation with a period of cooler and wetter climate. Zooarchaeological analysis, including deer body part distribution, adds to our understanding of the relative importance of marine and terrestrial resources in local prehistory, implying a forager, rather than a collector strategy.

Salish Narrative Character Speech and Traditional Ecological Knowledge: *IGNACE, Marianne B., Simon Fraser University and Secwepemc Cultural Education Society.*

This paper will demonstrate how the speech of animals and other characters in Interior Salish mythical discourse provides a way of encoding and inscribing onto collective memory, traditional ecological knowledge about animals, plants, the territory, and their interrelationship. While the linguistic and aesthetic aspects of character speech have previously been examined, their ethnobiological dimension has largely remained unexplored. Drawing on examples from Interior Salish narratives, this paper will contribute to our understanding of indigenous forces of disseminating traditional ecological knowledge.

Gum and Resin Chewing by the Maasai of East Africa: *JOHNS, Timothy, McGill University, Quebec, and MAHUNNAH,* RL.A., *Institute of Traditional Medicine, Tanzania.*

A questionnaire on patterns of chewing of gums and resins from plants was carried out with 100 Maasai women and men in Tanzania and Kenya. Eighty-five percent of those interviewed chew gums. More than 80% of women and 65% of men chew at least once a week. Among the 10 gums and resins identified in the survey, *Commiphora africana* (osilalei) was preferred by 90% of the persons interviewed. Gums may playa positive role in the lipid metabolism of the Maasai.

Some Aspects of Marine Subsistence at Shuku, Rincon Point, During 2,000 Years of Chumash Occupation: *JOHNSON, john* R, *Santa Barbara Museum of Natural History.*

In 1988, an opportunity presented itself for the Santa Barbara Museum of Natural History to conduct archaeological test excavations at CA-VEN-62A, the former site of the coastal Chumash town of Shuku. Radiocarbon dating reveals that the base of the shell midden dates to about 2,000 years BP. Site occupation spans most of the Middle Period and all of the Late Period in Chumash prehistory. Major climatic events transpired within this period that have been argued to have led to major transformations in Chumash society. This study examines several categories of invertebrate and vertebrate remains to reconstruct marine subsistence shifts that may correlate with episodes of environmental change.

Gitksan Plant Classification: *jOHNSON-GOTTESFELD, Leslie M., Department of Anthropology, University of Edmonton, Alberta.*

The Gitksan have a roughly hierarchical classification of plants. The general domain 'plant' is unmarked. Several broad groupings of the "life form" sort can be distinguished. Three of these are large groupings composed of a number of subordinate generics: trees, 'gan;' 'plants: 'sgan;' and berry or fruit plants, 'maa'y.' 'Plants' include a diverse mixture of forms ranging from small trees, to perennial herbs and prostrate sub-shrubs. The 'plant' and the 'berry' groups overlap extensively. The remainder are residual taxa which are "empty" containing a few or no named subtypes: grass or hay, 'habasxw;' 'leaves: or herbaceous plants, 'yens;' 'flowers: 'majagalee;' moss, 'uumhlw;' and fungi, 'gayda ts'uuts.' Ninety-one distinct generics (excluding synonyms) have been documented; 83 represent vascular plants and eight represent mosses, fungi and lichens. A mixture of morphologic and utilitarian characters seem to underlie the system of plant classification. The relationship of partonomy to utility and classification is explored.

Assessing Traditional Resource Management for *Sabal uresana: lOYAL, Elaine, Arizona State University, Tempe.*

An ethnoecological approach was designed to assess traditional resource management (TRM) for *Sabal uresana,* a wild-harvested palm native to Sonora, Mexico. Participant observation and formal interviews identified the following harvest practices: limiting access to populations, "sparing", controlling harvest times and levels, and choice of leaf age and palm size. Surveys across populations identified several patterns of size-class distribution and harvest. Leaf size was found to be larger in unharvested palms. Experimental harvests reduced leaf production, thus

slowing palm growth. A matriz model found lambda ≥1. Survival, especially of the larger size-classes, accounted for ca. 90% of total elasticity. Simulations of observed harvest response changed the stable-stage distribution. Thus, "sparing" is the single most important contributor to long-term population maintenance ("alpha" management). However, leaf harvest practices, while more subtle, affect population structure over time ("beta" management). This study provides a model for assessing TRM for wild-harvested species and for identifying practices which function as *de-facto* conservation traditions.

Archaeofaunal Patterns in Rural Gold Rush Mining Communities: An Example from Northern California: *lUNG, Shannon, California State University, Chico.*

The analysis of the faunal assemblage from Forks of Butte (CA-BUT-854) offers insights into the economic and ethnic composition of a rural mining community during the early period of the California Gold Rush. The faunal remains are part of a large refuse dump that was generated by Riley's Inn. The quality of pork and beef suggests that members of Forks of Butte had low economic status. The comparison of the Forks of Butte faunal assemblage with assemblages from urban Euro-American sites, of the same time period, reveals significant differences in the types and proportions of species consumed. The greater proportions of pork and chicken, in comparison to beef and duck, are more similar to historic faunal assemblages from urban Chinese sites.

