

THE ETHNOBOTANY OF THE YUOK, TOLOWA, AND  
KAROK INDIANS OF NORTHWEST CALIFORNIA

by

Marc Andre Baker

A Thesis

Presented to

The Faculty of Humboldt State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

June, 1981

THE ETHNOBOTANY OF THE YUROK, TOLOWA, AND  
KAROK INDIANS OF NORTHWEST CALIFORNIA

by

Marc A. Baker

Approved by the Master's Thesis Committee

James Payne Smith, Jr. Chairman

James F. Waters

Pat Weiger

~~Tom Jarsons~~

V. R. Smith

Approved by the Graduate Dean

Alma M. Gillespie

## ACKNOWLEDGEMENTS

An ethnobotanical study necessitates the cooperation of individuals who among themselves have a wide range of diverse interests. Dr. James Payne Smith, Jr., Professor of Botany was the chief coordinator of this unity as well as my principal advisor and editor. Most of the botanical related problems and many grammatical questions were discussed with him. Tom Nelson, Herbarium Assistant of the HSU Herbarium, aided in the identification of many plant specimens.

Dr. Jim Waters, Professor of Zoology, dealt with corrections concerning his field, and discerningly and meticulously proofread the entire text.

From the formal field of ethnology, Dr. Pat Wenger, Professor of Anthropology, worked with me on problems in linguistics, phonetics, and other aspects of ethnography. He also discussed with me many definitions, theories, and attitudes of modern ethnologists.

The field work would not have been possible without the help of Tom Parsons, Director of the Center for Community Development, Arcata, California. Mr. Parsons has been working with the Tolowa, Karok, and Yurok for many years and was able to introduce me to reliable and authentic sources of cultural information. His mediation eliminated the barrier of skepticism and apprehension developed by people of these cultures toward outsiders who have repeatedly taken advantage of them. All phonetics were recorded by Tom Parsons using

the Indian Unifon Single-Sound Alphabet. This alphabet was chosen for its simplicity and accuracy, and because many cultural authorities were well acquainted with it. All phonetic transcriptions in the final drafts were checked at least once by Tom Parsons, who made special trips back to the Indian Authorities in order to insure the accuracy of the linguistics.

I have a vast measure of appreciation for the cultural authorities themselves, whose religious and philosophical beliefs have enabled them and their immediate progenitors to endure more than a century of infringement of rights, discrimination, and exploitation. I am very thankful for the large degree of hospitality, trust, and congeniality that I received while visiting them.

Most botanical illustrations were done by Freddi Bowcutt. Artemisia douglasiana was drawn by Christine Ericksen, and the cultural distribution map by Kathy Simpson.

Most of the financial support was provided by the Center for Community Development. This included travel, time with the cultural authorities, transcription, and typing.

## INTRODUCTION

This study deals with the ethnobotany of the native Americans of the extreme northwest portion of California (see Figure 1). I conceive of ethnobotany as that area of study that attempts to illuminate the interrelations of plants with pre-literate man.

My primary goal is descriptive in nature, as it aims to present plant species used by the pre-1850 cultures of the Yurok, Tolowa, and Karok people and the manner of their use. This involves the identification in botanical and folk taxonomic terms of the plants used, the part of the plant used, the reasons for its collection by the culture, the manner and purpose for its use, and the antiquity of the utilization. My second goal is broader in scope in that it aims to determine the importance of these plants, their uses and their nomenclature to the Indian culture and the significance of this information to the theory of ethnobotany and botanical nomenclature.

Little research has been done on the ethnobotany of Northwest California. Schenk and Gifford have provided a major contribution in their work on Karok ethnobotany (86). Although copious information was obtained, little ethnological discussion followed. Also, since there is no record of voucher specimens for the work, the taxonomic status of many of the plant specimens remains in question. Harrington's monograph on tobacco uses among the Karok gives much information on the nature of linguistics as it

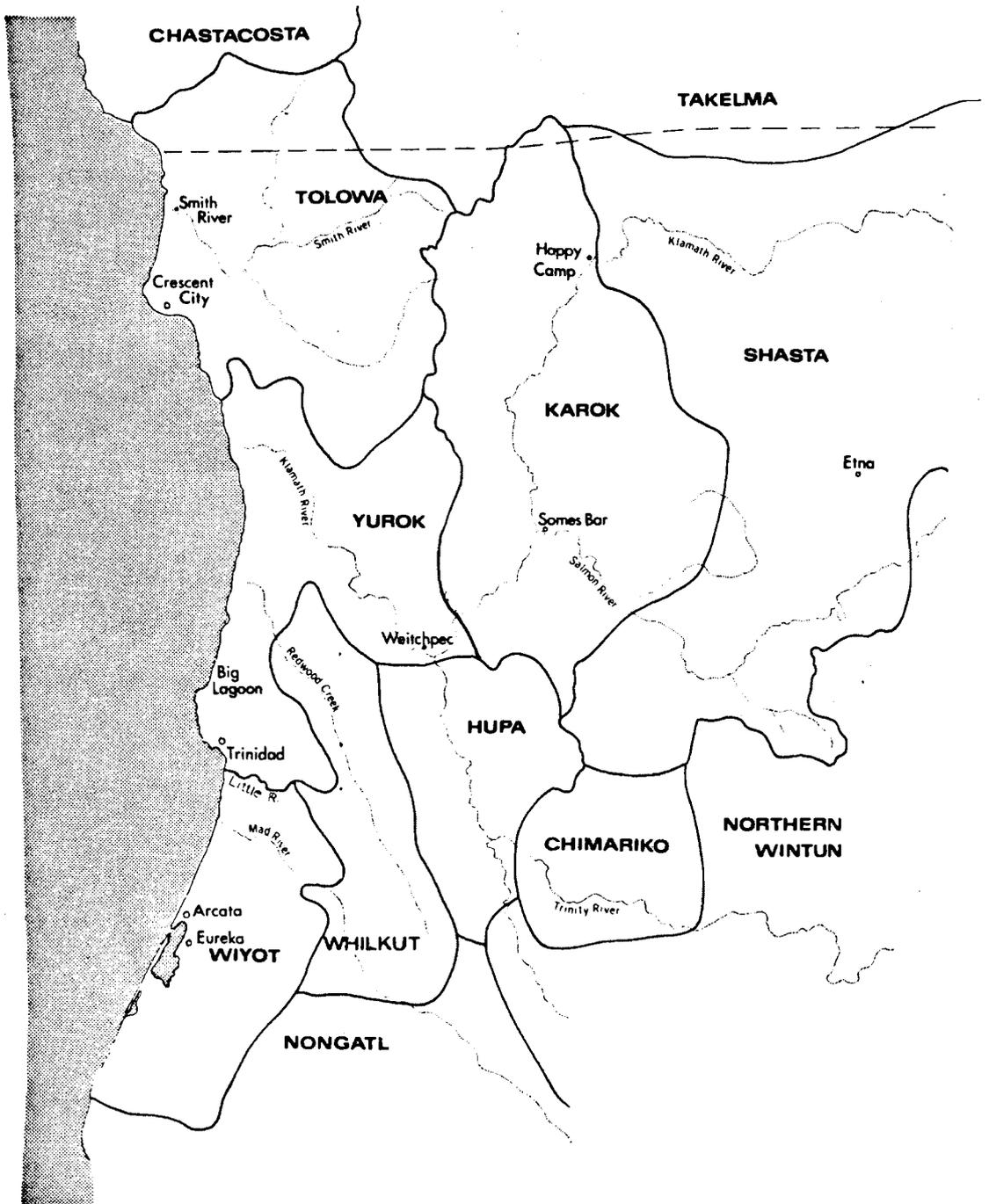


Figure 1. The distribution of the cultures of Northwest California prior to 1850.

relates to the Karok ethnobotany (43). His volume is outstanding in thoroughness of subject matter. The only other important contributor to the local ethnobotany was the zoologist and ethnographer, C. Hart Merriam, whose abundance of ethnobotanical data on California Indians has not yet been completely published (70).

## PHYSICAL ENVIRONMENT

At the time of the mass immigration in the early nineteenth century the Yurok, Tolowa, and Karok peoples lived adjacent to the Pacific Coast for a distance of approximately 130 km from the Little River, below Trinidad, California, to an area along the Oregon Coast about 15 km north of the California border (see Figure 1). From the coast, they extended directly inland an average of approximately 65 km, except in the north, where the distribution of the Takelma Indians dropped down to the headwaters of the Smith River, and in the south where the Whitlcut Indians occupied the major portion of the Redwood Creek Drainage and the Hupa occupied the lower Trinity River Drainage (80).

The area includes part of two geologic provinces, the Northern Coast Ranges and the Klamath Mountains. The Klamath Mountain province is an area of deeply benched mountains in Northwest California and Southwest Oregon. Within the distribution of the Yurok, Tolowa, and Karok, the province is drained by the Klamath and Smith Rivers. The Klamath River has three major tributaries: the Trinity, Salmon, and Scott Rivers. The altitude of many of the higher peaks in this portion of the Klamath Mountains is more than six thousand feet, the highest being English Peak at more than seven thousand feet in eastern Karok territory (80).

The North Coast Range is of mostly northwest trending

ridges at generally less altitude than those of the Klamath Mountains. They are drained by Redwood Creek, the Mad River, and the extreme lower reaches of the Klamath and Smith Rivers in the area under study. The principal rivers drain southwestward (55).

Almost all of the bedrock along the coastal margin is Franciscan, i.e., deep sea sediments that moved into a continental trench where they were compacted and metamorphosed, then raised above sea level, perhaps 70 million years ago. The Klamath Mountains are also of Franciscan Formation, but are geologically distinct from the Coastal Range, in that they contain rocks that are somewhat older and have been extensively intruded by large bodies of granite and serpentine. These outcroppings, especially the latter, provide for unique floristic islands (80).

The climate of Northwest California is determined mainly by westerly winds from the Pacific Ocean and by the highland that includes the Klamath Mountains and the northwest portion of the Coast Range. The annual precipitation ranges from 75 cm in the southwest portion of the study area to more than 125 cm in much of the northern and western parts. Locally it is as high as 250 cm. During the late fall and winter months, when there is much precipitation, the rivers become swollen and severe flooding may occur. Rain is infrequent during the summer (32).

The temperature along the coastal belt is moderate with daily and annual fluctuation. Monthly maxima range from about 45 C in January to 17 C in July. Freezing is uncommon. Ocean water temperatures are between 11 C and 13 C. The average humidity is greater than 70%, and it decreases gradually toward the east. Coastal fog is prevalent. East of the coastal belt, the climate is more rigorous, having greater variation in temperature. Temperatures of 0 C or colder occur in most of the area every year, and mean maximum values in July reach 35 C. During the winter, much of the area above 1,200 m elevation is covered in snow (32).

Vegetation is dense throughout most of the area, and it is especially dense along the coastal belt, where some areas are virtually impenetrable. Virgin stands of Sequoia are still found, but most have been logged at least once by recent immigrants. Elsewhere, Pseudotsuga, Abies, Picea, Calocedrus, Pinus, Lithocarpus, and Arbutus dominate the forest cover. Some areas are occupied with dense stands of shrub species, the more ubiquitous being of the genera Arctostaphylos and Ceanothus. Toxicodendron is frequent in most plant communities.

## SUMMARY OF THE INDIAN CULTURE

The Indian culture of Northwest California is regarded as the southernmost extension of the North Pacific Indian culture. It is thought to be of recent origin, in that the existing ethnic groups migrated into the area not later than 1000 years ago. Although sharing much in common with their northern neighbors, they are thought to have been less spectacular with regard to symbolism, custom, and ritual. Their relatively simple life style, along with other attributes such as acorn gathering, were shared with many other tribes of California (29).

The culture has been most recently characterized by Heizer et al. as "individualistic, prudish and given to litigation (50)." These terms appear more than merely descriptive and may bear some negative connotations. I might replace "prudish" with careful and considerate, and "given to litigation" with guided by moral structure. Of course compared to the present culture, they had very few laws and codes (50).

Beyond the patrilocal extended family, there was total anarchy. Personal value was heavily based on material wealth and social prestige, but one could buy into the latter. Prestige could also be obtained through shamanship and a wise shaman usually became wealthy. Wealth was measured in terms of material possessions such as dentalium shells and woodpecker scalps (60).

Materialism extended to the value of a human life.

This is revealed in two important cultural traits: monetarily exonerable homicide and polygamy. Although material payment did not necessarily justify killing someone of the same culture, it was considered adequate compensation. Wives were purchased at a similar cost and a wealthy man might have two or more wives. Since the materials of wealth were inherited, materialistic competition led to an economic social stratification where aristocrats enjoyed living patterns not available to others. Perhaps the greatest manifestation of this was the ownership of slaves or bondmen, which were manipulated, bought or sold at the discretion of the owner. Poor people often sold themselves into slavery in order to pay debts or in the case of "half marriage, a young man would sell himself to a prospective father-in-law in order to gain a wife (50,38,82).

The local Indian was primarily a fisherman rather than a hunter or gatherer, although the fruit of the Lithocarpus was of great economic importance to him. This fruit was the most highly prized among most California Indians (50,60).

Compared to other cultures of the region, industrial inventions were average, but art was more developed. Many objects which other California tribes fashioned in a purely utilitarian manner were aesthetically designed by the tribes of Northwest California (57).

This region contains the most remarkable linguistic variability in North America. Within its boundaries three linguistic stocks exist in juxtaposition, the Tolowa

belonging to the Athabascan, the Yurok to the Algonkian and the Karok to the Hokan. Their homogeneous non-linguistic culture combined with such linguistic diversity created an unusual and paradoxical situation. Inhabitants near tribal boundaries were frequently bilingual or trilingual knowing the language of the adjacent tribe or tribes as well as their own. However, loan words between the languages are few (14,50,82).

Personal kin and economic ties across boundaries were extensive. People did not venture into the unknown, however, and were suspicious of strangers. A man of prestige and character remained close to home and uninquisitive (60).

The major spiritual ceremonies included the White Deerskin Dance, the Jump Dance, the Kick Dance, and the Brush Dance. The most important was the White Deerskin Dance which was generally concerned with "world renewal", i.e. a recapitulation of the life of the Diety on earth, and stabilization of a preferred way of life through annual symbolic recreation. The Jump Dance was a solicitation of support from ancestors, the Kick Dance was a prayerful, community-assisted adjustment of the supernatural powers of a shamen, and the Brush Dance was held to cure a particularly sick child (50,60,82).

Shamanistic power resides in the control of "pains": small animate objects, non-biological, and of simple form which cause illness by entering the bodies of people. They also endowed the shaman with power when he directed

when he directed these pains to reside within himself. Pains were extracted with an incantation of a formula, which was a song either used exclusively or in conjunction with specific procedures using herbs. Only the simplest of illnesses were treated with herbs alone and usually not by shamans, but by members of the household who learned of the remedy from an elder (50,96).

The two coastal groups differed somewhat in their cultural patterns. The Tolowa migrated seasonally between the coast and areas close inland. The Yurok remained stationary. Although the Tolowa valued material wealth to gain prestige, as did the Yurok, the "prestige" economy of the Tolowa was mostly nontradable with the subsistence economy. Historically, the Tolowa are connected with the Athabascan tribes of Oregon immediately to the north; but the Yurok and their southern neighbors, the Wiyot, are thought to be a geographically disjunct population of the great Algonquin family existing more toward the East Coast of North America.

The culture of the inland group, the Karok, is closest to that of the Yurok and blended most where the tribes lived side by side along the Klamath River in the vicinity of Bluff Creek. The closest linguistic relatives of the Karok were the Chimariko (extinct) who lived to the south, and the neighboring Shasta who lived immediately to the east (30,40,47,50,60,82.)

The arrival of large numbers of whites approximately 1850 brought devastation to all near coastal Indian settlements. Both the Tolowa and the coastal Yurok were

either slaughtered or removed from their homes. Of the estimated one thousand Tolowa, only a handful remained after a mere twenty years of encroachment. Similarly, although there are many descendants of the original estimated three thousand Yurok, few are descendants of people who live along the coast. River people were only to a slightly lesser degree subjected to acculturation and mass genocide. The Whitlcut (Chilula) who once lived along the banks of Redwood Creek were bordered both by Yurok and Karok have become extinct except for one octogenarian, Harvey Maples. Also, some kinship and tradition is maintained by the Trinity River Hupa (48,78,82).

## INFORMANTS

Davis, Shan. Born 23 September 1918 at Somes Bar, California. Traditional spiritual leader of the Karok. California State credentialed teacher of American Indian Languages, Literature, and Culture (Karok) in Happy Camp High School and Elementary School. Shan was my chief informant for the Karok. I visited him at the Indian Council, at his home in Happy Camp, and at Somes Bar, at a Karok gathering.

Dietz, Ethyl (deceased). Born 1890 at the confluence of the Klamath and Salmon River, Siskiyou County, California. Some of her information was corrected by Shan Davis, though she had copious knowledge of plants. It was a great misfortune that she died the day following my first visit with her.

Exline, Jessie. Born 2 June 1921 on the Klamath Rivers at TWAT'HKÉRR State credentialed teacher of the American Indian Language, Literature, and Culture (Yurok). Teacher of Yurok at the McKinleyville High School, McKinleyville, California. I met with Jessie several times at her house in McKinleyville and once at the house of Aileen Figueroa in Westhaven.

Figueroa, Aileen. Born ca. 1910 at the mouth of the Klamath River at  $\Lambda^1$ -MA-NÁK. Her mother was a well-known Indian doctor and one of the last two Indians of Northwest California to have the III tattoo mark on her chin.