Anthropogenic Enhanced Fire Regimes: „Aboriginal Overkill?": *KAlB, Mark, Laboratory of Tree-Ring Research, University of Arizona, BAISAN, Christopher, Laboratory of Tree-Ring Research, University of Arizona, and SWETNAM, Thomas, Laboratory of Tree-Ring Research, University of Arizona.*

The extent of anthropogenic effects on ecosystems through use of fire is the subject of some controversy. Fire-scar chronologies from a network of 63 sites in the Southwestern United States can be used to test the extent of such anthropogenic ecosystem influence. While individual sites display a wide variety of unique characteristics, as a whole, region-wide fire synchrony is significantly correlated to climate, demonstrating the possible scale of climate-generated ecosystem processes. Some sites display anomalous periods of high fire frequency, which, in context with historical ethnographic accounts and fire-climate data, suggest anthropogenic enhancement. Anthropogenic fire patterns must first be resolved at specific well-documented sites before larger scale, mountain- to region-wide, ecosystem influences can be invoked. Site-specific anthropogenic fire patterns will be analyzed across several spatial scales to illustrate the possible extent of anthropogenic fire effects.

Ethnobotanically-Useful Prairie Plants Collected for Anti-Cancer and Anti-HIV Compound Testing: *KlNDSCHER, Kelly, Kansas Biological Survey, UniversityofKansas, and MANFREDI, Kirk, Chemistry Dept., University of Northern Iowa.*

We have collected lIb of material for 30 ethnobotanically useful prairie plants and are subjecting them to anti-HIV and anti-cancer screens. Plants were collected in Kansas, Nebraska, and South Dakota from a list of prairie plants that had medicinal uses by Native Americans of the Great Plains. Species include: locoweed *(Astragalus bisulcatus),* bush morning glory *(Ipomea leptophylla),* and silver-leaf scurf-

pea *(Psoralea argophylla).* Preliminary results suggest that by using plants that have a history of medicinal uses, even if those uses are different than the screens (HIV and cancer in this case), a higher percentage of positive screens will be found.

Gardens of Eden: An Ethnohistoric Reconstruction of **the** *Maohi* (Tahitian) Cultivation System: *LEPOFSKY, Dana, Dept. of Archaeology, Simon Fraser University, British Columbia.*

Tahiti, perhaps more than any other Polynesian island, conjures up images of a tropical paradise where beautiful people live in a bountiful lush environment which readily provided for all needs. This image of Tahitians *(Maohi),* promulgated by the earliest European explorers in Polynesia, has influenced the way anthropologists have characterized traditional *Maohi* lifestyle. This is especially apparent in the reconstruction of the *Maohi* cultivation system. However, the view of a non-intensive cultivation system is at odds with what is known about the highly complex *Maohi* socio-political system of the precontact and early contact era. A detailed review of the ethnohistoric literature reveals that the *Maohi* cultivation system was both highly extensive and intensive. Both the coast and inland were extensively cultivated by the *Maohi.* Six cropping subsystems encompassed the cultivation of a diversity of taxa and varieties within taxa. Intensive components of the cultivation system include reduced fallow periods, methods to enhance fertility, terracing, and the construction of irrigation systems. Labor-intensive gardens, where crops were raised exclusively for the elite, illustrate the close relationship between cultivation and the complex socio-political system of the *Maohi.*

Plants Sacred **to the** Ancient Maya (poster): *LITZINGER, William, Environmetal Studies, Prescott College and BRUCE, Robert, Depto. de Lingüística, Museo Nacional de Antropologia, México.*

Approximately 100 plant species are examined which may have had religious importance for the Ancient Maya. Although represented by more than 40 different plant families, many of these species have similar morphological features, such as very distinctive tubular corollas, hairs, spines, and thorns. Discussion of the hypothesis that these plants evoke imagery associated with ancient Mayan cosmological or religious concepts is based on a consideration of the special morphological attributes of these plants, the linguistic analysis of their Maya plant names, and ethnographically and historically recorded details of their uses.

Historic *Vaccinium* Processing in the Cascade Uplands, South-Central Washington: *MACK, Cheryl, Gifford Pinchot National Forest, Washington, and McCLURE, Richard, Gifford Pinchot National Forest, Washington.*

Among the native peoples of south-central Washington state, berries of the genus *Vaccinium* hold a significant place among traditional foods. In historic times, the berries were collected in quantity at higher elevation in the central Cascade Mountains, and the surplus harvest dried for winter use. Berries were dried along a shallow trench using indirect heat from a smoldering log. To date, archaeological investigations in the Gifford Pinchot National Forest have resulted in the identification of 234 *Vaccinium* drying features at 27 sites along the crest of the Cascades. High feature densities demonstrate extensive protohistoric and historic

upland land use reflecting the economic and cultural significance of the resource. Analyses have included archaeobotanical sampling, radiocarbon dating, and identification of associated features, incorporating ethnohistoric and ethnographic studies. Site investigations shed new light on the importance of montane resources to Columbia River peoples. Strategies for future research are proposed.