Humphrey, Berneice. Born ca. 1910. State credentialed teacher of American Indian Language, Literature, and culture (Tolowa). Daughter of the Tolowa matriarch, Amelia Brown, who died 25 March 1979 at the age of 110. Amelia Brown was not available to visitors at the time of my study. Berneice was my chief informant for the Tolowa, and I met with her on several occasions, both at the Crescent City High School and at her home in Smith River.

Lopez, Sam (deceased) Born ca. 1890. Spiritual leader of the Tolowa tribe, though spent most of his working life as a woodsman. Sam was part of a group which met at Crescent City High School.

Norris, Ella. Born ca. 1895. One of the very few remaining Indians who freely translates between two Indian languages (Tolowa and Yurok). Ella was part of the group which met at the Crescent City High School.

## MATERIALS AND METHODS

Field work was conducted between 9 May 1977 and 28 June 1978. Plant vouchers were brought to informants and they were asked the name of the folk taxa of the specimens and whether they knew of any pre-1850 uses. Discussions with informants were either as a group or individually, and were recorded on 90 minute cassette tapes for the purpose of linguistic accuracy and future record. Informants were selected on the basis of their reputation as people knowledgeable of authentic Yurok, Tolowa, or Karok past culture. The authenticity of their knowledge was tested in two ways. The first and most objective test was by asking informants about plants known by modern taxonomists to have been introduced into the area within the past century and a half. This method indicated a high degree of competence among informants of all three cultural groups. The second test noted the consistency of information among individuals. This also indicated a high degree of competence, but was of little relevance to more idiosyncratic knowledge.

Informants were asked if they recognized the plant, if the plant had always existed in the area, if they knew a native name for its folk taxon, and if they knew of any other ethnographic information associated with the folk taxon.

TABLE 1  
CHART OF GRAPHEMES

CONSONANTS							
	Labial	Labio-dental	Dental, Alveolar	Alveo-palatal	Velar	Uvular	Glottal
<b>Stops</b>							
voicelles	P		T		K		
voiced	B		D		G		
<b>Affricates</b>							
groove (voiceless)				ʃ			
groove (voiced)				ʒ			
lateral (voiceless)			θ				
<b>Fricatives</b>							
slit (voiceless)		F	θ		X		H
slit (voiced)		V	ð			Y	
groove (voiceless)			C	S			
groove (voiced)			Z	ʒ			
<b>Resonants</b>							
nazal	M		N				
lateral			L				
median	W		R	Y			

VOWELS			
	Front	Central	Back
High	I	ɛ	ʊ
Lower High	ɨ		ɔ
Mid	Δ	U	Q
Lower mid	E		Λ
Low	A	O	

DIPHTHONGS

O + I = Δ      Q + I = G  
O + U = Q      Y + U = W

## RESULTS

Taxa which were discussed with informants are listed alphabetically by genus in Table 2. The left column contains the botanical names of the taxa. An asterisk indicates that the taxon was introduced into the study area within the last two centuries (73). The middle column contains the symbols referring to the culture groups and directly to the right are the data collected from the authorities, followed by the Humboldt State University Herbarium voucher specimen accession number. N. D. indicates no data were collected.

Except where recent nomenclatural changes have been made, synonyms were taken from the most recent California flora (73,74). Where synonyms were taken from more recent papers, a reference citation is placed following the binomial.

Of the 328 taxa shown to various informants, plants of three were recognized as exotic, as compared to the ten known exotics. Specimens representing native taxa were never described as exotics by the informants. Of the total number of taxa, 222 were recognized, but linguistic and nonlinguistic data were gathered only on 127 of these. Thirty-nine, 21, and 49 names of folk taxa were recorded from the Yurok, Tolowa, and Karok authorities.

Plant voucher specimens were selected, whenever possible, from areas native to informants. Living specimens and dried, mounted herbarium specimens were used. Living voucher specimens were mounted by standard herbarium procedure and filed at the Herbarium of Humboldt State University (HSC), as were the cassette tapes.

The phonetic alphabet used was the Indian Unifon Single-Sound Alphabet adapted from Unifon\* by The Center for Community Development, Arcata, in close co-operation with fluent elders of the tribes in the region. (Table 1)

---

\* Developed by John Malone, President, Foundation for a consistent and compatible alphabet, Park Forest, IU.

Table 2.

## RESULTS

TAXON	CULTURE	DATA
<u>Abies concolor</u> (Gord. & Glend.) Lindl.	Y	ND 36700
	T	All firs the same 36700
	K	Recognized 35700
2 <u>Acer circinatum</u> Pursh	Y	NS 31545
	T	Does not grow in their area. 31545
	K	Made acorn paddle from the wood (CO'-ON) 31545
3 <u>Acer glabrum</u> Torr.	Y	Played with the fruit 31803
	T	Not used 31803
	K	ND 31803
4 <u>Acer macrophyllum</u> Pursh	T	Fibers of bark used for the making of woman's skirts 60002
	K	Made acorn paddle from wood 60002, 60003
5 <u>Achillea millefolium</u> L. var. <u>californicum</u> (Pollard) Jeps. (31)	Y	Used to relieve the aching of sore eyes, eyes washed with a concoction or steamed (CMAT)-O-WERH) 60004
	T	Used for something 60004
	K	ND 60005
6 <u>Adiantum pedatum</u> L. var. <u>aleuticum</u> Rupr.	Y	Rachis used for the designs in baskets (REH'-GOH') 00951
	T	Rachis used for the designs in baskets, dried for storage and then soaked in water to make pliable before use. If the stem was light on one side, then the light side was turned in (GITC-TCΔ-SRÓ-TE') 43906

Table 2. Continued

16

TAXON	CULTURE	DATA
<u>Adiantum pedatum</u> L. var. <u>aleuticum</u> Rupr. (continued)	K	Rachis used for the designs in baskets 00951
<u>Allium amplexans</u> Torr.	Y	ND 39433
	T	ND 39433
	K	(XON-ÓJ-YOH) 39433
<u>Allotropa virgata</u> T. & G. ex Gray	K	ND 43606
<u>Alnus oregana</u> Nutt. (Figure 2)	Y	Bark was used to dye fibers of <u>Woodwardia</u> , stems used in basketry 60006
	T	Bark used to dye fibers <u>Woodwardia</u> , stems used in basketry 60006
	K	Stems (CÓR-+P) used in basketry and lashing for sweat house. Used after soaking in water 60006
<u>Amelanchiér pallida</u> Greene	Y	ND 44175
	T	Recognized 60007
<u>Anemone quinquefolia</u> Gray var. <u>oregana</u> Gray	Y	ND 31790
	T	ND 31790
<u>Angelica arguta</u> Nutt.	Y	ND 21444, 34298
	K	ND 34298
<u>Angelica genuflexa</u> Nutt.	Y	ND 0419
* <u>Anthemis cotula</u> L.	Y	Informant has seen it since she was small 33171
	K	Whites drink tea made from this plant. Plant has always grown here 33171

Table 2. Continued

TAXON	CULTURE	DATA
<u>Apocynum pumilum</u> (Gray) Greene	Y	ND 27635
	T	ND 27635
	K	ND 27635
<u>Aquilegia formosa</u> Fisch. in DC.	Y	The sweet nectaries inside the sepal spurs are bitten off and savored mostly among the younger people. 18041
	T	ND 18041
<u>Aralia californica</u> Wats.	Y	Recognized 03249
	T	Recognized 03249
	K	The roots were boiled and the concoction used to treat arthritis, the entire extremity is placed in the solution. 03249
<u>Arbutus menziesii</u> Pursh	Y	The berries were eaten after roasting over an open fire. Children use bark as sleds. (CE'Δ'-GA) 32379
	T	The inner bark sewed together to make "every-day dress". The berries were not eaten, but made into necklaces. Children used bark to slide as sleds. (DUC-DO-KI) 32379
	K	Berries eaten and used as bait for steelhead, "can't fool them but once." Wood used for carving, will not split when dry. Leaves used to test the temperature of pitch to be used in canoe construction. The pitch is ready when the leaf turns black. Children used bark as sleds. Either wet bark was found or wetted with urine. (KOC-RI-PON) 60008

Table 2. Continued

TAXON	CULTURE	DATA
<u>Arceuthobium campylopodum</u> Engelm. in Gray	Y	ND 15901
	T	ND 29239
	K	ND 29239
<u>Arctostaphylos cinerea</u> Howell	Y	Berries eaten. Bears eat them also. (PI-UP) 31533
	T	Berries eaten, mixed with salmon roe and sugar, formed into patties and baked in rocks. Too much makes one constipated. 31533
<u>Arctostaphylos nevadensis</u> Gray	Y	ND 31762
	T	Same as <u>A. cinerea</u> 31762
	K	Berries eaten and pulverized and made into a drink. "too many berries get choaked up." Concoction from leaves, used to treat diarrhea (*-YU#N-N*) Plant also used to treat poisoning from <u>Toxicodendron diversiloba</u> 31762
<u>Arctostaphylos uva-ursi</u> (L.) Spreng.	Y	Same as <u>A. cinerea</u> 12226
	T	Same as <u>A. cinerea</u> 12226
<u>Armeria maritima</u> (Mill.) Willd. var. <u>californica</u> (Boiss.) G.H.M. Lawr.	T	Recognized 60009
<u>Armillaria ponderosa</u> (PK.) Sacc.	Y	This mushroom is eaten.
	K	This mushroom is eaten.
<u>Artemisia douglasiana</u> Benth. in Hook.	Y	Fresh leaves were used as a poultice for arthritis, as a linament, as a steamed herb for fractures

Table 2. Continued

TAXON	CULTURE	DATA
<u>Artemisia douglasiana</u> Benth. in Hook (continued)	Y	and as a tea for "pin worms, the kind kids get when they're little". It is sometimes combined with <u>Lysichiton</u> or <u>Tsuga</u> (Y-M*-JOON-*P) 60010
	T	Used the same as with the Yurok (G'OO-MUN) 60010
	K	The shoots were kept with drying salmon to keep "salmon beetles" away. The leaves were applied as a poultice for rheumatism and arthritis, "hot as you can stand it". 60011
<u>Asarum caudatum</u> Lindl.	Y	Leaves used in a preparation used to keep a newborn baby's naval from becoming infected. A large snails body was taken from the shell, smashed and put inside a leaf of <u>A. caudatum</u> . The preparation was steamed and then held over the umbilical cord with twine. The umbilical cord would fall off and the hole would heal. (WER-KWE-NEP) 44110
	T	"Crow's Foot", the leaves were used as a poultice for any infections. Used by themselves and wrapped in twine (DANC-MAC) 60012
<u>Asclepias cordifolia</u> (Benth.) Jeps.	Y	The older people chewed the dried latex at their leisure. The stem was broken to let latex flow out. The latex was dried somewhat to let it harden. 03299
	T	Recognized 03299

Table 2. Continued

TAXON	CULTURE	DATA
<u>Asclepias cordifolia</u> (Benth.) Jeps. (Continued)	K	The latex was chewed. After extracting from the plant, it was boiled to condense it. (M#T-#M-JUX-VU) 03299
* <u>Asparagus officinalis</u> L.	K	Brought in by the settlers long ago, grows by the river. 60013
<u>Aspidotis densa</u> (Brack.) Lellinger (89)	T	Not strong enough for baskets. 60014
	K	Recognized 42904
<u>Athyrium filix-femina</u> (L.) Roth	Y	ND 42293
	T	ND 42293
	K	Used leaves to clean eel's blood from butchered eel. (KO-TOS-SIIP) 60015
<u>Azolla filicoides</u> Lam.	K	ND 60017
<u>Baccharis pilularis</u> DC. ssp. <u>consanguinea</u> (DC.) C. B. Wolf	T	ND 60018
	K	ND 60018
<u>Balsamorhiza deltoidea</u> Nutt.	Y	ND 35033
	T	Recognized 60019
	K	Penduncles eaten. 35033
<u>Blechnum spicant</u> (L.) Roth.	Y	Leaves used for bedding. 00984
	T	Recognized 00984
	K	Recognized 00984
<u>Boschniakia strobilacea</u> Gray	Y	"Heard they are good to eat". 22126
	T	"Does not grow here". 1669
	K	Eaten when young. 60120

Table 2. Continued

TAXON	CULTURE	DATA
<u>Boykinia elata</u> (Nutt.) Greene	Y	ND 60020
	K	ND 39223
* <u>Briza minor</u> L.	Y	Recognized 60021
<u>Brodiaea elegans</u> Hoov.	Y	Bulb is what is called "Indian potato". They are baked in sand with a fire built over them. 03103
<u>Bromus mollis</u> L.	Y	"Grass" 22638
	T	"Grass" 22638
	K	ND 22638
<u>Calocedrus decurrens</u> (Torr.)	Y	ND 01293
	T	"White cedar" (GUC-DÓT'Ø) 60022
	K	(H'Λ-ØØ') 38728
<u>Colochortus tolmiei</u> H. & A.	Y	Recognized 38386
	T	ND 38386
	K	ND 38386
<u>Calycanthus occidentalis</u> H. & A.	Y	ND 37043
	K	ND 37043
<u>Calyptridium umbellatum</u> (Torr.) Greene	Y	ND 32128
	K	Recognized 43533
<u>Camassia quamash</u> (Pursh) Greene (Figure 1)	Y	ND 27140, 33058
	T	"Indian potato". (GUMP'IC) 27140, 33058
	K	"Indian potato", used to grow along the road. The bulbs were dug up with a stick and placed in a pit two feet in diameter.

Table 2. Continued

TAXON	CULTURE	DATA
<u>Camassia quamash</u> (Pursh) Greene (Figure 1) (continued)	K	Leaves of <u>Vitis californica</u> were placed on bottom, then a layer of bulbs and another layer of <u>Vitis</u> leaves. Finally a layer of dirt was added and a fire built on top. Mush formed is pure white and eaten by itself. 33058
<u>Campanula prenanthoides</u> Durand	Y	ND 00144
	T	ND 00144
	D	ND 41304
<u>Carex barbarae</u> Dewey in Torr.	T	ND 60023
<u>Carex nudata</u> W. Boott.	Y	Recognized 44411
	K	Recognized 44411
<u>Castilleja applegatei</u> Fern	Y	Recognized 38037
	T	Recognized 38037
	K	ND 38037
<u>Ceanothus cordulatus</u> Kell.	Y	ND 35785, 38718
	T	ND 35785, 38718
<u>Ceanothus cuneatus</u> (Hock.) Nutt.	Y	ND 36764
	T	ND 36764
<u>Ceanothus integerrimus</u> H. & A.	Y	ND 60024
	K	New shoots were used to make baskets. The Karok did not use the flowers for soup, they used sand. (KIH-RIP) 60024
<u>Ceanothus prostratus</u> Benth.	Y	ND 40199
	T	ND 40199

Table 2. Continued

TAXON	CULTURE	DATA
<u>Ceanothus pumilus</u> Greene	Y	ND 34599
	T	ND 34599
<u>Ceanothus velutinus</u> Dough. ex Hook. var. <u>laevigatus</u> (Hook.) T. & G.	T	Recognized 60025
* <u>Cerastium arvense</u> L.	T	ND 60026
<u>Cerastium viscosum</u> L.	Y	Recognized 04105
<u>Cercis occidentalis</u> Torr. ex Gray	Y	Recognized 27417, 31807
	T	ND 27417, 31807
	K	(O-COX-YÓ'M-CÓR-IP) (60028)
<u>Cerocarpus betuloides</u> Nutt. ex T. & G.	Y	ND 12510
	K	ND 12510
<u>Chamaecyparis lawsoniana</u> (A. Murr.) Parl.	Y.	"White cedar, throw fruits at each other when we were kids" 42312
	T	"Cedar" 42312
<u>Chimaphila menziesii</u> (R. Br. ex D. Don) Spreng.	Y	ND 27644
	K	"Big medicine", concoction leaves drunk to remedy kidney, bladder, and female troubles. 27644
<u>Chimaphila umbellata</u> (L.) Barton var. <u>occidentalis</u> (Rydb.) Blake (Figure 5)	Y	Concoction made from leaves. Often mixed with leaves of <u>Artemisia douglasiana</u> . Used for the treatment of various aches and pains and to relax muscles. Also mixed with Mahonia to treat kidney ailment. 34474
	T	"Looks like prince's pine" 34474

Table 2. Continued

TAXON	CULTURE	DATA
<u>Chlorogalum pomeridianum</u>	Y	Recognized 30345
(D. C.) Kchth.	T	"Does not grow here" 30345
<i>chinguapim</i>	K	ND 15443
<u>Chrysolepis Chrysophila</u>	Y	"Nuts" eaten(ἸΔ-ΓΪΗ') 22115
(Dougl. ex Hook.)	T	Traded for the fruit. The dry fruits were shaken and the "nuts" would fall out. The nuts were rolled over hot coals and eaten. "Sweet and rich" 22115
Hjelmquist	K	Grows high in mountains "nuts" eaten after roasting in coals. 22115
<u>Chrysothamnus nauseosus</u>	Y	ND 41178
(Pall.) Britton ssp.	K	Recognized 41178
<u>albicaulis</u> (Nutt.) Hall & Clem.		
<u>Cicuta douglasii</u> (D.C.)	T	ND 36262
C. & R.		
<u>Cirsium proteanum</u> J. T.	Y	"Silver thistle" 60029
Howell	K	May have eaten it. 60029
<u>Claytonia parviflora</u>	T	ND 60030
Moc. ex DC. (68)	K	A game was played which employed the shoots. The stem was tripped of its outer layers leaving only the terminal leaf or inflorescence hanging loosely on a flexible strand. Opponents hold firmly to the base of the strand and attempt to hook the opponents leaf or inflorescence. After engaging, the opponents pull, and the opponent who retains his leaf

Table 2. Continued

TAXON	CULTURE	DATA
<u>Claytonia parviflora</u> Moc. ex DC. (68) (continued)	K	or inflorescence wins. (O'ROŔ-UV-O-LE-I) 17698
<u>Claytonia perfoliata</u> Donn. (68)	Y	Children play a game with this plant which is the same game played by the Karok with <u>C. parviflora</u> . 17698
	T	ND 17698
<u>Claytonia sibirica</u> L. (68)	Y	Top of shoot eaten raw 60031
	T	ND 60044
<u>Clematis lingustifolia</u> Nutt. in T. & G.	Y	ND 26751
	K	Recognized 26751
<u>Collinsia rattanii</u> Gray	Y	ND 60032
<u>Collomia heterophylla</u> Dougl. ex Hook.	Y	Recognized 60033
	K	ND 60033
<u>Cornus nuttallii</u> Aud.	T	Recognized 60034
<u>Cornus stolonifera</u> Michx	T	"looks like dogwood" (M'I-DAN'T-θ-COC) 43706
<u>Corallorhiza maculata</u> Raf.	K	ND 30395
<u>Corylus cornuta</u> Margh. var. <u>californica</u> (A. DC.) Sharp	Y	Nuts eaten fresh. Stems used in basketry. Bushes burned then the new shoots are harvested (HO-ŪH') 04750
	T	Nuts eaten fresh. They were gathered before they became too dry and pounded with a wooden pommel to loosen the exocarp. The seeds could be

Table 2. Continued

TAXON	CULTURE	DATA
<u>Corylus cornuta</u> Margh. var. <u>californica</u> (A. DC.) Sharp (continued)	T	dried and stored for winter. For basket making, young shoots are dried and soaked in water prior to using. Weevils can crawl inside stem holes and eat baskets if one is not careful. 04750
	K	Nuts eaten. Stems used in basketry. Entire hillsides of <u>Corylus</u> were burned. Stems harvested second year after burning. The stems make the strongest ribbing for all baskets. (CÓR'IP) 04750
<u>Crataegus douglasii</u> Lindl.	K	"Wild plum" 60035
<u>Crepis acuminata</u> Nutt.	K	ND 23027
<u>Cryptantha affinis</u> (Gray) Greene	Y	ND 41196
	T	ND 41196
	K	ND 41196
<u>Cynoglossum grande</u> Dougl. ex Lehm.	Y	Recognized 41622
	T	ND 41622
	K	(TÍV-U-XRÓ-KO-XRÓK-O) 41622
<u>Cyperus eragrostis</u> Lem.	Y	Recognized 07210
	T	Recognized 07210
	K	ND 07210
<u>Cypripedium californicum</u> Gray	Y	ND 31057
	T	Recognized 60036

Table 2. Continued

TAXON	CULTURE	DATA
<u>Darlingtonia californica</u> Torr.	Y	"Fly catcher", old Indians knew it ate insects. 01903
	T	Recognized 01903
<u>Datisca glomerata</u> (Presl.) B. & M.	Y	ND 24675, 26003
<u>Datura innoxia</u> Miller	Y	ND 34318
	T	ND 34318
* <u>Daucus carota</u> L.	Y	ND 02151
<u>Daucus pusillus</u> Michx.	Y	ND 21481
<u>Delphinium glaucum</u> Wats	T	"Seen it growing higher up" 36217
<u>Delphinium menziesii</u> DC.	T	Recognized 24973
<u>Delphinium nuttallianum</u> Pritz. ex Walp.	Y	ND 60037
	T	ND 60038
	K	ND 60037
<u>Dentaria californica</u> Nutt.	Y	"Snowdrops" first plant to flower in spring (HÁKI-PÉRÈ) 36818
	T	Recognized 36518
<u>Dichelostemma ida-maia</u> Greene (76)	Y	Recognized 60039
	K	Picked flowers for bouquet (+X-YŪH-I-HO-TÓ- YIØ) 38482
<small>WILD HYACINTH</small> <u>Dichelostemma multiflorum</u> (Benth.) Heller (74)	K	Bulb was dug up and eaten raw 60040
<u>Dichelostemma pulchellum</u> (Salisb.) Heller	Y	ND 60041
	K	"Ate the bulbs" 60041

Table 2. Continued

TAXON	CULTURE	DATA
<u>Disporum hookeri</u> (Torr.) Nichols	Y	Aileen Figueroa's mother said not to eat the berries because "the river serpent (KO-MÉC) will get you--he will see your heart, because your heart turns orange from the berries." 32000
<u>Disporum smithii</u> (Hook) Piper	T	Recognized 60042
<u>Dodecatheon hendersonii</u> Gray	Y	ND 17909
	T	ND 17909
	K	"shooting-star" (ÓK-CON-ŴO-HI) 17909
<u>Drapera systyla</u> (Gray) Torr.	Y	ND 14199
	K	ND 14199
<u>Dryopteris arguta</u> (Kaulf.) Watt.	Y	Leaves used to clean meats and to lay over meat to keep flies off. This fern is used because it has no odor. Spores used to make designs on hand. (HΛ-Δ-LÉK) 36688
	T	ND 36688
	K	Leaves used to clean eels. (KO-T'ŴO-CIP) 36688
* <u>Elymus glaucus</u> Buckl.	Y	"Grass" 40317
	T	"Just a grass" 40317
	K	"Foxtail bad stuff. Gets into dog's ear and eyes.?" 40317
<u>Empetrum hermaphroditum</u> (Lange) Hagerup	T	Recognized 60043, 33094

Table 2. Continued

TAXON	CULTURE	DATA
<u>Epilobium angustifolium</u> L.	Y	"Fireweed" 36743
	K	Recognized 36743
<u>Epilobium canum</u> (Greene) <u>Raven ssp. latifolium</u> (Hook.) Raven (88)	Y	Recognized 24235
	T	ND 24235
	K	Recognized 24235
<u>Epilobium munitum</u> Lind. ex. Hook.	T	ND 60045
<u>Equisetum arvense</u> L.	Y	"Water grass" 60046
	T	"Species of file grass, does not grow around here" 44045
	K	"These are in my garden, I have a hard time getting rid of them. The '64 flood brought them." 44045
<u>Equisetum laevigatum</u> A. Br.	K	Stem used to sandpaper madrone spoons. 60047
<u>Equisetum telmateia</u> Ehrh. var. <u>braunii</u> Milds.	Y	Very small fresh sprouts eaten. 60049
	T	Stem rubbed on child's teeth to keep them from gritting their teeth. "file grass" 60049
	K	ND 60048
<u>Eremocarpus setigerus</u> (Hook.) Benth.	Y	Recognized 27395
	T	Berneice Humphrey has seen it growing on the river bars since she was a child. 27395.
<u>Erigeron foliosus</u> Nutt. var. <u>hartwegii</u> (Greene) Jeps.	T	ND 60050
<u>Erigeron philadelphicus</u> L.	T	ND 60051
	K	ND 60051

Table 2. Continued

TAXON	CULTURE	DATA
<u>Eriodictyon californicum</u> (H. & A.) Torr.	Y	The leaves were made into tea for colds and coughs. 41928
	K	Strong concoction made from leaves of this and pitch from <u>Pinus lambertiana</u> ; also leaves chewed and then water drank; "it is sweet and soothing" (PÍR-+S-OX-VÓ-XOR-OC) 60051
<u>Eriogonum nudum</u> Dougl. ex Benth. var. <u>oblongifolium</u> Wats.	Y	ND 60052
	K	Roots were used to prepare a medicine for abdominal ailments. Young shoots eaten. 60052
<u>Eriophyllum lanatum</u> (Pursh.) Forbes	Y	Recognized 60053
<u>Eriophyllum lanatum</u> (Pursh.) Forbes var. <u>arachnoides</u> (Fisch. & Ave-Lall.) Jeps.	K	ND 60054
<u>Erysimum capitatum</u> (Pursh) Greene	Y	ND 60055
	T	Recognized 60055
	K	Recognized 44063
<u>Erythronium californicum</u> (Purdy) Greene	Y	ND 15489
	K	ND 15489
<u>Erythronium citrinum</u> S. Wats.	T	"Maybe bouquet" 01900
<u>Eschscholzia californica</u> Cham.	Y	Here as long as she can remember. 31513
	T	Recognized 31513
	K	"Get drowned if you pick it. He is just a pretty flower." (C+N-VÓN-NO-HIC) 31513

Table 2. Continued

TAXON	CULTURE	DATA
<u>Fragaria chiloensis</u> (L.) Duchn.	Y	Fruit eaten while fresh. 60056
<i>CAS</i>	T	Fruit eaten while fresh 60056
<u>Fragaria vesca</u> L. ssp. <u>californica</u> Staud.	Y	Fresh fruit eaten. 44523
	K	Fresh fruit eaten. 44523
<u>Frasera speciosa</u> Dougl. ex Griseb. in Hook.	Y	Recognized 24830
	T	ND 24830
	K	ND 24830
<u>Fraxinus latifolia</u> Benth.	Y	ND 16197
	T	ND 16197
	K	ND 16197
<u>Galium aparine</u> L.	Y	"Grab you" 19780
	T	ND 19780
	K	Recognized 19780
<u>Garrya buxifolia</u> Gray	Y	Recognized 08383
	T	ND 08383
	K	ND 08383
<u>Gaultheria shallon</u> Pursh	Y	Fruit eaten (MA-KUB) 31633, 41340
	T	Fruit eaten. 60057
	K	ND 31633, 41340
<u>Gilia capitata</u> Sims.	K	ND 38733
<u>Gnaphalium microcephalum</u> Nutt.	Y	Recognized 44099
	K	ND 44099

Table 2. Continued

TAXON	CULTURE	DATA
<u>Gnaphalium purpureum</u> L.	T	ND 60058
<u>Hemitomes congestum</u> Gray	Y	ND 38797
<u>Hemizonia clevelandii</u> Greene	Y	Recognized 35622
	T	ND 35622
<u>Heracleum lanatum</u> Michx.	Y	Cortex of stem near shoot apex eaten. Stem picked under shade of alder and before the plant blooms. The outer layers of the stem are peeled away and the inner layers eaten raw.(CEKW'C) 60059
	T	Used similar to the way the Yurok used it. (CUB) 60059
<u>Heteromeles arbutifolia</u>	Y	Children like to roast the berries over an open fire and eat them. (PA'-CA) 36744
	T	ND 36744
	K	Berries roasted over open fire and eaten. "They make you choke"(PQC-YOO) 36744
<u>Heuchera micrantha</u> Dougl. ex Lindl. var. <u>pacifica</u> Rosend, Butt., & Lak.	K	"Seeds are called lice" 60060
<u>Hierochloe occidentalis</u> Buckl.	Y	"Just a grass" 10096
	T	"Looks like wild oats, all just grass." 10096
	K	ND 10096
<u>Holodiscus discolor</u> (Pursh) Maxim. var. <u>fransciscana</u> (Rydb.) Jeps.	Y	Recognized 31802
	T	ND 60061
	K	"Looks like arrow wood but it's not." 31802

Table 2. Continued

TAXON	CULTURE	DATA
* <u>Hypochoeris glabra</u> L.	Y	"Dandelion" 60062
	K	ND 60062
<u>Iris innominata</u> Henders.	T	Roots and leaves are used (mostly roots) to manufacture cordage. It was collected by men, who dried it and made cordage out of it in the winter. They would put bunch of it in their mouths and chew it until it was soft and then roll it on their legs to form twine. Gasquet is the closest place from Crescent City where it can be gathered and the higher the elevation of the mountains it is collected the better the quality it is. 60063.
<u>Iris macrosiphon</u> Torr.	K	Not what is used for making cordage. 34916
<u>Iris tenax</u> Dougl. ssp. <u>klamathensis</u> Lenz (Figure 6)	T	Used this iris for cordage. (TAA-ME') 45313
<u>Juncus effusus</u> L.	Y	Young females used the stems to practice making baskets. The stems were first turned over an open fire to turn the stems brown, then soaked in water to make them pliable. 60065
	T	Used same as Yurok (BÓ-O-BUC) 60065
	K	Used same as Yurok, also medicine man put the stems and leaves in the fire, then prayed over it. It is bad luck if you see it in the fire with <u>Ceanothus</u> .

Table 2. Continued

TAXON	CULTURE	DATA
<u>Juncus effusus</u> L. (cont.)	K	(TÓO-PH <sup>0</sup> Θ) 60065
<u>Juniperus communis</u> L. var. <u>saxatilis</u> Pall.	Y	Dried berries used to decorate dresses, probably traded for. 01220
	T	Dried berries used to decorate dresses and for beads of necklaces. 01220
<u>Lathyrus nevadensis</u> Wats	Y	Recognized 42276
	K	Recognized 42276
<u>Ledum glandulosum</u> Nutt. (Figure 7)	Y	Leaves simmered to make a tea which was most prized. (WΔ-YÁK-CIP) 60066
	T	Leaves simmered to make a tea. The leaves are picked after the plant has bloomed. 60066
	K	ND 32017
<u>Letharia vulpina</u> (L.) Hue	Y	Used as a dye for porcupine quills.
	K	"Wolf moss", used as a dye for porcupine quills.
<u>Ligusticum californicum</u> C. & R.	Y	ND 28170
	T	Roots eaten. 60067
<u>Lilium pardalinum</u> Kell.	Y	ND 36887
	T	Recognized 36887
	K	(MO-ÍO-YIΘ) 36887
<u>Lilium rubescens</u> Wats.	Y	ND 32663
	T	ND 32663
	K	"Sweet smelling, picked for bouquet." 32663

Table 2. Continued

TAXON	CULTURE	DATA
<u>Lithocarpus densiflora</u> (H. & A.) Rehd. (Figure 8)	Y	Fruit was main staple; ground into flour after leaching. Leached by forming impression in a sandy beach. When an old person was on dying bed, if could drink the acorn mush, he would not die that day. dough (WAA-LAN') acorn soup (KA-GA) 08071
	T	Fruit was main staple. Bark was used to dye fishing nets so the fish could not see them. Baskets were also dyed. (CAN-DUN); acorn soup (CAN-DUN-TU-I') 08071
	K	Fruit was main staple. People would camp in groves when harvesting the fruit. Certain villages have certain fruit crops. Fruit was gathered after it had fallen from the tree, but before insects invaded them. While younger men hunt, the remainder of the people played games centered around removing the shells singularly from the seed. When the seeds are ground, a basket with a hole in the bottom large enough to include the stone mortar was placed over the mortar to keep the acorn flour in place. It was then leached in sand with cold water. The finished flour was mixed with water to make a past which could be cooked in several ways. "Never taste ashes." A gruel was most often made by cooking the paste in

Table 2. Continued

TAXON	CULTURE	DATA
<u>Lithocarpus densiflora</u> (H. & A.) Rehd. (Figure 8) (Continued)	K	<p>cooking baskets. Hot rocks were placed into the paste to bring it to boiling. The rocks were kept from burning the basket with "acorn paddles". The rocks were placed in and out of the gruel with twigs bent into a U-shape. Males ate gruel with wooden spoons, the females used mussel shells. The cake of acorn meal that formed around the hot rocks was given to children as sort of a treat. Gruel was flavored with venison, herbs, etc. The paste was occasionally baked as patties in hot coals. Flour was stored in large storage baskets.</p>

Table 2. Continued

TAXON	CULTURE	DATA
<u>Lithocarpus densiflora</u> (H. & A.) Rehd. (continued)	K	Lithocarpus, tree(XON-YEÉP); acorn (XON-TO-PUN); acorn meat (XOR-#S); mortar (C #-POM); pestle (#-KRÓ-VOR); 08071
<u>Lithospermum californicum</u> Gray	Y	ND 27758
	K	ND 27758
<u>Lomatium californicum</u> (Pursh) C. & R. (Figure 9)	Y	"Smells like which is used for different things, thrown in fire at ceremonies." 32947
	K	The root was chewed and smoked in the pipe. 32947
<u>Lomatium dissectum</u> (Nutt.) M. & C.	Y	ND 34655
	K	"Looks like (KHIS-WOF)" 34655
<u>Lomatium triternatum</u> (Pursh) C. & R. var. <u>macrocarpum</u> (C. & R.) Mathias	Y	ND 27741
	T	ND 60068
	K	"Looks like wild celery" (#N-KÓN-W'IO-UX) 26997
<u>Lomatium utriculatum</u> (Nutt.) C. & R.	Y	ND 60069
<u>Lonicera hispidula</u> Dougl. var. <u>vacillans</u> Gray	Y	ND 60070
	K	ND 60071
<u>Lonicera involucrata</u> (Richards) Banks	T	"Not good to eat, poison" 60072
	K	ND 30320
<u>Lotus crassifolius</u> (Benth.) Greene	Y	"Wild Lotus" 44374
	K	ND 44374
<u>Lotus humistratus</u> Greene	Y	"Grows in sandbars" 44375
	K	Recognized 44375