Growth Analysis of Five Populations of J/QuintonilesJ/ *(Amaranthus* spp.) from Sierra Norte of Puebla, Mexico: *MAPES, Cristina, Jardin Botánico, Instituto de Biologia, Universidad Nacional Aut6noma de México, DIAZ, Araceli, Jardin Botánico, Instituto de Biologia, Universidad Nacional Aut6noma de Mexico, and BYE, Robert, Jardin Botánico, Instituto de Biologia, Universidad Nacional Aut6noma de Mexico*.

Five populations of green edible amaranths from Sierra Norte of Puebla *(Amaranthus hypochondriacus* L. Africano, Mixteco and Azteca, *A. hybridus* and *Amaranthus cruentus* L. Mexicano) were cultivated for 149 days under uniform conditions in Chalco, Valley of Mexico. Plant height, leaf area, biomass, biomass allocation, and growth rate were measured periodically. *A. hybridus* and Mexicano reached their maximum height more rapidly than Africano, Azteca and Mixteco. The total leaf area of the five populations was significantly different among them, with Mixteco producing the greatest (2.91 $m^2$). Africano and Mixteco allocated 1.1 and 6% of the standing biomass to reproductive parts 149 days after germination, while Azteca and Mexicano allocated 18% and A. hybridus 42%. The relative growth rate (RGR) was comparable for Africano, Mixteco and *A. hybridus* with a general decline over time. The leaf area quotients (LAQ) for all five populations were at their maximum at the beginning of the cultivation and declined to zero at the end except Mixteco. The pattern of early biomass allocation for vegetative parts and later biomass allocation to reproduction coincided with that of plants selected for edible leaves rather than for grain production. In the vegetable forms, which usually are semicultivated, humans have assured a prolonged availability of edible leaves by selecting plants which delay the development of inflorescences and produce a high proportion of leaves over extended periods of time.

Patterns of Mollusk Use in a Nineteenth Century Colonial Context: *MARTINEZ, Antoinette, University of California, Berkeley.*

While relationships between a human culture and associated living organisms can change dramatically with the arrival of another group, some strategies for survival and success may transcend the changes attributed to "cultural differences." The comparison of archaeofaunal remains from the nineteenth century Native Alaskan Village of Fort Ross and associated Kashaya Pomo villages provides patterns, contrasts, and points of departure for the discussion of the processes of culture change. Supported by extensive archaeological and ethnohistoric data, this presentation will focus on the use of, and attitudes towards, mollusks by the segments of this colonial population defined herein by ethnicity, gender, and political power within a rugged northern California coastal setting.

Contemporary California Indian Basketry Symposium: *Symposium Chair: MATHEWSON, Margaret, University of California, Berkeley, WALLACE, Kathy, Yurok/ Karuk/Hupa;* DQ *University, SCHWALEN, Emily, Cherokee; University of California, Davis, MANRIQUEZ,* L. *Frank, Tongva/Ajachemem, Sonoma State University, BATES,*

*Jennifer D., Tuolumne MeWuk; Chairperson, California Indian Basketweavers Association, UNZUETA, Gilbert, Chumash; Oakbrook Park Chumash Interpretive Center; and PARKER, Julia, Miwok/pomo; Yosemite National Park.*

Contemporary California Indian basketweavers maintain a close relationship with native plants. This symposium will outline some of the issues faced by collectors in the modem landscape including access rights, land development, spraying of herbicides and pesticides, museum and archival research, and the revitalization of fading traditions. The presentation will begin with a slide show of fiber plants in California.

A Success Story of Rejuvenation of Biodiversity in Denuded Forest for Traditional Health-Care (poster): *MEHTA, M.B., International Tree Crop Research Institute, India Chapter.*

In developing countries where the rich biodiversity of forest is threatened due to heavy demands on it by human as well as cattle populations, efforts were made in the past to reforest through plantations of only economically important species. In the process, rich flora which provided medicinal plant products of great therapeutic value in the Traditional Health Care System were being lost, as no efforts were made to plant other than two or three timber species. The therapeutic values and uses are mentioned in ancient Indian treatises written in 1600-3000 BC The rejuvenation effort was carried out with people's participation, and 125 species with known therapeutic values and uses were selected for planting in 27,000 hectares of forest in the watershed of a river valley in western India. The success of plantations is visible, and within three years of the work, 15 species of trees were seen to regenerate naturally-a phenomenon not seen in the degraded forests in the last three decades. A list of species with their traditional therapeutic values was prepared and is appended with this paper. The paper is an honest presentation of the author's work in the field, as a forester with 34 years of experience.