Table 2. Continued

TAXON	CULTURE	DATA
<u>Lupinus albifrons</u> Benth.	Y	(TÓP-TOP) 60073
var. <u>flumineus</u> C. P. Smith	K	ND 60073
<u>Lupinus littoralis</u> Dougl. in Lindl.	T	ND 60074
<u>Lycopodium clavatum</u> L.	Y	"Elk moss" 23776
	K	ND 23776
<u>Lycopodium inundatum</u> L.	Y	ND 36099
	T	ND 36099
<u>Lysichiton americanum</u> Hult. & St. John	Y	Sturgeon eggs were baked in rolled leaves placed in in ashes. The leaves were used as a vessel to drink water from streams. Hot rocks of "California jade" (vesuvianite) were placed in water with the root to steam it as a remedy for arthritis, stroke, and lumbago. The center of root was eaten after boiling eight times. (KO-MEC-U-KAAP) 60075
	T	Used the same as did the Yurok. (DA-JU-CEC) 60075
<u>Madia elegans</u> D. Don var. <u>vernalis</u> Keck	Y	ND 60076
	K	"Lemon scented" 60076
<u>Mahonia aquifolium</u> (Pursh)	Y	Root used to dye porcupine quills yellow. 41476
	K	Fruits, if eaten "give you the shits". 41476
<u>Mahonia pumila</u> Greene (2)	T	Roots are used in a concoction which is used for coughs and for blood purification. 03344

Table 2. Continued

TAXON	CULTURE	DATA
<u>Mahonia pumila</u> Greene (2) (Continued)	K	Root used to dye porcupine quills yellow. Root also used as a concoction which was used for a tonic. 03344
<u>Maianthemum dilatatum</u> (Wood) Wels. & Machr.	Y	Recognized 60077
	T	ND 60077
	K	Recognized 60077
<u>Marah fabaceus</u> Greene	Y	ND 12785
	T	ND 12785
	K	ND 12785
<u>Marah oreganus</u> (T. & G.) Howell	Y	Tea made from young shoots of this and rhizomes of <u>Polypodium</u> . Children constructed representations of animals by inserting twigs into the fruit; they also tossed the fruit at one another in play. (TAKW'-CKΔ) 37571
	T	ND 37571
	K	Poultice made from roots to draw boils and to apply to bruises (TUC-O'F-F*B) 60078
* <u>Medicago polymorpha</u> L. var. <u>brevispina</u> (Benth.) Heyn.	Y	Recognized 60079
<u>Mentzelia laevicaulis</u> (Dougl.) T. & G.	T	ND 15837
	K	Recognized 15837

Table 2. Continued

TAXON	CULTURE	DATA
<u>Micropus californicus</u> F. & M.	T	ND 06008
	K	Recognized 06008
<u>Microseris laciniata</u> (Hook.) Sch.-Bip.	Y	ND 60080
	K	ND 60080
<u>Mimulus aurantiacus</u> Cort.	Y	ND 12003
	T	ND 12003
<u>Mimulus cardinalis</u> Dougl. ex Benth.	Y	ND 38462
	T	ND 38462
<u>Mimulus guttatus</u> Fisch. ex DC	Y	Recognized 60081
	T	ND 60081
	K	ND 60081
<u>Mimulus kelloggii</u> (Curran ex Greene) Currah ex Greene	Y	ND 60082
	K	ND 60082
<u>Mirabilis greenei</u> Wats.	Y	ND 37770
	T	ND 37770
	K	ND 37770
<u>Monardella oderatissima</u> Benth.	Y	ND 44557
	K	ND 44557
<u>Monotropa hypopithys</u> L.	Y	ND 22823
<u>Monotropa uniflora</u> L.	Y	ND 24530
	K	ND 24530
<u>Nemophila menziesii</u> H. & A.	Y	Recognized 35381
	T	ND 35381
	K	ND 35381

Table 2. Continued

TAXON	CULTURE	DATA
<u>Nicotiana bigelovii</u> (Torr.) Wats.	Y	"This does not look like the cultivated Indian tobacco, leaves too small." Indian tobacco (WA-HP); pipe(CKO) 32069, 32070, 37513
	T	"Does not grow on coast." Sam Lopez' grandfather obtained powdered tobacco from Hoopa where it grew above the bank near the village of Terwer. Tobacco was smoked in trumpet shaped pipes 5 to 10 inches long. Berneice Humphrey once owned a pipe which had a stem made of <u>Taxus</u> wood and a bowl made of soapstone. Tobacco was carried in a weasel-skin pouch along with the pipe. Smoking was for leisure, not for medicine. (CAB-Ψ) pipe (ΔΔ-JAN') 32070
	K	"This is not the tobacco they used." 37573
<u>Nuphar polysepalum</u> Engelm.	Y	(KAA-MUC) 16161
	T	The seeds were eaten in more recent times. The Tolowa learned of the use from the Klamath Falls Indians who called it (WQQ-KUC) 16161
<u>Oemlaria cerasiformis</u> (H. & A.) Landon (61)	T	"Wild cherry" fruit was only eaten a few at a time otherwise the mouth would turn black or dark purple. This is called the "wood that lies" because it is the first to bloom in the spring and the last to set fruit. 60083

Table 2. Continued

TAXON	CULTURE	DATA
<u>Orogenia fusiformis</u> Wats.	T	ND 29192
<u>Orthocarpus attenuatus</u> Gray	Y	ND 60084
	T	ND 60084
<u>Osmorhiza purpurea</u> (C. & R.) Suksd.	Y	ND 21585
	T	ND 21585
	K	ND 21585
<u>Oxalis oregana</u> Nutt.	Y	Plant eaten with dried fish. 16711
	T	Plant eaten with dried fish; used as a poultice to treat sores or swollen areas on the skin; and to draw infections; mixed with other plants such as <u>Asarum caudatum</u> . 16711
	K	ND 16711
<u>Paxistima myrsinites</u> (Pursh) Raf.	Y	ND 24106
	K	ND 24106
<u>Penstemon deustus</u> Doug. ex Lindl.	Y	ND 60084
	K	ND 60084
<u>Penstemon laetus</u> Gray ssp. <u>sagittatus</u> (Keck) Keck	K	ND 60085
<u>Perideridia howellii</u> (Coult. & Rose) Math	Y	Recognized 39730
	K	ND 39730
<u>Perideridia oregana</u> (Wats)	Y	ND 35616, 21598
<u>Petasites palmatum</u> (Ait.) Gray	Y	Recognized 06056
	T	"Colt's foot", placed leaves in hot water and put whole over

Table 2. Continued

TAXON	CULTURE	DATA
<u>Petasites palmatum</u> (Ait.) Gray (Continued)	T	arthritic joint. 60086
<u>Phacelia heterophylla</u> Pursh	Y	ND 60087
	T	Recognized 44366
	K	ND 60087
<u>Philadelphus lewisii</u> Pursh	Y	"Mock orange" 08622
	T	ND 08622
	K	"Grows north" 08622
<u>Phoradendron juniperinum</u> Engelm. ssp. <u>libocedri</u> (Engelm.) Wiens	Y	ND 33282
	T	ND 33282
	K	ND 33282
<u>Phoradendron villosum</u> (Nutt.) Nutt.	Y	Recognized 36216
	T	ND 36216
	K	ND 15921
<u>Phyllospadix scouleri</u> Hook.	T	ND 06560, 1980
<u>Physocarpus capitatus</u> (Pursh.) Kuntze	Y	ND 31639
	T	"Run to squeeze seeds and pop them." 31639
	K	"Does not grow around here." 31639
<u>Picea sitchensis</u> Carr.	Y	Roots were used to make the horizontal weave in coarse baskets used for drying foods in smoke house. "Did not care what happened to them." (WA-PA) 60088
	T	"Spruce does not grow here. 08414

Table 2. Continued

TAXON	CULTURE	DATA
<u>Picea sitchensis</u> Carr. (continued)	K	ND 04814
<u>Pinguicula macroceras</u> Link	Y	ND 38380
	T	ND 60089
<u>Pinus albicaulis</u> Englem.	Y	ND 32544
	T	ND 32544
	K	ND 32544
<u>Pinus attenuata</u> Lemmon	Y	ND 40747
	K	Recognized 40747
<u>Pinus contorta</u> Dougl. ex Loud.	Y	"Pine" 01476
	T	Hunters rubbed the branches on their bodies to hide the human scent. 60090
	K	ND 01476
<u>Pinus jeffryi</u> Grev. & Balf. in A. Murr.	Y	"From a different climate." 37669
	K	"Bull pine because the cone has scales with three burs on them. (*S-V*R-#P) 37669
<u>Pinus lambertiana</u> Dougl.	Y	ND 32594
	K	The seeds were eaten. The cones were placed in a trench and covered with dirt. A fire was built on top. After roasting, the cones were broken open to release the seeds. Some were stored over winter. Seeds were also used as beads in jewelry. (OC-CH*P) cones (O-C) seeds (OC) 32954

Table 2. Continued

TABLE	CULTURE	DATA
<u>Pinus ponderosa</u> Dougl. ex. <u>p. Lawson</u>	Y	"Bull pine" 91530
	T	"All pines the same" 01530
	K	"Not (CÓR'UM) is the root of (S-VR-P) The swollen part of the root nearest the tree is called (CÓR-OM-OF-FIB) The bigger the (CÓR-OM-OF- FIB) the bigger the root will be for basketry. Material for baskets is collected beyond (CÓR-OM-OF-FIE away from the tree. 01530
<u>Pinus sabiniana</u> Dougl.	K	ND 60091
<u>Piperia elegans</u> (Lindl.) Rydb. (64)	K	ND 16623
<u>Pityopus californicus</u> (Eastw.) Copeland	Y	ND 43601
<u>Pityrogramma triangularis</u> (Kaulf.) Maxon	Y	Spores used by children to produce a design on their hands. 36688
	T	ND 33659
	K	ND 33659
<u>Plantago hirtella</u> H.B.K. var. <u>galeottiana</u> (Dene.) Pilg.	Y	Same as <u>Plantago major</u> (16856). 60092
	T	A poultice was made from the leaves to treat cuts and boils. 60092
	K	ND 16832
<u>Plantago lanceolata</u> L.	Y	"Always here." 44219
	T	Recognized 60093
	K	"Always here." 44219

Table 2. Continued

TABLE	CULTURE	DATA
<u>Plantago major</u> L. (Figure 10)	Y	A poultice was made from the steamed leaves to treat boils. The leaf blades were separated from their petioles and the main vascular bundles of the midrib by bending the petiole back until the epidermis broke. The petiole and vascular bundles were then pulled away from the lamina. The lamina were applied to the boil two or three thick. 16856
<u>Plantago maritima</u> L. var. <u>californica</u> (Fern.) Pilg.	T	"Grows on sand bank." 60094
<u>Plectritis congesta</u> (Lindl.) DC	T	ND 60095
<u>Pleuricospora fimbriata</u> Gray	Y	ND 43600
<u>Polypodium californicum</u> Kaulf.	Y	A concoction was made from rhizome to treat infrections, "antibiotic". 01134
	T	ND 01134
	K	Recognized 01134
<u>Polypodium glycyrrhiza</u>	T	ND 01126
	K	ND 01126
<u>Polystichum munitum</u>	Y	Leaves used for bedding. 60096
	T	Recognized 60096, 60097
	K	ND 41354

Table 2. Continued

TAXON	CULTURE	DATA
<u>Populus trichocarpa</u> T. & G.	Y	"Lots of it down the (Klamath) River." Tips of the vegetative shoots were boiled to make a medicinal concoction. Pitch was used to apply soot in the tattooing process. To make a tattoo, the chin was cut three times and the soot-pitch mixture is added. Sometimes the juice from the fruit of <u>Rubus spectabilis</u> was added. 12394.
	T	ND 12394
	K	"Not even good for stove wood." (O-COO-PIP) 12394
<u>Porphyra lanceolata</u> (Setchell) G. M. Smith (Figure 11)	Y	Collected in the late spring for food. The best seaweed was picked in February and March and is called "eel seaweed." 3850 (non-vascular herbarium)
	T	Eaten. Another seaweed which is long and thin and flat is collected the latter part of June, also dried and eaten. 3850 (non-vascular herbarium)
<u>Potamogeton nodosus</u> Poir	T	ND 17771
<u>Potentilla glandulosa</u> Lindl. ssp. <u>nevadensis</u> (Wats.) Keck	Y	Recognized 00131
	K	ND 00131
<u>Prunella vulgaris</u> L.	K	Recognized 36015

Table 2. Continued

TAXON	CULTURE	DATA
<u>Prunus virginiana</u> L.	Y	Fruits eaten. 40671
var. <u>demissa</u> (Nutt.) Sarg.	K	ND 40617
<u>Pseudotsuga menziesii</u> (Mirb.) Franco	Y	Grouse eat young sprouts, people used to chew on them. Young sprouts made into tea. Young plant (CTA-CÍAK); mature plant (TA-PA) 01585
	T	ND 01585
	K	A concoction was made from young sprouts, drunk at leisure, and used to treat colds. (I-OR-IP) 60098
<u>Psilocybe semilanceata</u> (Gary) Nenser	T	"Tolowa did not eat mushrooms, all poison."
<u>Pteridium aquilinum</u> (L.) Kuhn. var. <u>pubescens</u> Underw.	Y	The leaves were used to make layers between layers of <u>Porphyra</u> while drying the latter. Fronds were also used as plates to serve fish, to put over fish to keep the flies off, and to clean fish. (HA-A-LEK) 60099
	T	The leaves were pulverized and applied as a poultice to treat <u>Toxicodendron</u> poisoning. (DA-SRAH-XI-DÁN'-N) 60099
	K	The leaves were used to clean eels and salmon. (KO-T'IO-CIP) 60099
<u>Pterospora andromedea</u> Nutt.	Y	ND 40122

Table 2. Continued

TAXON	CULTURE	DATA
<u>Quercus garryana</u> Dougl.	Y	ND 60100
	T	ND 60100
	K	(XON-ØIP) 60100
<u>Quercus chrysolepis</u> Liebm.	Y	ND 27470
	T	ND 27470
	K	Fruit always full fo "bugs and worms". They were eaten after they were buried from one to four years. (XUN-PØT-#P) 60101
<u>Quercus kelloggii</u> Newb.	Y	Ate fruit. 08265
	T	Ate fruit. 08265
	K	Fruit eaten after soaking them in mud for a year or so. 08265
<u>Quercus sadleriana</u> (R. Br.) Camst	Y	ND 19218
	T	ND 19218
	K	Grows high in the mountains. When there was a large fruit crop, the bears would stay up high in the mountains. 19218
<u>Ranunculus californicus</u> Benth. var. <u>cuneatus</u> Greene	Y	"Buttercup" 60102
	T	"Buttercup" 60102
	K	Split stem and sucked on it to make a sound that went(MØT-MØT) 60102
<u>Rhamnus californica</u> Pursh.	Y	ND 31883
	K	ND 31883

Table 2. Continued

TAXON	CULTURE	DATA
<u>Rhamnus purshiana</u> DC.	Y	Bark either boiled to form a concoction or chewed, for use as a laxative; very bitter. (CΛΛ) 18417
	T	Bark used as a laxative. (JEN-NE) leaves and bark (CÚN'-N-ÚÚ) 60103
<u>Rhododendron occidentale</u> (T. & G.) Gray	Y	ND 32381
	T	ND 32381
<u>Rhus trilobata</u> Nutt. ex T. & G	K	ND 60104
<u>Ribes cruentum</u> Greene	K	Ate fresh fruits, placed them in Indian basket and then rubbed spines off with Indian cap. Collected fruits with burden basket. (OX-RÓOY) 30831
<u>Ribes lobbii</u> Gray	T	Ate fresh fruits. (NINT'-GAN'-GAN'-CÁT.'H)
<u>Ribes marshallii</u> Greene	T	ND 34291
<u>Ribes nevadense</u> Kell.	T	Leaves placed between seaweed patties to keep them from sticking together. They give the seaweed a slight flavor. (DA-ME!) 24240
<u>Ribes roezlii</u> Regel.	Y	Fresh berries eaten, they are rolled about in a lacework basket with a basketry cap until the spines break off. 60105
	K	"Another gooseberry". Ate fresh fruit. Thrash in Indian plate (basket of <u>Corylus</u> stems) and

Table 2. Continued

TAXON	CULTURE	DATA
<u>Ribes roezlii</u> Regel.	K	break off thorns with Indian cap. (OX-RŌOC) 60105, 43613
<u>Ribes sanguineum</u> Pursh.	K	"Just a flower." 41269
<u>Romanzoffia tracyi</u> Jeps.	T	ND 60106
<u>Rorippa nasturtium-aquaticum</u> (L.) Schinz & Thell.	Y	"Water cress" 06873
	T	ND 06873
	K	"Eaten when young, boiled" 60107
<u>Rosa pisocarpa</u> Gray	Y	Medicinal tea made from fruit. 60108
<u>Rubus leucodermis</u> Dougl.	Y	"Black caps", Ate fresh fruit. (KA-PĪN') 40998
	K	"Black caps", ate fresh fruit. (PU-TŌ-RŌ-VĒN) 40998
<u>Rubus parviflorus</u> Nutt.	Y	Ate fresh fruit. bush (KER'PĒR'); berry (KERR-PĪN) 12456
	T	"Salmonberry" 12456
	K	ND 60109
<u>Rubus procerus</u> P. J. Muell.	Y	Always grew along the Klamath River, but people would cut them back away from their living structures. 91673
	K	"Later years have these." 19673
<u>Rubus spectabilis</u> Pursh	Y	Ate fresh berries. 60110

Table 2. Continued

TAXON	CULTURE	DATA
<u>Rubus spectabilis</u> Pursh. (continued)	T	Ate fresh berries. Young sprouts that were long, were eaten with seaweed and dry eels; underneath berries (J'UT-YΔΔ-TO-DA-JΔ-YE) 60110
<u>Rubus vitifolius</u> Cham. & Schecht.	Y	Ate berries fresh; young shoots boiled with other vine shoots for tea. (LA-JÉΘ) 19692
	K	Same as <u>Rubus leucodermis</u> 19692
<u>Rumex acetosella</u> L.	Y	Recognized 43535
	K	"Always here." 43535
<u>Rumex angiocarpus</u> Murbeck	T	Recognized 60112
<u>Rumex crispus</u> L.	Y	"Always here in fields." (PĀ-PU-LŪΘ) 17593
	K	"Always here." 17593
<u>Salix delnortensis</u> Schn.	T	"Another willow." 19928
<u>Salix lasiandra</u> Benth.	Y	ND 38534
<u>Salix hindsiana</u> Benth.	Y	"Silver willow", must be picked when it begins to bud in the latter part of March or early part of April. The bark must be peeled off soon after it is harvested, otherwise the bark will dry out and would be difficult to peel away. Grows along the sandy banks of the Klamath River. (PER-GERN) 42318, 20098

Table 2. Continued

TAXON	CULTURE	DATA
<u>Salix hindsiana</u> Benth. (continued)	T	See <u>S. sitchensis</u> (20104). 20098
	K	Stems used for the main ribs in baskets as an alternate for stems of <u>Corylus</u> . (PÓR-OX) 20098
<u>Salix scouleriana</u> Barr.	Y	See <u>S. sessilifolia</u> (20098). Roots used to make baskets. 37875
	T	See <u>S. sitchensis</u> (20104). 37875
	K	(PÓR-OX) 37875
<u>Salix sitchensis</u> Sanson	Y	Same as <u>S. scouleriana</u> (37875). 43419
	T	"All one willow". The roots were used in basketry. (GΔ-LIS) 20104
<u>Sambucus caerulea</u> Raf.	Y	Same as <u>S. callicarpa</u> (03968). 41198
	K	ND 41198
<u>Sambucus callicarpa</u> Greene	Y	Ate only a few fresh berries, they are sour. Sturgeon eggs were packed in the leaves of <u>S.</u> <u>callicarpa</u> to cook the eggs. (TÓ-A-MA) 03968
	K	ND 03968
<u>Sanicula arctopoides</u> H. & A.	T	Recognized 60113
<u>Sanicula crassicaulis</u> Poepp. ex DC.	T	ND 60114
	K	ND 60115

Table 2. Continued.

TAXON	CULTURE	DATA
<u>Sarcodes sanguinea</u> Torr.	Y	ND 34487
<u>Satureja douglasii</u> (Benth.) Brig. (Figure 12)	Y	Tea made from leaves, "good for the blood". (HA-GAA-R#-KIC) 39957
	T	Refreshing tea made from fresh leaves. (NO-GOC-TOK-NE') 39957
	K	Tea made from leaves, "good for kidneys and as an aphrodisiac." (JUM-PHIN-NI-S#) 60116
<u>Schoenolirion album</u> Durand	Y	ND 39115
	T	ND 39115
	K	ND 39115
<u>Scirpus acutus</u> Muhl. ex Bigh.	Y	ND 07437, 26107
	T	ND 07437
	K	ND 07437, 26107
<u>Scirpus criniger</u> Gray	T	ND 60117
<u>Scrophularia californica</u> Cham. & Schlecht.	Y	ND 60118
	T	ND 60118
<u>Sedum laxum</u> (Britton) Berger ssp. <u>heckneri</u> (Peck) Clausen	Y	ND 27599
	K	ND 27599
<u>Sedum laxum</u> (Britton) Berger ssp. <u>laxum</u>	T	Recognized 23227
<u>Sedum spathulifolium</u> Hooker ssp. <u>purdyi</u> (Jepson) R. T. Clausen (17)	Y	ND 35127

Table 2. Continued

TAXON	CULTURE	DATA
<u>Sedum spathulifolium</u>	Y	Recognized 41898
Hooker ssp. <u>spathulifolium</u>	K	Recognized 41898
<u>Selaginella oregana</u> D. C. Eaton	T	ND 00926
* <u>Senecio jacobaea</u> L.	T	Recognized 60119
<u>Sequoia sempervirens</u> (D. Don) Endl.	Y	Wood used for building materials. Naturally fallen trees were sought, but occasionally people felled the trees. Canoes were made from 3rd cut logs, 20 feet long and 5 feet in diameter. Foots were used for weaving acorn cooking baskets because they expanded well and thereby held water well. (KIH) 60121
	T	Same as for Yurok. 60121
	K	<u>Sequoia</u> did not grow near Karok villages. <u>Sequoia</u> canoes were traded from Yurok who lived down the Klamath River. (OŌ-KUM-PŌ-HIP); in front (ocean side) (OŌ-KUM); <u>Umbellularia californica</u> (PO_HIP)
<u>Sidalcea malvaeflora</u> (DC.) Gray ex Benth.	T	Recognized 60122
ssp. <u>elegans</u> (Greene) C. L. Hitchc.	K	ND 60122
<u>Silene californica</u> Durand	T	ND 60133
	K	ND 60133

Table 2. Continued

TAXON	CULTURE	DATA
<u>Silene campanulata</u> Wats.	Y	ND 23683
	T	ND 23683
	K	ND 23783
<u>Sisyrinchium bellum</u> Wats.	Y	"Just a grass" 38768
<u>Smilacina racemosa</u> (L.) Desf. var. <u>amplexicaulis</u> (Nutt.) Wats	Y	Recognized 27622
	T	Recognized 27622
	K	Recognized 27622
<u>Solidago californica</u> Nutt.	Y	Recognized 35992
	T	ND 35992
* <u>Sonchus oleraceus</u> L.	K	"Came with the whites." 60123
<u>Sparganium angustifolium</u> Michx.	Y	ND 29329
	T	ND 29329
	K	ND 29329
<u>Spiraea densiflora</u> Nutt. ex T. & G.	T	ND 43651
	K	ND 43651
<u>Spiraea douglasii</u> Hook	Y	Recognized 19754
	T	ND 19754
	K	Recognized 19754
<u>Stachys chamissonis</u> Benth.	Y	"Hard to get rid of." 14419
	T	ND 14419
	K	"Look like some mint." 14419
<u>Symphoricarpos hesperius</u> G. N. Jones	T	ND 33433, 27962

Table 2. Continued

TAXON	CULTURE	DATA
<u>Symphoricarpos rivularis</u> Suksd.	K	ND 60124
<u>Taxus brevifolia</u> Nutt. (Figure 13)	Y	Bows were made from the wood; a concoction was made from the bark and drank to "purify the blood". (CA-AL) 18878
	T	"Did not grow here." Northern Indians used wood to make pipes (See <u>Nicotiana bigelovii</u> ). 18878
	K	Bob Offield said that the berries were eaten, but only one at a time. The wood was gathered near streams and from that part of the stem that faced the stream, for this was where the smooth wood was. The wood was used for bows and various tools. A concoction was made from the bark and drank as a "blood medicine". The leaves were used to sew sacks (XU-PÓR-IS). The mental apparatus that is needed to use the bow (XUC-KOM-HOR-U) 18878
<u>Tellima grandiflora</u> (Pursh) Dougl.	Y	ND 00640
	T	ND 00640
	K	Recognized 00640
<u>Thermopsis gracilis</u> Howell	Y	Recognized 35756
	T	ND 35756
	K	Recognized 35756

Table 2. Continued

TAXON	CULTURE	DATA
<u>Tolmiea menziesii</u> (Pursh.) T. & G.	K	ND 60125
<u>Tonella tenella</u> (Benth.) Heller	K	Recognized 23978
<u>Toxicodendron diversilobum</u> Greene (38)	Y	Poisonous to some Yurok. 60126
	T	Poisonous to some Tolowa. When buds first came out in the spring they would eat some to obtain immunity. 40005
	K	Branches used to prop salmon filet open. Some Indians chewed it like tobacco, "just to raise heck". They began with a small piece and would gradually build up to larger quantities. Some Karak were poisoned by it, most people stayed away from it. Poisoning was treated with <u>Arctostaphylos</u> . (KUC-VE'P) 60126
<u>Trichostema lanceolatum</u> Benth.	Y	ND 14449
	K	Recognized 14449
<u>Trientalis latifolia</u> Hook	T	Recognized 60127
<u>Trifolium cyathiferum</u> Lindl.	K	Recognized 22022
* <u>Trifolium pratense</u> L.	T	Grew locally as long as Berneice could remember. 60128
* <u>Trifolium subterraneum</u>	T	Recognized 60129

Table 2. Continued

TAXON	CULTURE	DATA
<u>Trillium chloropetalum</u> (Torr.) Howell	Y	Bulb was cut in half and scrapped and the scrappings applied as a poultice to treat burns. 28003
	K	ND 28003
<u>Trillium ovatum</u> Pursh	Y	Recognized 60130
	T	"Bouquet is all." 60130
	K	ND 60130
<u>Triteleia bridgesii</u> (Wats.) Greene (75)	Y	Recognized 60131
	K	Recognized 60131
<u>Triteleia laxa</u> Benth. (75)	K	Recognized 03055
<u>Tsuga heterophylla</u> (Raf.) Sarg.	Y	"Some kind of pine." 39045
	T	ND 39045
<u>Typha latifolia</u> L.	Y	Leaves woven together to make a mat or raincoat. 21409
	T	Leaves woven together to make raincoats. 21409
	K	ND 36609
<u>Umbellularia californica</u> (H. & A.) Nutt.	Y	Fruit are eaten, the seeds are picked after the pericarp has rotted off, but birds usually eat them first. They can be gathered and buried until the shells rot off. Once the shells were removed, the seeds were baked in the sand with a fire made above. It is also a medicinal plant. The leaves are burned in the house to

Table 2. Continued

TAXON	CULTURE	DATA
<u>Umbellularia californica</u> (H. & A.) Nutt. (continued)	Y	take bad luck away or the smoke waved over people as they leave for the same reason. It was put under the bed to rid it of fleas. (WÁH'-KE-LÁH')
	T	Fruit shelled, roasted and eaten. 18809
	K	Foliage placed on fire during the Brush Dance in order to drive evil spirits away. The shelled seeds (PO) were roasted and eaten. Ground seeds were used as a poultice on sores. (PÓ'HIP) 60132
<u>Urtica lyallii</u> Watson	Y	ND 21671
medic	T	Fresh pounded leaves applied as a poultice to skin inflammations. (XWUW-JÍS) 21671
	K	"Stay away from". (UK-VIÍN) 60134
<u>Vaccinium membranaceum</u> Dougl.	Y	ND 43690
	T	"Look like huckleberry" 43690
	K	ND 43690
<u>Vaccinium ovatum</u> Lindl.	Y	ND 60136
	T	"regular blue huckleberries"; used the same as <u>Vaccinium parviflorum</u> (YO-ITĤ-DEĤ-NI) 60137 Another variety which grows out on the sand dunes is (DUSH-É-JO) "red huckleberry; small coast huckleberry. (XUN-DE-JE-YE) 60136

Table 2. Continued

TAXON	CULTURE	DATA
<u>Vaccinium ovatum</u> Lindl. (continued)	K	Fresh berries eaten. (PØR-#Ø-#-PO-HO) 60135
<u>Vaccinium parvifolium</u> Sm. in Rees.	Y	Same as <u>V. scoparium</u> 29340
	T	Fresh berries eaten. Berries were also dried and stored. Other tribes to the east came and took back with them these berries to heal sickness. Branches used as a broom. (ØK-ÓI-NE) 60137
	K	ND 43689
<u>Vaccinium scoparium</u> Leib.	Y	Fresh berries eaten. Branches used as a broom. (CLÓØ-KE-TA-WØR-NÉR) 29340
	K	ND 29340
<u>Valeriana sitchensis</u> Bong. ssp. <u>scouleri</u> (Rydb.) F. G. Mey.	T	ND 60138
<u>Vancouveria chrysantha</u> Greene	T	Used for medicine. 60139
<u>Vancouveria hexandra</u> (Hook) Morr. & Dec.	Y	Fresh leaves were consumed to treat cough. 43745
	T	Recognized 43745
	K	Recognized 43745
<u>Vancouveria planipetala</u> J. E. Smith	T	ND 30381
<u>Veratrum viride</u> Ait.	Y	Recognized 30440
	T	Recognized 30440
	K	ND 30440

Table 2. Continued

TAXON	CULTURE	DATA
* <u>Verbascum blattaria</u> L.	Y	"Just a weed." 21174
	T	Remembered it since she was a child. 21174
<u>Vicia american</u> Muhl.	Y	"Wild vetch, always here." 15245
* <u>Vicia angustifolia</u> Reichard (55)	T	Recognized 60140
<u>Viola adunca</u> Sm.	Y	"Blue Johnny jump up." 33964
	T	Leaves chewed and applied as a poultice to sore eyes. 33964
	K	Recognized 33964
<u>Viola sempervirens</u> Greene	Y	"Johnny jump up" 42197
	T	"Yellow violet" 42197
	K	ND 42197
<u>Vitis californica</u> Benth.	Y	Fresh berries eaten. 36747
	T	"Grows up in the mountains." 36747
	K	Roots used for basketry material mostly on bottom of baskets. Stem used for lashings (ÓR-ROŔ-RO-Δ); peoples (ÓR-ROŔ-RO); grape (Δ); grape vine (O-YÍP'-ON); root (Δ'POM-Í'-PUM) 60141

Table 2. Continued

TAXON	CULTURE	DATA
<u>Whipplea modesta</u> Torr.	T	ND 60142
	K	ND 60142
<u>Woodwardia fimbriata</u> Sm. in Rees.	Y	Fibers were harvested when leaves are fully grown and then dyed with alder bark. The strands could be dyed by chewing ine <u>Alnus</u> bark and running the fibers through the mouth or by pounding the bark in a mortar and pestle. 32055
	T	The two fibers of each leaf were collected at the end of June or the first part of July. The rachis is pounded and the fibers fall out. For designs, the fibers were dyed with <u>Alnus</u> bark. (DA'-MUS) 32055
	K	Fibers were pounded from the rachis and dyed with <u>Alnus</u> bark for use in basketry. The fibers were then dreid and coiled for storage. They were soaked to unroll and use. (TIP-TIP) 34935
<u>Xerophyllum tenax</u> (Pursh) Nutt.	Y	Plants were burned every year and then leaves were harvested in the spring when they first begin to grow out from their charred rhizome. Small leaves were used for dresses. Prior to use, the leaves were soaked in water to make them pliable, but if left too long they turned green. 36767

Table 2. Continued

TAXON	CULTURE	DATA
<u>Xerophyllum tenax</u> (Pursh) Nutt. (continued)	T	ND 60143
	K	Plants were burned every year and new sprouts were used for baskets, especially for designs. (PUN-YŪR-OR) 36767
<u>Zigadenus micranthus</u>	T	ND 60144
<u>Zigadenus venenosus</u> Wats	K	One Karok said he ate the bulbs from this plant. 35063
<u>Zostera marina</u> L.	T.	Recognized 21902