Archaeological Investigations of Fish Remains at Ancient Lake Cahuilla: Evidence for Lacustrine Adaptation of Endemic Colorado River Fishes (poster): *MOFFITT, Linda* R., *Dept. of Anthropology, University of California, Riverside, and MOFFITT, Steven A., Dept. of Anthropology, University of California, Riverside.*

The remains of native Colorado River fishes, currently listed as endangered or threatened species, were recovered at seven of twenty-eight archaeological sites recently investigated along the shoreline of desiccated Lake Cahuilla, in the Coachella Valley, Riverside County, California. The fish elements collected support evidence obtained at thirty-one additional Lake Cahuilla sites for the predominant presence in the lake of two of the five known native Colorado Riverine fishes, the Razorback sucker *(Xyrauchen texanus* [Abbott]) and the Bonytail chub *(Gila elegans* [Baird]). The essentially exclusive presence of these two species in the archaeological assemblages associated with the lake reflects the successful adaptation of these riverine species to a warm-water lacustrine environment in prehistory.

Recycling Ethnoherpetological Knowledge: Marine and Desert Reptiles in Seri Indian Crafts Promotion and Environmental Education: *NABHAN, Gary Paul, Arizona-Sonora Desert Museum, ROSENBERG, Janice, University of Arizona,*

*ROMERO, Pedro, Seri Tribal Governor, and LAWLER, Howard, Arizona-Sonora Desert Museum.*

The Seri Indians of Sonora, until recently, depended upon marine and land reptiles to meet a significant portion of their dietary needs; reptiles were also important symbols in art and religion. Over the last three decades, sea turtle populations in the Sea of Cortez and desert tortoises on the Sonoran mainland have dramatically declined; however, desert tortoise and chuckwalla densities remain high on Tiburon and San Esteban Islands, where the Seri are biosphere reserve managers. At the request of the tribal governor, we collaborated with the Seri eIders to develop a primer for Seri schoolchildren focusing on the cultural significance, natural history and economic importance of these reptiles so that traditional knowledge and values could be reinforced in a school setting. In addition, we have promoted Seri carvings of desert and marine reptiles, a craft which acknowledges the Seris' distinctive ethnobiological knowledge.

Las Aves en el Pensamiento Teotihuacano y Maya: *NAVARlfO ORNELAS, Lourdes, Instituto de Biologia, Universidad Nacional Autonoma de Mexico.*

Son estudiadas las aves que figuran en la pintura mural prehispanica del sitio de Teotihuacan en el Valle de México, as! como las plasmadas en los muros de cinco sitios mayas de la Republica Mexicana. El objetivo de esta presentacion es el de dar a conocer a la riqueza de especies utilizadas como objetos culturales en el lenguaje pictorico, 10 que nos provee, en primer termino, de valiosa informacion biologica. En segunda instancia, nos acerca a las formas de pensar de estos pueblos, en razon de que en cada una de las escenas pictoricas se puede leer el papel de las aves como sirnbolos para expresar y perpetuar ideas y conceptos que denuncian la existencia de mecanismos de asociacion entre los eventos naturales y los culturales que influyeron en la vida de los teotihuacanos y mayas.

(Birds in Teotihuacano and Mayan Thought)

(Birds depicted in prehispanic mural painting from the site of Teotihuacan in the Valley of Mexico were studied, as well as the wall frescoes of five Mayan sites in the Republic of Mexico. The objective of this presentation is to give an idea of the richness of species utilized as cultural objects in pictorial language, which firstly provides us with valuable biological information. Second, we address the thought processes of these communities, since in each of the pictorial scenes one can read the role of birds as symbols to express and perpetuate ideas and concepts that indicate the existence of mechanisms of association between natural and cultural events that influenced the lives of the Teotihuacanos and Mayas.)

Stable Carbon Isotopic Discrimination of Maize and Bison in the Central Great Plains: *NELSON, Gretchen A., University of Nebraska, Lincoln, and REINHARD, Karl J., University of Nebraska, Lincoln.*

In the central Great Plains, bison and maize are two main sources of C4 signal in historic and prehistoric diet. As part of repatriation analysis sponsored by the Omaha Tribe of Nebraska, stable carbon and stable nitrogen analyses were conducted of Omaha skeletons dating between 1780 and 1820. Analysis of collagen alone indicated a change in diet, probably reflecting increased meat consumption over time. Analysis of bioappetite clearly shows that the historic diets of the Plains

were reliant on bison meat. The value of appetite analysis in diet reconstruction has been accepted only in the last two years. This analysis shows that such studies are especially useful in distinguishing C4 plant versus C4 meat signals in archaeological bone.