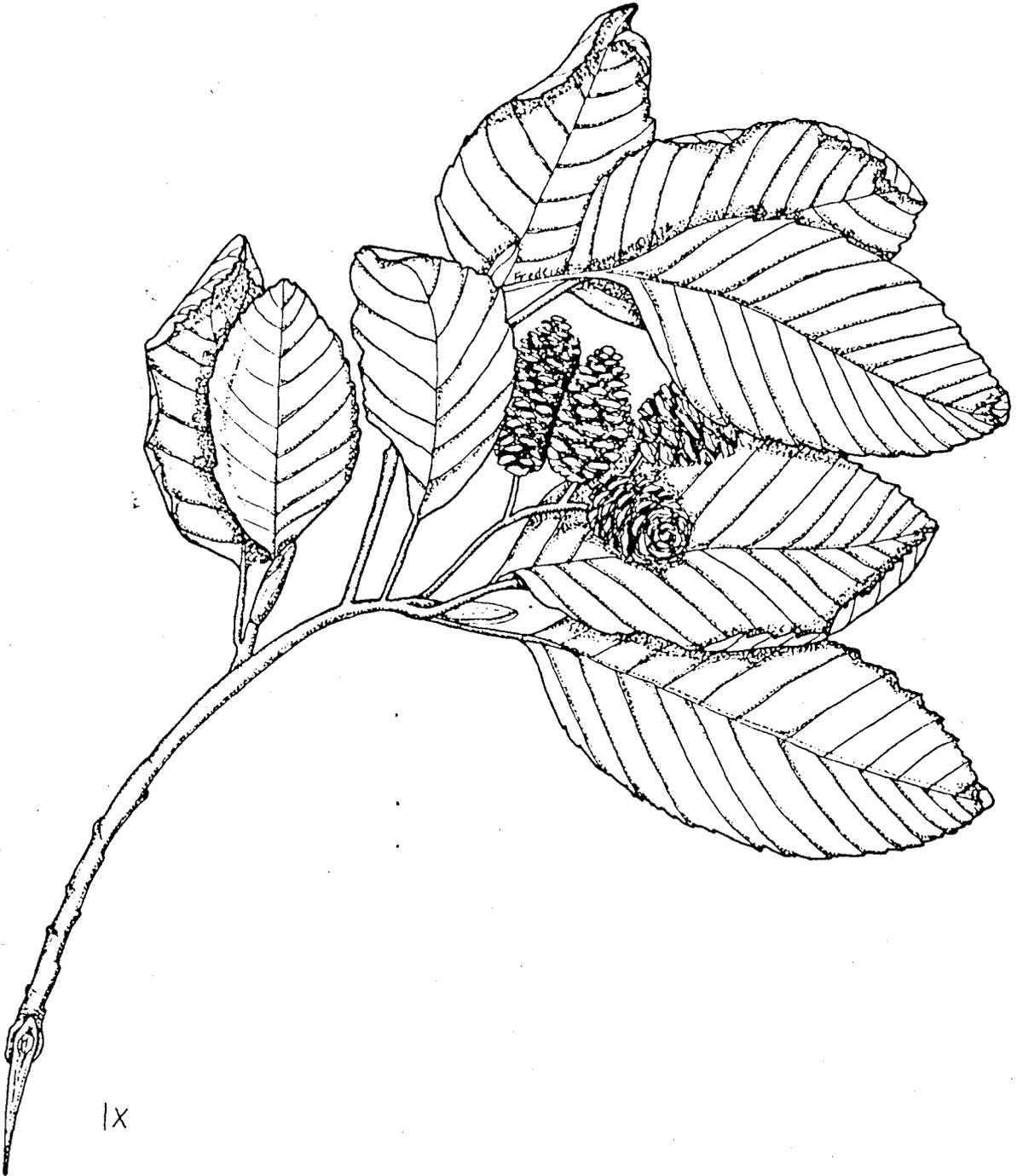


Figure 2. Alnus oregana



Figure 3. Artemisia douglasiana



Figure 4. Camassi quamash



Figure 5. Chimaphila umbellata



Figure 6. Iris tenax ssp. Klamathensis



Figure 7. Ledum glandulosum

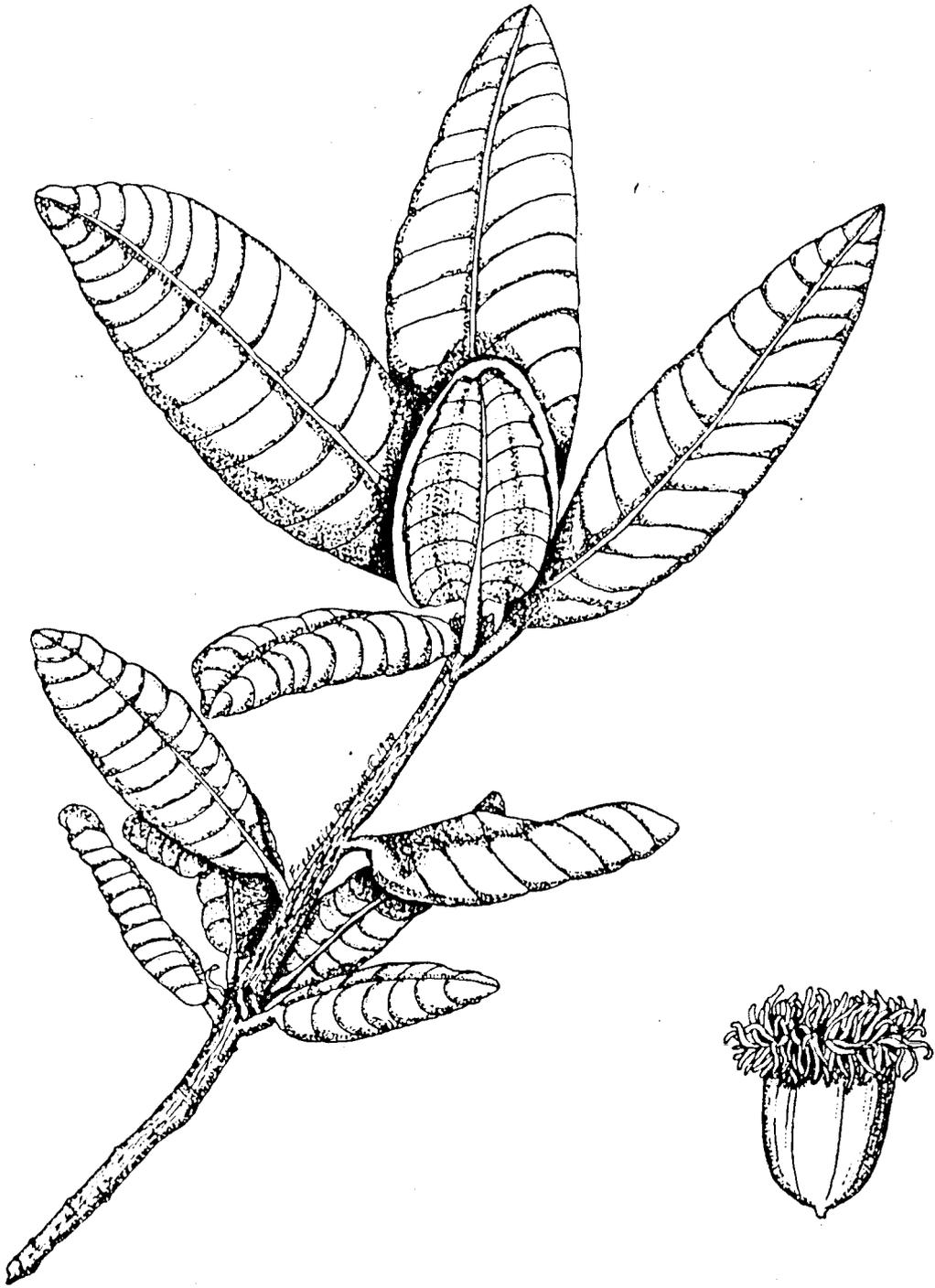


Figure 8. Lithocarpus densiflora

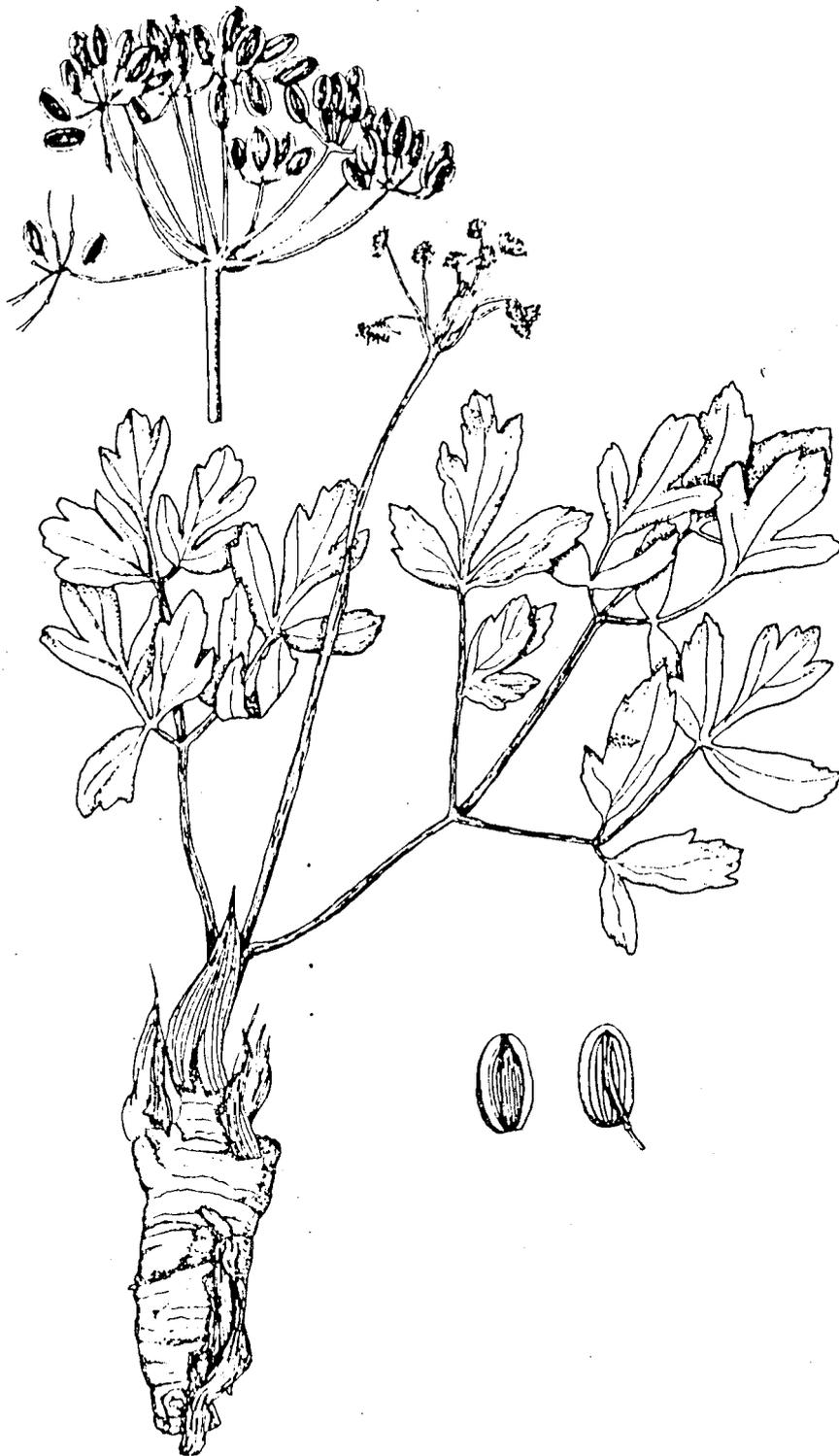


Figure 9. Lomatium californicum



Figure 10. Plantago major

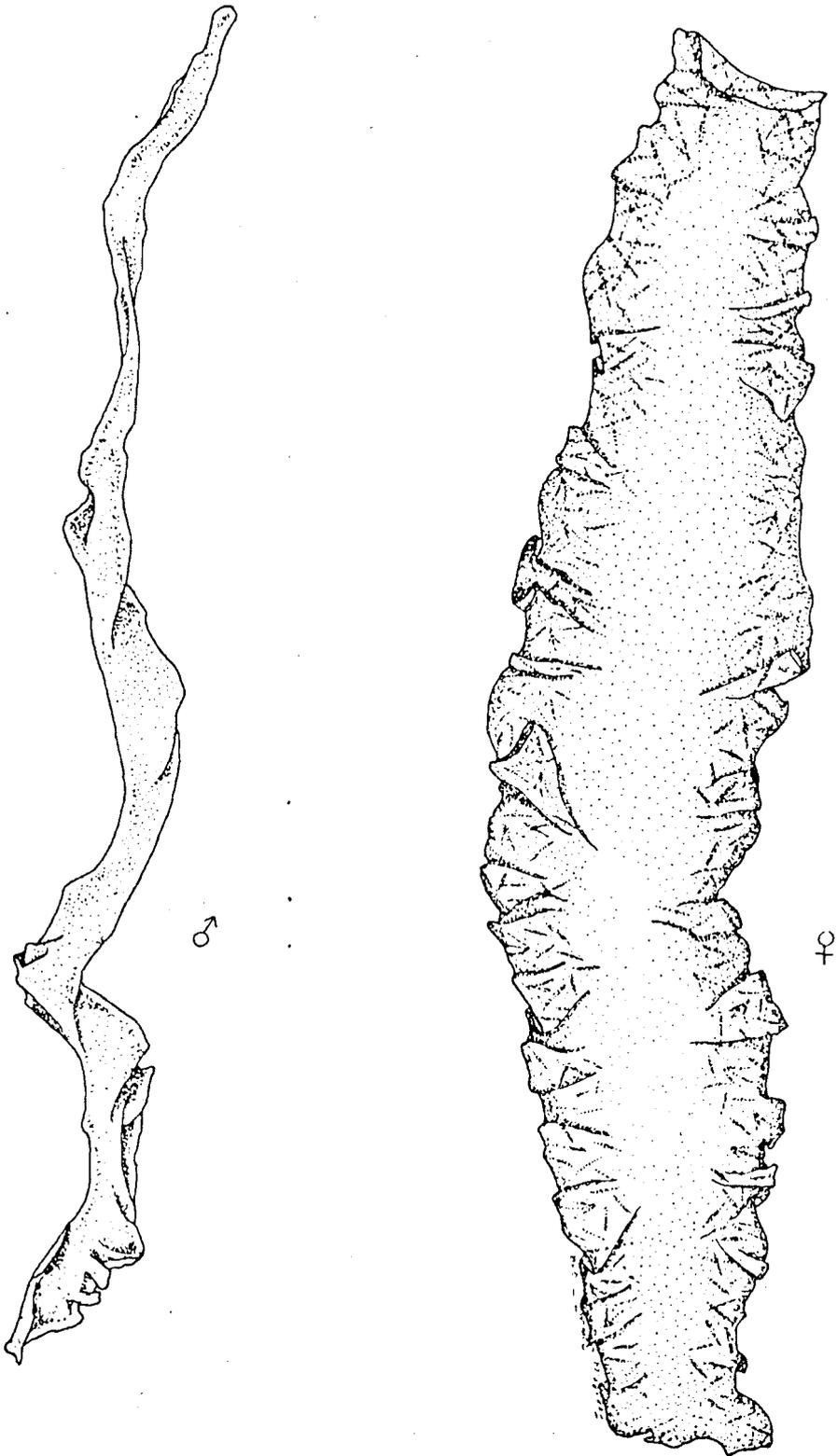


Figure 11. Porphyra lanceolata



Figure 12. Satureja douglasii

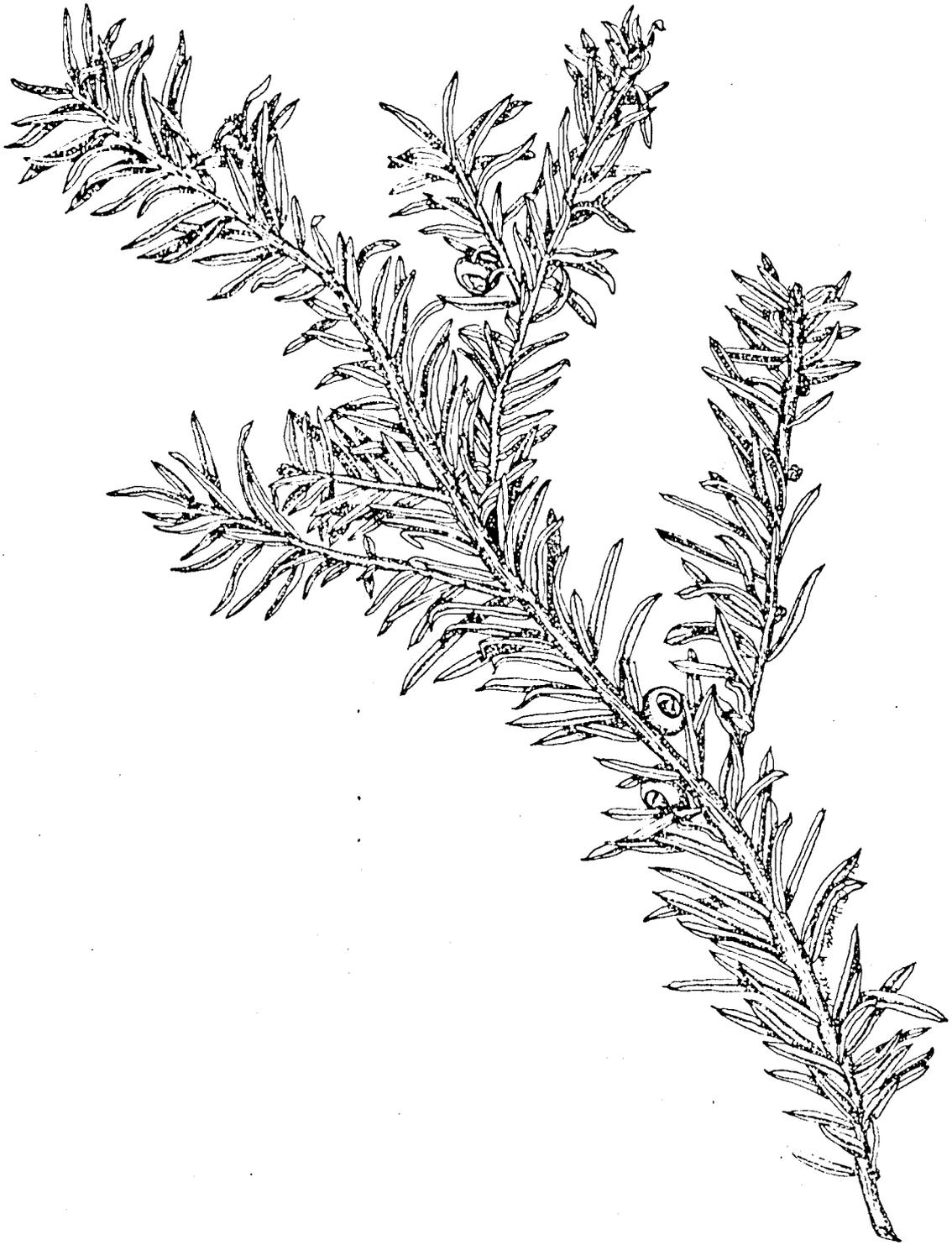


Figure 13. Taxus brevifolia

## MATERIA MEDICA

Plants appear to have played a minor role in medical practices, although this kind of ethnographic data is difficult to obtain because it is regarded as secret by Indian doctors. As with most other North American Indians, the curing of disease was attempted mainly by sucking, singing, dancing, and smoking tobacco (47). The ultimate goal of the doctor was to remove a spiritual object which was regarded as the cause of the disease, thus working primarily through the patient's mind rather than directly with the body. Much disease was thought to be a manifestation of wrongs done by the patient, or his living or deceased relatives (60).

At times, doctors used formulae which were accompanied by herbs, but the most important portion of these formulae or charms was the part that was sung or spoken. Whether or not an herbal formula was used depended upon the degree to which the doctor thought the disease was caused by a natural or supernatural agent. Herbs were either applied directly to infected areas, applied indirectly by steaming the herb on hot coals, or used in such a way as to seem physically unrelated. Only for minor medical needs would the herb alone be used. Such minor remedies were handed down by older members of the family (60).