Taproots, Taboos and Transfonnations: *PEACOCK, Sandra* L., *University of Victoria, British Columbia, and TURNER, Nancy J., University of Victoria.*

Balsamroot *(Balsamorhiza sagittata,* Asteraceae) figures prominently in traditionallifeways of the Salishan-speaking people of the interior of British Colwnbia. It was a dietary staple, a powerful medicine and a spiritual helper. Clues to the cultural significance of balsamroot lie in its chemical constituents and the manner in which these are transformed through culturally prescribed practices. In this paper, we examine the nutritional and medicinal properties of this taprooted perennial and discuss the methods used to transform it from a low-use plant into a highly-valued resource.

Without Willow: Replacement Patterns and stylistic Outcomes in Western Mono Basketry: *POLANICH, Judith, Hearst Museum, University of California, Berkeley.*

Prehistoric migrations brought Mono peoples from the east to the west flank of California's Sierra Nevada, into a new biotic environment. Essential Owens River willow species were no longer available for use in twined basketry and the Mono chose replacements from chaparral species abundant in their new home. In this paper, I reconstruct how the Western Mono identified, tested, and standardized use of the several plants which replaced the riparian willows. These new materials brought about profound but subtle changes in culinary baskets and caused a stylistic revolution in baby cradles, essentially creating what we now know as Western Mono twined basketry.

The Dynamics of Chinampa Agriculture: A Middle Postclassic Case Study: *POPPER, Virginia 5., Institute of Archaeology, University of California, Los Angeles.*

Chinampa farming, the system of raising fields in the swampy lakes of the Basin of Mexico, has long been recognized as a remarkable form of intensive agriculture. The study of plant remains from a Middle Postclassic (AD 1150-1350) Chinampa settlement in Lake Chalco illustrates that chinampa farming was a dynamic system, varying according to natural and cultural conditions.

Which Came First-The Cowboy or the Tumbleweed?: *PUSEMAN, Kathryn, Paleo Research Labs.*

Russian thistle *(Salsola* sp.), also called tumbleweed, is noted in botanic literature to have been introduced into North America around 1873 or 1874; however, charred *Salsola* seeds have been recovered from prehistoric archaeological sites in Utah, Colorado, Nebraska, and Wyoming. Two charred *Salsola* seeds were recovered from a hearth at Site 5WL1794 in northeastern Colorado that yielded a radiocarbon date of 2970 ± 90 BP. The two charred seeds were sent to the University of California Radiocarbon Laboratory for AMS dating. These two seeds yielded a prehistoric radiocarbon date, proViding a strong argument for the presence of a native *Salsola* in North America prior to the 1800s introduction.

"He Never Paid Them for Their Acorn Trees": Conflicts over Gathering Rights in the Yosemite Valley in the Late 19th Century: *RAYMOND, David, San Francisco State University.*

After the Yosemite Valley was made a park in 1864, some of the indigenous Ahwahneechee Miwok continued to live there, surviving by working in the tourist industry, and by hunting and gathering. In 1869, the Yosemite park manager banned "cutting oak limbs" to harvest acorns. The Ahwahneechee responded that he had never paid them for the Valley, nor for the trees. What did the park manager hope to accomplish by this restriction? Why did the Indians respond by asserting their land rights in the Valley? The answers to these questions illustrate the difficulties of using historical accounts as sources of ethnobotanical information.

Can Ethnobiology Really Contribute to Alleviating Native American Diabetes in the Plains?: *REINHARD, Karl* ]., *University of Nebraska, Lincoln.*

In conjunction with the Omaha Tribe of Nebraska, anthropologists from the University of Nebraska *have* been working to understand the basis for diabetes for six years. This work is done in consort with medical professionals and medical anthropologists who *have* 14 years of experience with the disease. Initially, research was based on the premise that diabetes had a three-part basis in diet, activity patterns, and genetics. Gradually there has been the realization that the disease also relates to grief, familial relations, self-esteem, and an ill-defined factor termed "stress". In the context of these findings, the applied roles of ethnobiology and archaeology are assessed.

Archaeobotany of an Open Residential Site in Stillwater Marsh, Western Nevada (poster): *RHODE, David, Quaternary Sciences Center, Desert Research Institute, Reno.*

Flooding in Stillwater Marsh in the early 1980s exposed a rich archaeological record of marshside habitation in the Carson Sink, western *Nevada.* Excavations at one site, 26Ch1062, revealed numerous archaeological features, including the remains of at least two probable houses. Flotation analysis of nineteen features from the site resulted in the *recovery* of abundant plant remains. These remains, coupled with recent analyses of plant remains in coprolites from nearby Hidden *Cave, provide* new clues into the use of marsh plant resources in the Carson Sink.

Bracken Fern: Collection, Processing and Management for Sustainable Yields of Basket Materials (poster): *RUCKS, Meredith, Heritage Program, Lake Tahoe Basin Management Unit, USDA Forest Service, with KIZER, Mrs. Marie, Washoe Elder, JACKSON, Mrs. Teresa, Washoe Elder, MARTiNEZ, Mrs. Joanne, Washoe Elder, and CONWAY, Mrs. Florin, Washoe Elder.*

This poster exhibit describes the first season (August - October 1995) of field trips conducted by the Forest Service and Washoe participants to identify areas where gathering and management of traditional plants would be desirable. Washoe elders, including master basket makers, soon focused on Meeks Bay which ineludes an extensive meadow accessible to them but restricted from use by the general public. Although the meadow includes many plant resources of interest,

the basket makers were intent on locating stands of bracken fern with thick, straight rhizomes. The exhibit will describe the micro-habitat of desirable bracken and rhizome collection and processing by Washoe Elders. The exhibit will also solicit information on bracken ecology and use from others in order to better describe the ecology of basket bracken and design a long-term study of the effects of gathering practices and plant tending for achieving and maintaining rhizome attributes sought by basket makers.

**A Model of Indigenous Botany:** *SALMON, Enrique, The Baca Institute of Ethnobotany.*

Indigenous plant/healing paradigms will often locate a plant at the center of a cultural cosmological circle. Cycling around the plant are four aspects of the plant-human relationship. These aspects include mental, physical, social, and spiritual relationships to the plant. The aspects are anchored by cultural history, identity, language, land base, and beliefs of the particular culture. Traditional indigenous people synthesize all these aspects and anchors to each other and to the plant in order to construct a paradigm of the plant world: an indigenous botany. The indigenous botany will be presented as a model by which ethnobotanical researchers can compare their perceptions of the particular cultures they study. An indigenous perception of the botanical world is necessary in order to fully comprehend the distinct intricacies of the plant-human relationship.

**Evaluating the Toxic Health Hazards to Native Californians Engaged in Traditional Environmental Management Activities** (Mathewson symposium): *SCHWALEN, Emily, Ecology Dept., University of California, Davis.*

Conventional exposure risk assessment has been proposed for use in evaluating the toxic health hazards to Native Californians engaged in traditional environmental management activities. Certainly, the present loading of pesticides and other toxics has altered the potential health risks for traditional gatherers and basketweavers from those that were experienced in precolonial times. For those Native Californians that are actively involved in cultural recovery activities, these risks should be known and reduced wherever possible. Cultural survival of the invaluable environmental knowledges and skills of Native Californians requires the physical health and survival of these individuals. While some of the risks associated with traditional practices can be characterized as similar to those experienced by such at-risk workers as farmworkers, many aspects of traditional gatherer exposure are quite different. There are several exposure routes for gatherers, such as continued dermal contact and ingestion of collected materials over extended periods of time, that are quite different from worker exposure. Also, gathered materials include materials used for textiles, food, medicine, fuel, and ceremony. These complex routes of exposure from multiple sources must be considered if reasonable estimates of traditional gatherer risk are to be developed. Several options beyond conventional risk assessment are useful to understand the real health hazards. This approach could be productive for indigenous cultural workers worldwide involved in cultural revival among similarly threatened groups and ecosystems.

Ethnomedicinal Studies in Ladakh (Little Tibet): *SHARMA, G.K., Dept. of Biology, University of Tennessee.*

Ladakh is one of the most secluded parts of the enigmatic Himalayas. Furthermore, its medicinal flora and the indigenous system of medicine-the Amchi system-remain shrouded in the forbidding elevations of this arid and vast plateau. The area under investigation-the restricted region of Shyok and Nubra Valleys adjoining Siachen glacier in Ladakh-faced dereliction in the past. It is, therefore, a virgin site for ethnobotanical studies of the local flora. The present study attempts to investigate the ethnomedicinallore of the area, known for its remoteness and inaccessibility. The area ranges from 4,000 to 7,000 meters in elevation and lies at 35°20' to 36°10' North Latitude and 78°20' to 82°10' East Longitude.

Crop Population Size and In Situ "Conservation" for Farmers' Needs: *sOLERI, Daniela, Arid Lands Resource Sciences, University of Arizona.*

In traditionally based agricultural communities, farmer selection and management have combined with natural selection to produce crop landraces or folk varieties. In many of these communities there are trends toward reductions in the number of household farming, number of varieties of a species being grown, area of land cultivated, and area devoted to folk varieties. These changes raise questions about the size of remaining folk variety populations and their structure and diversity. Locally adapted population structure and genetic diversity are recognized as contributing to the success of these varieties in meeting low-input farmers' needs. The purpose of this paper is to use current theoretical insights into the effect of small population size on plant populations to investigate, hypothetically, the effect of the sort of reductions listed above on the genetic diversity present in folk variety populations.