## Psychotropics

No psychoactive plants were used other than Nicotiana. Datura was not used and was not recognized by my informants, although it was used extensively elsewhere in California (35). Informants did not recognize psychoactive mushrooms of Amanita muscaria or Psilocybe semilanceata, which were collected within the present study area.

Nicotiana was the only plant cultivated by California's northcoast Indians. I found no Nicotiana while collecting in the region nor any person possessing it. The specimens of Nicotiana which are located in the Humboldt State University Herbarium were said by my informants to have leaves too small to be the cultivated tobacco. This indicates that the local variety may no longer exist.

Although used medicinally by the Karoks for the relief of insomnia (43), tobacco was largely smoked at leisure for the stimulating effects of nicotine. It was cultivated mainly on the banks and river bars, and dried and smoked in a trumpet-shaped pipe which was entirely of steatite, or of Arctostaphylos or another hard wood with a steatite bowl. Details of tobacco smoking can be obtained by consulting Harrington (43), Schenck and Gifford (86), and Walker (99).

## Oculenta

Several medicines were used to sooth sore eyes, but remedies varied greatly from tribe to tribe. The Yurok dried the leaves of Achillea milleforlium var. californicum which would then be boiled and applied as an infusion, applied directly as a poultice, or placed over hot coals so

that the patient's eyes would come in contact with the saturated steam (70). Many tribes across North America, including other Northwest Indians, were using A. millefolium for various reasons at least as early as 1724 (91,98)

Merriam recorded that Artemisia ludoviciana was used by the Tolowa to treat sore eyes (70). I suggest the correct identification of the plant to be A. douglasiana, a species I have found to be represented in the Tolowa homeland. A. ludoviciana is mainly restricted to east of the Cascades and Sierra Nevada (1).

The stalk of Equisetum hyemale var. affinis was soaked in water and applied directly to the eyes by the Karok (86). The Quinault Indians used an infusion of the root of Equisetum, sometimes mixed with human milk for the same purpose (42). Gnaphalium was used by the Karok in the same manner, but a formula was said to be necessary for the medicine to be effective (86).

### Antibiotics

Plantago was an important herb medicine of the Tolowa and Yurok, used as a poultice on cuts and boils. The central vascular bundles of the leaf midrib were removed by bending the petiole until the epidermis broke, and then pulling backwards until the bundles were free. The leaves were wilted by steaming and then placed on the infected area two or three thick. Another method was simply to pound the leaves and to apply them as a poultice. Along the coast, P. hirtella var. galeottiana was used and farther inland, at least along the Klamath River, P. major was used.

Achillea lanulosa was used by the Karok for open arrow and gunshot wounds. A poultice was made of the stalk and leaves and a formula was recited (86).

Trillium chloropetalum and probably members of other species of the genus were used for the treatment of burns. The bulb was cut in half, the pulp scraped out and applied directly to the affected area. Trillium was official in the National formulary from 1916 to 1947 and was once used for its astringent properties by physicians (98). Both Trillium and Marah were used by the Karok to draw boils. Both plants were scraped to free a quantity of cytoplasm which was applied directly to the infection (86).

Artemisia douglasiana was used by the Tolowa for itching skin (70). The Karok name of Sarcodes sanguinea translates into English as "itch medicine" and it was probably used for that reason (86).

The Tolowa used Polypodium californicum in tea form as an antibiotic as did the Wailakis Indians of Mendocino County (15). The Tolowa also used Oxalis oregana and Asarum caudatum, separately or together, to draw infections. The crushed leaves were fastened to the body with Iris string. At least two antibiotic substances have been isolated from Asarum by pharmacologists (98). Asarum is widely known among the Northcoast Indians as an antibiotic and healing agent used to cover the baby's navel immediately after the umbilical cord has been severed. Aileen Figueroa said she never knew of any babies who had infected navels after this treatment and that it has been used at least until very

recently. The Yurok took the body of a large snail from its shell, smashed it, placed it inside of a leaf of Asarum and steamed the entire preparation. It was then placed over the baby's navel and held in place with a band of hide. The remaining portion of the umbilical cord would eventually fall off and the hole would heal. The Tolowa used Asarum by itself and held it in place with Iris string. Pteridium aquilinum var. pubescens was pulverized and used as a poultice on infections caused by Toxicodendron poisoning. Pteridium contains several active principles (98). The Karok often treat cuts with a mixture of Nicotiana and saliva (43). They also chewed the leaves to relieve toothache and used them as a poultice for earaches (43).

#### Panaceas, Hematonics, Analgesics, and Antirheumatics

Besides the common teas, treated under food plants, which were drunk for their good taste as well as for their reputed medicinal value, other tonics were used and widely known. The bark of Taxus brevifolia was boiled by all the tribes of the area. Betty Green said she used it often for kidney ailments. Mahonia "was a favorite with the California Indians, who made a concoction of the roots with water and took the medicine internally for general debility or to create an appetite" (98).

Chimaphila was used by all three tribes as an elixir-  
tonic. The leaves were sometimes mixed with those of Artemisia douglasiana and made into a tea. Chimaphila and Artemisia were considered panaceas by the Indians, used for general aches and pains, and especially for rheumatism. The Karok even attributed tranquilizing properties to

Chimaphila. Chimaphila, like Artemisia, was used extensively across the United States by native peoples (98).

In addition to the drinking of infusions, rheumatism was treated by steaming in the usual manner, or by applying as a poultice over the affected joint. The roots of Aralia californica were chopped and boiled by the Karok, then the entire affected extremity was placed into the solution. The Yurok and Tolowa soaked the leaves of Petasites palmatus and placed them directly over the joint. Artemisia douglasiana was used with Tsuga heterophylla needles, either boiled or steamed, to heal fractures. Artemisia douglasiana was also used with the roots of Lysichiton americanum in making of a liquor used as a liniment. An infusion of fresh sprouts of Pseudotsuga menziesii was also used. The Cowlitz and Squazin of Western Washington boiled the pitch of P. menziesii for the same reason (42).

#### Cold Remedies

The bark of the twigs of Prunus demissa was scraped and the scrapings placed beside the nose of an affected baby (86). This plant is reported by modern pharmacologists to have tonic principles (92). Jesse Exline said the Klamath Yurok made a tea remedy from the fruit of Rosa pisocarpa. The Yurok used the leaves of Garrya elliptica (70). Artemisia douglasiana was used by the Karok (86).

Both the Karok and the Yurok used Eriodictyon californicum to treat colds. Eriodictyon was boiled down to make a syrup and the sugary pitch from Pinus lambertiana added to lessen the bitter taste. Eriodictyon californicum has been used by Indians of Utah, Arizona and other Indians

of California for similar reasons (98). Eriodictyon was apparently good as a cold remedy because of its expectorant properties, since it was also used to treat pleurisy, tuberculosis, (86) and cough by the Karok and Yurok.

The Karok used Mahonia aquilifolia with other herbs in the steaming process to treat what Schenk & Gifford (86) thought to be pneumonia. Species of Mahonia were also used by the Yurok and Tolowa to remedy coughing. The Yurok alone used Vancouveria hexandra. The Tolowa drank an infusion of Letharia columbiana for lung congestion.

#### Abdominal Medicines

For a loss of appetite, the Karok soaked roots of Ligusticum apiifolium and Lomatium californicum, or the shoots of Oxalis oregana. Any of these plants used for this reason were accompanied by a formula. The bark of the twigs of Taxus brevifolia was scraped and used as a stomachic. Lupinus albifons was used for the same purpose. In this case, the patient drank an infusion of the plant, and was used for kidney and bladder troubles (86).

The bark of Rhamnus purshiana was used universally by the Indians of Northwest California as a laxative. An infusion could be made and drank or the bark simply chewed. The purgative glycosides of this plant were commonly used by natives and settlers throughout the Pacific Northwest (58,98).

For treatment of diarrhea, the Tolowa used the roots of Rubus vitifolius. The syrup of the bark of a Rubus species is known as an astringent remedy for diarrhea (92). A root infusion of the same was the most common

diarrhea medicine of the Indians of Mendocino County.

### Obstetric Medicine

Anthemis coutula was part of a Karok formula for pregnant women. My Karok informants said that the whites drank a tea from this plant. Considering that the plant is a native of Europe (74), the Karoks who used the plant probably learned of any therapeutic value it may have, early on, from the Europeans.

Small babies were fashionable in Northwest California, and methods were used to reduce the size of the fetus. One herbal medicine used for this purpose by the Karok was an infusion of the roots of Darmera peltata. A formula song was sung with the plant (86). The chloragogue, laxative, and hydragogue properties of this plant may lend some credibility towards its reputed effectiveness (92).

Karok women in labor were administered a form of Lotus humistratus. The patient was washed with a warm infusion of the plant, and drank some of it. The bark of Quercus garryana was used if the woman was having her first child. The pounded bark was rubbed on the sides of the young mother, and as with the L. humistratus medicine, she again drank an infusion, but of the bark. A formula song was sung (86).

Many formulæ to assist childbirth were used. Many of these were thought to become effective as soon as the doctor entered the house with her herb (60). Artemisia douglasiana and Pityrogramma triangularis were used by the Karok to mitigate birth. An infusion of A. douglasiana

was drunk. Both plants required that a formula be sung (86). If a Karok woman had suffered an injury during childbirth, a medicine from Ceanothus integerrimus was used with a formula (86). If there had been a miscarriage, Hierochloe occidentalis was used in the form of an infusion which was drunk (86). The treatment of the umbilical cord with Asarum is discussed under antibiotics.

#### Pediatric Medicines

The Karok used an infusion of Mimulus cardinalis in a formula to wash the newborn baby (86). The Yurok used an infusion of Ceanothus thyrsiflorus branches (70). Mirabilis greenei was used along with a formula to make the newborn healthy (86).

Schenk and Gifford mention herb medicines which were used by the Karok to treat illnesses of babies. The bark of Prunus virginiana var. demissa has already been mentioned. Pyrola picta was used to make a medicine for a "child who is sick, 'looking like a dead person'". This medicine is administered by a shaman, who sings the charm as he dips the plant in warm water and shakes it over the child. The song of the charm is short. It mentions heaven in order to bring the child back from death." Pyrola californica was used for a child who was unmanageable or too lively. During the Brush Dance, the child is steamed with it after having had the plant passed over him or her while a charm is being sung.

The Tolowa rubbed the silica-impregnated stems of Equisetum telmateia var. braunii on a child's teeth to keep him from gritting them. Any of the species of Equisetum

would have probably sufficed, but Bernice Humphrey said this is the species which grows within the Tolowa territory.

Psychologic and Preventative Medicines

The roots of Osmorrhiza chilensis were dried by the Karok, kept in the house, and used in several formulae (86). If there had been an illness in the house, the house would be fumigated with the plant. Other uses of O. chilensis by the Karok included placing the root under the pillow to keep sickness away or mitigating grief from a lost relative, or carrying a piece of the root as protection against the devil. The Swinomeh chewed the root as a powerful love medicine (42). Penstemon laetus was used by the Karok to lessen the burden of grief (86). They used Elymus glaucus to settle family quarrels by them, but could only be used once (86).

The Yurok had a similar medicine- Umbellularia californica, which would be burned in the house to take bad luck out and the smoke waved over people as they left for the same reason. The aromatic leaves of the plant have been shown to have properties which would help explain its use in this manner. Its insecticide and antiseptic properties are the two most obvious (92).

The sucking doctors of the Karok always smoked Nicotiana bigelovii before treating a patient. The pains were thought to be sucked out with the smoke (43). The steaming doctor of the Karok used N. bigelovii before praying over his herbs. The crushed leaves were simply but ceremoniously strewn outside of the house. The

steaming doctor's herbs were the twigs of Pseudotsuga menziesii, Pinus jeffryi, Populus, Alnus, and a certain species of fern (41).

Schenk and Gifford mention several plants which were used as love medicine by the Karok. These include Acer circinatum, Calystegia fulcrata , Galium triflorum, Populus trichocarpa, and Monardella odorissima. A formula was usually required to make the medicine effective (86).

#### General Remedies

There are some plants the informants could remember as being used for medicine, but could not recall the disease it was used for. The Tolowa used Vancouveria chrysantha as a medicine for an unknown ailment. The Tolowa and Yurok informants told of other tribes coming to the coastal area from far to the east to gather Vaccinium for a specific illness. A fern called "op-si-e-kan-e-wan-ich" or "black leg" was used when one was in trouble. It was either held up with the hand and a plea was made to the "first people" for help, or the herb was placed on the trail behind one, so the devil could not pass (3). The identity of this according to Schenk and Gifford is Pityrogramma triangularis, although there is no mention of this particular use (86).

## FOOD PLANTS

The fruit of Lithocarpus densiflora and to a lesser extent some species of Quercus constituted the main plant staple of the Yurok, Karok and Tolowa. It was second only to salmon as the primary food source (34,52,28,36). Other animal foods were mussel, whale, sea lion, lamprey, surf fish, trout, steelhead, sturgeon, deer, elk, and many other fish and game animals, including the yellow slug, which was used during time of famine (41,29,70). Plant foods other than the acorn were not abundant (24), but they did provide for a greater variety in the diet. The plant foods include a vast array of root crops, shoots, nuts, berries and other fruits.

Salmon fishing was apparently of primary consideration for determining village sites of the Karok and Yurok, but most villages were well within the range of groves of Lithocarpus densiflora. These groves were said to be "owned" by individuals, families, clans or not at all. The Tolowa, on the other hand lived in villages close to the coast for much of the year and migrated in the late summer to the seashore to hunt sea lion. In late fall, they would migrate from the shore to the oak flats along the Smith River and east edge of the Redwood Belt. They stayed there for about a month, then returned to their villages near the coast (9).

The nut of another fagaceous plant, Chrysolepis chrysophylla, was eaten by the three tribes. The Tolowa and some Yurok traded for the fruits, but the remainder of the Northwest Indians had a plentiful supply. When the dried fruits were shaken, the nuts would fall out of the spiny involucre. If the fruit was not yet dry, the involucre would be burned off. The bony exocarp would then be broken with the teeth. Jesse Exline said this was a very difficult thing to do and for this reason she did not eat many of the fruits when she was young. The seeds could be eaten without further processing or they could be stored.

The identification of the plants used for their edible grains and seeds is mostly lost. Gramineae, Compositae, and other taxa representing relatively inconspicuous plants, can no longer be identified by the local informants beyond the modern family level. One reason for this is there is a great number of modern taxa included within these groups and the native cultures probably recognized many fewer taxa. Also, the relatively inconspicuous characters used to separate folk taxa of these groups have not survived the "culture shock" of the last century. Another important reason is that much of the grassland of the region has been overtaken by ruderals introduced by the Whites. Even in 1952, when Schenk and Gifford made their study of the ethnobotany of the Karok, they could find only one species of grass, Deschampsia elongata, originally used for food by the Karok, who of the three tribes probably relied most heavily on grains as a food source because of their more inland position.

This one species, in fact, was said to no longer grow within the Karok area (86). The other four species of Gramineae said to have been used for food, Bromus mollis, B. diandrus, Avena fatua, and Elymus glaucus, are introduced from Europe (74).

The source areas on the Whitkut, (Cchilula) Prairie of the Bald Hills were owned by Yurok families (34). The Karok probably had a similar system. It is doubtful that the Tolowa did much collecting of grains, although they did eat the seeds of Nuphar polysepalum after obtaining the idea from the Klamath Indians.

Gathering of grain was done by thrashing the inflorescences against the edge of a burden basket. The grain was placed in a winnowing basket and parched, then the chaff, trichomes and other debris winnowed away. The grain was not cooked (70, 86).

Pinus seeds were eaten, but probably only to any significant degree by the Karok and possibly the Klamath Yurok. Pinus sabiniana, the primary source of Pinus seed for Indians southward (15), was not utilized in this manner by the tribes of extreme Northwest California. The primary reason is that its distribution does not extend into their region. The Karok have only a few of these trees in their area and used the seeds for jewelry. The coastal Indians had no P. sabiniana or other good Pinus seed sources accessible to them, but traded for them from the Karok and Klamath Indians (24).

The Karok and probably some of the Klamath Yurok made use of Pinus lambertiana for food. Pinus lambertiana tracts

were owned by families (86). Both sexes and their invited friends would pick cones (27). The cones would either be set upright against a branch laid upon the ground (86), or buried upright in the ground. In either case a fire would be built over them to speed the drying process. Afterwards, the seeds were beaten with sticks, broken open and what seeds did not fall out were picked out by hand (70). The seeds were then ready to be shelled and eaten or they would be stored within the testa for winter use.

The Yurok child during the first five or six days of its life would be fed a small quantity of a thin suspension made of water and either Pinus seeds or the seeds of Corylus cornuta var. californica (70).

All three tribes ate the seeds of Corylus cornuta var. californica. The nuts were pounded with a wooden pestle to remove the sclerified outer layer of the pericarp. They were eaten immediately or dried and stored for winter use.

Another fruit classified as a nut by the local Indians, possibly because it was done so by the white settlers, was that of Umbellularia californica. Botanists consider the fruit a drupe (74). It was gathered after having fallen on the ground. It was usually taken fresh and the exocarp peeled away. It could be also taken after the exocarp had rotted, but leaving the fruits on the ground for this period of time left them subject to consumption by birds, such as the "blue jay", (probably Steller Jay). Some people buried the fruits to rot away the exocarp. The Karok parched the whole

fruits, cracked them open and ate them (86). After peeling or rotting away the exocarp, the Yurok baked the seeds in sand with a fire built over them.