Recent Results in Identification of Residues and Adhesives from the Southwestern Great Basin: *STACEY R.]., Dept. of Archaeological Sciences, University of Bradford, United Kingdom, HERON* C., *Dept. of Archaeological Sciences, University of Bradford,* SUTTON, *Mark Q., Dept. of Sociology and Anthropology, California State University, Bakersfield, and* FOX *A., Dept. of Archaeological Sciences, University of Bradford.*

Ethnographic data on the use of natural products as adhesives and sealants is sporadic and W1specified. Recent results of continuing work on the chemical identification of amorphous deposits surviving on stone tools, ceramics, and perishable artifacts from various archaeological sites in the southwestern Great Basin are reported. Materials identified include lac resin, pinyo pitch, and a combination of the two. Implications for aboriginal technology are discussed.

An Update on the Vegetal Cordage from Bayou Jasmine, Louisiana: *STANDIFER, Marie 5., Dept. of Plant Biology, Louisiana State University, Baton Rouge, KUTRUFF, ]enna Tedrick, School of Human Ecology, Louisiana State University, and TUCKER, Shirley* C., *Dept. of Biological Science, University of California, Santa Barbara.*

In ongoing investigations of the vegetal cordage from the Bayou Jasmine site in Louisiana, examples of braided cordage, fiber strands, and plant parts have been studied. A calibrated, radiocarbon date of 1600-1292 Be makes the cordage

one of the oldest textile remains in the Southeast. Technical analysis of cordage specimens provided information about the fiber strands and the techniques used in braid construction. The botanical analysis revealed that the fiber strands were made from the roots of a monocotyledonous plant, probably a grass or sedge, which had not previously been reported as a fiber source. DNA analysis is being attempted as a possible aid in identification.

Economic / Ethnobotany in a Liberal Arts Context: Challenges and Strategies: *STURGEON, Karen* B., *Biology Dept., Linfield College, Oregon.*

In this paper, I trace the development of an economic / ethnobotany course at a private liberal arts institution of 1500 students. I describe the challenges I faced and the strategies I used to locate the course in a curriculum organized around traditional disciplinary boundaries and expectations. As one who trained as an evolutionary biologist and botanist, I describe the strategy I used to educate myself about ethnobotany and to develop a syllabus that would attract and serve the needs of students from several disciplines. I discuss the challenges I faced in focusing on the four Willamette Valley "plant cultures"-agriculture, horticulture, silviculture, and viticulture (an economic botany approach). At the same time, I tried to reflect on the value and meaning of plants in modem and indigenous human cultures in the valley and elsewhere (an ethnobotanical approach). I share these challenges and strategies in the spirit of support for others wishing to develop such a course and encouragement for practicing economic and ethnobotanists interested in developing texts, lab manuals, and other curriculum materials or in offering workshops and seminars for the purpose of sharing their expertise with the wider community of educators.

Quemado Alegre: Explorations of Detail, Scale and Comparability: *TOLL, Mollie S., Museum of New Mexico, and McBRIDE, Pamela J., Museum of New Mexico.*

LA 5047, located in the Mogollon Highlands of Western New Mexico, is a site with remarkable interpretive riches, deriving largely from special preservation conditions. The site includes a pitstructure which burned while still in daily use during the Early Pithouse period (AD 200-600). Collapse of the roof during the fire preserved abundant botanical remains in and around the archaeological features, tools, and containers which structured their everyday use. This study relates a variety of experimental methods developed to recreate burn conditions and extract details of routine subsistence chores. Working with this assemblage forced consideration of questions of scale and comparability of floral data recovered under very different preservation circumstances, in local open sites and dry shelters, and farther afield under diverse climatic and soil situations.

Documenting Plant Knowledge of the Secwepemc of British Columbia: A Collaborative Research Project: *TURNER, Nancy J., University of Victoria, British Columbia, IGNACE, Marianne* B., *Secwepemc Cultural Education Society / Simon Fraser University, IGNACE, Ronald, SCES / SFU, NICHOLAS, George, SCES / SFU, and KUHNLEIN, Harriet V., Centrefor Nutrition and the Environment of Indigenous Peoples, Quebec.*

The Secwepemc Ethnobotany Project, ongoing since 1990, has aimed to document the traditional plant knowledge of these interior Salish peoples of southern

British Columbia. Their territory is extensive and ecologically diverse, encompassing grasslands, forests, and montane ecosystems, and many specialized habitats, all of which are integral to Secwepemc life. This paper explores the complex relationships among various aspects of plant knowledge and use, including: ecological setting, food and medicine systems, plant nomenclature and classification, historical settlement, worldview and past and present land and resource use patterns.

**In** a Pig's Eye: Javelina Complications of Coprolite Identification: *VINTON, Sheila Dorsey, University of Nebraska, Lincoln.*

Determining the origin of the feces is the first obstacle encountered by coprolite analysts. Several techniques have been developed to determine human origin. In practice, these are primarily "hands-on" evaluations of pre-rehydration morphology, rehydration color, rehydration smell, and content. Recently, purported "human" coprolites from Arizona were submitted for analysis. The coprolites were morphologically consistent with humans, and rehydration characteristics were not unusual. However, the analysis of the contents revealed an unusual dietary pattern most consistent with javelinas. It is clear from this experience that archaeologists and analysts must be familiar with the javelina feces to prevent collection of spurious data.

Out of Africa: The Impact of Millets in South Asia: *WEBER, Steven A., Washington State University, Vancouver.*

When do millets first appear in South Asia? How important were they in the rise and collapse of Harappan Civilization? Previous analysis of millets has been based on scant evidence, meaning that the true significance of millets has not been recognized. Using new data, this paper will explore the role these plants played in early civilizations in South Asia. This new evidence indicates that not only were African millets introduced not all at once but over a long period of time, beginning prior to the third millennium BC, but it is their integration into well-developed subsistence systems in the second millenium BC that is closely associated with significant socio-political change.

Prehistoric Pinniped Exploitation at Two Sites at Point Argiiello, California: *WILLIAMS, Christopher, Dept. of Anthropology, University of California, Santa Barbara.*

There is a debate in the archaeological literature concerning whether or not the prehistoric coastal inhabitants of California and Oregon routinely exterminated mainland pinniped populations early in prehistory. One side of the debate argues that pinnipeds were driven to offshore refuges, and coastal hunter-gatherers developed watercraft to continue the profitable exploitation of these animals. Data heretofore presented in this debate is inconclusive. New faunal data from two long-inhabited prehistoric sites near Point Arguello, California, indicate the inhabitants obtained pinnipeds locally on the mainland coast throughout prehistory. Even though some overhunting in the Point Arguello area may have occurred, it does not appear that local mainland populations were ever permanently eliminated. The author has concluded that the Point Arguello inhabitants never had to travel to the Santa Barbara Channel Islands, or trade with island inhabitants to procure pinnipeds.

Herbal Remedies and Cures in Mexico: *WILLIAMS, Nancy, Dept. of Anthropology, University of California, Santa Barbara.*

This project compares and contrasts the use of herbal remedies through autobiographical accoW1ts of childhood illnesses as experienced by women who live in and aroW1d the Colonia La Esperanza, Tijuana. Most grew up in rural Mexican households with little or no access to bio-medicine. Examined in this study are the memories of symptoms, remedies, preparations, ritual, and quality of care. Herbs were used for almost every illness. Many of these women currently use the same preparations to treat their own children. This study highlights the significant role herbs continue to play in this economically stressed colonia, despite the copious splattering of bio-medical clinics.

Consequences of Overexploitation on the Leeward and Virgin Islands: *WING, Elizabeth S., Florida Museum of Natural History.*

Evidence for overexploitation of some animal resources accompanies human population increases during prehistoric times in the Leeward and Virgin Islands. Those animals most affected are land crabs and carnivorous reef fishes. This is despite the fecW1dity of land crabs that can produce a million eggs a year and the legendary productivity of coral reefs. Compensation for the decline of these resources is seen as a shift to relatively greater use of hermit crabs, intertidal mollusks, herbivorous and omnivorous reef fishes, and land vertebrates such as mice and small birds. Options not taken were expansion of the pelagic fishery or more intensive husbandry of introduced animals.

Bison and Wapiti Exploitation in Eastern Beringia during Late Pleistocene / Early Holocene Times: *YESNER, David* R., *University of Alaska.*

Archaeofaunal data from the Broken Mammoth and Mead sites in the Tanana Valley of east-central Alaska, as well as from the Dry Creek site in the nearby Nenana Valley, suggest that *Bison priscus* and *Cervus* d. *elaphus* were the two most important large mammal species hW1ted during the late Pleistocene and early Holocene of eastern Beringia. Current data suggest that obligatory browsers including *Equus* and *Mammuthus* may have become extinct by ca. 12,000 BF, concident with, or immediately preceding, initial human occupation of the region. At the same time, there is increasing evidence that bison and wapiti persisted regionally into late Holocene times (ca. 3,000 BP). Evidence from artifacts, features, and butchering pattern studies suggests that Broken Mammoth and other early sites were seasonal camps for the primary processing of large mammals, birds and fish, and the subsequent caching of meat as well as retransport to secondary villages. Seasonality studies of both mammalian and avian fauna from these sites suggests primary fall / winter utilization, consistent with similar "overlook" sites on the Plains in which bison were hunted in areas blown free of snow. Studies of contemporary bison *(Bison bison)* in the area, while taxonomically distinct, may offer important analogies for reconstructing late Pleistocene / early Holocene subsistence patterns in eastern Beringia.