The fruit of many food plants were classified as berries by the Indians. This classification is based on a characteristic freshness, not on anatomical characteristics, as is the botanical definition. Most of the berries were gathered and eaten fresh, some were dried and stored, some roasted, and others were made into beverages. Table 3 summarizes these species and their use by the Tolowa, Yurok and Karok.

Large quantities of berries were gathered in burden baskets. The berries of Arbutus menziesii were steamed by the Karok before drying, and then soaked in water before eating (86). The dried berries of Arctostaphylos were sometimes pounded and mixed with salmon eggs by the Tolowa, Yurok and Karok. The Tolowa and Yurok made the mixture into a patty, mixed it with "sugar" (possibly sap from Pinus lambertiana), and baked it in rocks. It was thought that one would get constipated if he ate too much. Dried whole smelt was eaten with the sauce of Gaultheria shallon berries (84). The berries of Heteromeles arbutifolia and, by some people, those of Arbutus menziesii, were only slightly roasted or merely wilted by waving a branch with berries over an open fire.

The fruits of Ribes subgenus Grossularia of (101) were placed in a lacework basket and rubbed with a basketry cap. The Karok placed the berries in a wooden bowl to remove

Table 3. A list of species having fruit which were collected, eaten, and classified as "berries" by the Yurok (Y), Karok (K), and Tolowa (T). M-mixed with salmon eggs, B-made into a beverage, S-steamed, D-dried, F-eaten fresh, R-roasted.

Plant Species	M	B	S	D	F	R
<u>Amelanchier pallida</u>						K(86) K(86)
<u>Arbutus menziesii</u>	K(86)	K(86)	K(86)	K(86)		Y
<u>Arctostaphylos canescens</u>	K(86)	K(86)		K(86)		
<u>A. manzanita</u>	K(86)	K(86)		K(86)		
<u>A. navedensis</u>	TYK(86)	K(86)		K(86)		
<u>A. patula</u>				K(86)		
<u>A. uva-ursa</u>	TY					
<u>Arctostaphylos</u>		Y(27)				
<u>Fragaria californica</u>						K(86)
<u>F. chiloensis</u>						TY
<u>F. vesca</u>						KTY
<u>Gaultheria shallon</u>						KTY
<u>Heteromeles arbutifolia</u>						KY
<u>Paxistima myrsinites</u>						K(86)
<u>Prunus virginiana</u>						K(86)
<u>Ribes cruentum</u>						K
<u>R. divaricatum</u>						K(86)
<u>R. lobbii</u>						T
<u>R. roezlii</u>						KTY
<u>Rubus leucodermis</u>						K(86)Y
<u>R. parviflorus</u>						K(86)Y
<u>R. procerus</u>						KY
<u>R. spectabilis</u>			T(27)			YT
<u>R. vitifolius</u>				T(70)		K(86)Y
<u>Sambucus caerulea</u>				T(70)K		K(86)K
<u>Vaccinium ovatum</u>						K(86)YT
<u>V. parviflorum</u>						K(86)YT
<u>Vitis californica</u>						K(37)T(37)

the spines and then poured them into a basket plate to sift away the spines (86).

The purple-black fruit of Vaccinium ovatum was one of the major berry crops. Vaccinium parviflorum, V. uliginosum and V. membranaceum bore red fruit and were considered to be one folk taxon (74). Although less abundant than V. ovatum, they were highly prized because of their sweetness. For more details on the methods used for berry preparation, see Schenk and Gifford (86) and Warburton (101).

There are a number of species of the region which yielded berries which were eaten elsewhere, but are not known to have been utilized as such by the local people. These included Amelanchier, Rhamnus purshiana, Malus fusca, Oemleria cerasiformis, Rosa, Mahonia, Maianthemum dilatatum, Prunus demissa, P. subcordata, Solanum nigrum and Taxus brevifolia (15, 34, 42, 94).

Many berries were regarded as poisonous by the Indians. Lonicera involucrata is an example which is probably spoken of most often. Mahonia aquilifolium and probably other related species were thought to "give you the shits". The Karok said the fruits of Marah oregana and Toxicodendron diversilobum are poisonous (86). The fruits of Oemleria cerasiformis were said to be eaten only by squirrels (86). The Tolowa said that the fruits of this plant were not eaten much because the mouth would turn dark purple or black. They called it the "wood that lies" because it was the first to bloom in the spring and the last to set fruit. Prunus subcordata, which is used elsewhere and grows within the Karok territory, was not used by them, because the fruits

are not large enough (86). A few berries of Sambucus callicarpa were eaten, but they were said to be too sour to be eaten in large quantities. Bob Offield said the berries of Taxus brevifolia were eaten, but only one at a time.

Root crops were probably important only when other foods were scarce, since they could be dug up any time of the year. The peak harvesting period was probably in the summer (70), while at least some bulbs, as those of Lilium pardinalum, were dug for the fall (86).

Probably most of the Indian plants which yielded an underground root or stem were called "Indian potato" by the settlers. Many of the Indians themselves were confused as to the exact identity of the much cited Indian potato. Most often it was probably Camassia quamash. Both Berneice Humphrey (Tolowa informant) and Ethel Dietz (Karak informant) so identified the plant. A Klamath Yurok informant identified Brodiaea elegans as the Indian potato, although she was not certain. Camassia quamash was not common anywhere in Northwest California. Ethel Dietz said it grew along the road near her house five miles above Katamin, the center of the Karok "world". Berneice Humphrey said the Tolowa collected the plant near Oregon. She said the wetlands where it grew have since been drained and commercialized by the whites.

Indian potatoes were baked in subterranean pits with fires built over them. The Karok built a pit two feet across and placed the leaves of Vitis californica on the

bottom with a layer of Camassia quamash bulbs on top. Another layer of V. californica leaves were placed over the bulbs, then a layer of dirt upon which a fire was built. When cooked the bulbs were placed hot on an Indian plate and mashed by hand. It was said that the bulbs were "too starchy", but they were eaten alone. Schenk and Gifford (86) give a slight variation of this Karok preparation, whereby the pit is first lined with rocks, directly on which a fire is built. After the first fire had burnt, the ashes were removed and the cleaned bulbs were put on the hot rocks over a layer of maple leaves and another layer of maple leaves placed on top of the bulbs. A layer of Arbutus menziesii leaves placed on top and then another layer of hot rocks. This was covered with earth and another fire was built over it. The bulbs were removed and prepared the following day. For the baking of Chlorogalum bulbs, which was similar to the first method described here, the leaves of Toxicodendron diversilobum and Vaccinium are used in addition to the V. californica leaves. After baking, the mucilaginous leaf bases were eaten by pulling them off the bulb one at a time (86).

Bulbs of Lilium, Calochortus, Brodiaea, Dichelostemma and Triteleia were baked and eaten in this manner. Dichelostemma pulchella, eaten by the Karok (86), was not recognized as an edible plant by any of my informants. This species and other species of the genus, however, were recognized by the common name and as plants existing in their territory. At least two species of Lilium were eaten by the Karok.(86)

Lilium pardinalum was said to be the most highly regarded of all the bulbs. Lilium occidentale was slightly bitter to the Karok and was not known to be eaten at all by my Yurok informants, who said it grows within their territory. The Karok name of (XÍR-I-PÍ-10) alludes to its having been used during times of famine, although the Karok informant of the time, Mary Ike could give no reason for its name (86). One unidentified Karok informant at a gathering at Katim-een identified Zigadenus venenosus as a plant which was uprooted for its edible bulb. I advise great caution, since this species specifically is the one referred to as "death camas" in some floristic studies (74,58). Kingsbury writes in some depth about the poisonous alkaloids of this genus, but does not mention any specific cases of poisoning by Z. venenosus and that the poisonous principles of the species within the genus vary greatly (58). It is probable, however, that the informant had this plant confused with Camassia quamash, which looks very similar in size and shape to Zigadenus. (15,94).

The corms of Titeleia laxa (86), Dichelostemma pulchella and Brodiaea elegans were eaten where they grew in the more inland areas. The corms of other species of these genera were probably eaten as well.

The rhizomes of Pteridium aquilinum were probably eaten by the Yurok. In the notes of Merriam we find "[the] roots [of Pteridium aquilinum] are prized for food, when cooked in the ground oven they become milky and have a fine flavor" (70). Although he writes of the roots, there is little

doubt he was referring to the rhizome, since this is the only underground portion of the plant which is fleshy. The edibility of the rhizome is documented by Harrington(43).

The only root crops known to have been gathered by the Indians which have true roots are Perideridia gairdneri and Ligusticum californica. Perideridia gairdneri was baked by the Karok like the bulbs of Lilium. This plant was also a favorite food of many Indians of the Western United States (16,27). The roots of L. lingusticum were simply pulled up and eaten by the Tolowa.

Shoots of many plant species were eaten. The floral stems of Darmera peltata and Heracleum lanatum were peeled and eaten fresh while still young. Darmera was eaten by the Karok and Yurok, while the Yurok and Karok (86) and Tolowa ate H. lanatum. It was picked "under the shade of alder and before it blooms". A Yurok informant said the reason for these requirements is the stems are very bitter otherwise. The Karoks ate the sour young stems of Eriogonum nudum, the long sprouts of Angelica tomentosa (86), the peeled stems of Crepis acuminata (86), peduncles of Balsamorhiza deltoidea, the young shoots of Nasturtium officinali, and the leaf blades of a certain species of Chlorogalum (22). The Yurok ate the small fresh sprouts of Equisetum and the tops of Claytonia siberica. The Yurok and Tolowa ate Oxalis oregana and related species with dried fish.

All three tribes ate but one mushroom, Armillaria ponderosa. It is picked and eaten in November. The Yurok and Karok informants said it has always been eaten by the

Indians, but Berneice Humphrey said the Tolowa learned of its use from the Whites early on.

At least two species of seaweed, Porphyra lanceolata and a yet unidentified species, were eaten by the Indians of Northwest California. Species of the genus Ulva may also have been eaten. Berneice Humphrey, who still collects the first two species, collects P. lanceolata in the late spring and the other species, which is long, thin and flat, in the latter part of June. The Tolowa wash and dry the seaweed, while the Yurok do not wash it. Berneice says that the seaweed was not used for salt by the Tolowa as has been previously noted by ethnographers (27). The Karok and Yurok both obtained salt in this manner. The Yurok traded seaweed to the Hupa (24) and Karok.

The primary tea of the Yurok and Tolowa was Ledum glandulosum var. glandulosum and var. californicum. The leaves are picked before the plant has bloomed. The primary tea of the Karok and the second most popular tea plant of the Yurok and Tolowa was Satureja douglasii. It is good only when fresh. The fresh sprouts of Psuedotsuga menziesii and the needles of Abies grandis (86) were made into a tea by the Karok. The Yurok made tea from the fruits of Rosa pisocarpa, and the tips of the vegetative shoots of Populus trichocarpa. Tea was made from species of Chimaphila by all three tribes.

Besides the teas, there are a number of plants which might be classified as food plants but yield little nutrition. For instance, the milky sap of Asclepias eriocarpa and

possibly other species of the genus were cooked down and used as a chewing gum by the Tolowa (27,103), Yurok and the Karok. For further details on Karok use, see Schenk and Gifford (3). The Yurok and Karok also chewed pine pitch. The Karok alone sucked out the milky latex from the crown of a broken root of Agoseris aurantiaca and chewed it (86). The chewing of Asclepias latex and Pinus resin was a common practice of California Indians (100). The Yurok bit off the ends of the sepal spurs of Aquilegia formosa which contain sweet nectar glands.

## INDUSTRIAL USES OF PLANTS

A few of the plants utilized for purposes of food preparation, such as the leaves of Vitis californica, Arbutus menziesii, Toxicodendron diversilobum, and Acer macrophyllum, have already been discussed under the heading of food plants. Many other plants used in native gastronomy will be discussed with basketry. The remainder of known ethnobotanical culinary aids are few and idiosyncratic.

A variety of plants were used for preparing fish to smoked or roasted. After salmon were first caught by the Yurok, the tails were cut off and the remainder laid to bleed on leaves of Pteridium aquilinum var. pubescens. The leaves would be changed as they became saturated with blood. (86). The following day the salmon were cleaned using the leaves of P. aquilinum var. pubescens, Dryopteris arguta or possibly Athyrium filix-femina. These leaves are also places over meat in general to keep flies off. These ferns were used because of their lack of odor. Salmon was ordinarily smoked by the Karok, who after splitting the fish longitudinally, held it open with small stems of Toxicodendron diversilobum. The Yurok ate some salmon roasted but also smoked salmon open faced holding them open with wooden pins. (34). The Tolowa also smoked and roasted salmon. Sturgeon eggs were wrapped by the Yurok in leaves of Sambucus callicarpa or Lysichiton americanum while being cooked.

The leaves of L. americanum were said to lose their odor when cooked. The Tolowa layered "myrtle" leaves, possibly Umbellularia californica, between smelt in storage baskets within the living houses to prevent moisture and pests from rotting the fish (40).

Seaweed was dried between layers of Pteridium aquilinum var. pubescens by the Yurok. The Tolowa used Ribes nevadense and possibly other species of Ribes. In addition to keeping the patties from sticking together, the Ribes leaves impart flavor to the seaweed. ←

Table 4 summarizes the plants used in extreme Northwest California native basketry. Basket materials were carefully chosen. Not only were certain species used, but individual plants or populations were found to yield better basket-making materials through years of empirical investigation.

Twining was the sole technique used for making baskets in Northwest California. The foundation was made of stems, the twining elements of roots, and the overlay materials or designs of leaves of Xerophyllum tenax, stipes of Adiantum pedatum, or stipe fibers of Woodwardia fimbriata. Several dyes were used to color overlay materials.

The stems primarily used were those of Corylus cornuta and Salix hindsiana. Thickets of C. cornuta were burned biennially and the shoots harvested the second year after the burn. Ceanothus integerrimus stems were used to some extent by the Karok who managed the shrubs as they did Corylus. Where new shoots of C. cornuta were difficult to

Table 4. Plants Used in Basketry

Plant Species	Leaf	Stem	Root	Bark	Dye
<u>Adiantum pedatum</u>		YTK			
<u>Alnus oregana</u>					T
<u>A. rhombifolia</u>			K(86)		K(86)
<u>A. rubra</u>					K(86)TY
<u>Amelanchier pallida</u>				K(86)	
<u>Ceanothus integerrimus</u>		K(86)			
<u>Datisca glomerata</u>					K(86) See S & L
<u>Fraxinus latifolia</u>			K(86)		
<u>Gaultheria shallon</u>					K(86)
<u>Heracleum lanatum</u>					K(86)
<u>Juncus ensifolius</u>		K(86)			
<u>Juncus</u>		TYK			
<u>Mahonia aquilifolium</u>					K(47)
<u>Picea sitchensis</u>			Y(70, 79) K(79)		
<u>Pinus jeffreyi</u>			K		
<u>P. lambertiana</u>			K(79)		
<u>P. ponderosa</u>			K		
<u>Populus trichocarpa</u>			Y(79), K(86) K(86)		
<u>Salix hindsiana</u>	Y		K(86)		
<u>S. scouleriana</u>				K	
<u>S. sitchensis</u>			YT		
<u>Sequoia sempervirens</u>			YT		
<u>Woodwardia fimbriata</u>		TKY	K(79), Y(79)		
<u>Vitis californicas</u>			KY		
<u>Xerophyllum tenax</u>	KYT				

obtain, shoots of Salix hindsiana were collected. S. hindsiana shoots were reputedly inferior to those of C. cornuta because they are more susceptible to pests and more difficult to prepare. Stems were harvested when they first began to bud in the last part of March or early April. The bark had to be peeled off within a few days or it would dry out, making the task very difficult. They were fathered again in August when the present year's growth is large enough to use (86). O'Neale (70) mentions a plant called "myrtle" used by the most skillful Karok weavers. He identified the plant as Myrtus communis, which is unlikely since this is not native and its growing "high in the hills" would make the "myrtle" an unlikely candidate for an introduced plant. It is probably not Oregon myrtle (Umbellularia californica) or "wax myrtle" (Myrica californica), because the habitat for both of these is canyons and moist hillsides (1). For making handles, reinforcing baskets, or whenever a basket needed stiffening, the Karok used the stems of Amelanchier pallida (86). Juncus, although used elsewhere for serviceable basketry (72), were used by young Tolowa, Karok and Yurok girls only to practice basket making. Although Schenk and Gifford (86) listed only J. ensifolius as useful in this manner, many species of Juncus were probably used, depending on the locality. The stems were turned over an open fire until brown, then they were soaked in water to make them more pliable.

There were a number of twining elements used, none of

ch was obviously preferred. The larger roots obtained  
n Pinus ponderosa, P. jeffreyi, Picea sitchensis, and  
Thuja sempervirens were cooked, split with an elkhorn  
edge and stone maul (86), subdivided by knife, and  
shaped (70, 79). The roots of the redwood were noted for  
their quality of expanding and thereby preventing water  
from passing through the baskets. The roots of Pinus sabiniana  
were used by neighboring tribes (72), but were not used by  
the Yurok, Tolowa and Karok mainly because the tree did not  
grow in any abundance within their territory.

The smaller roots were simply barked, subdivided and  
shaped. These include the roots of Populus trichocarpa,  
Alnus rhombifolia (86), Fraxinus latifolia (86), Vitis  
californica, Salix laevigata (86), and Salix sitchensis.  
Other species of Salix were possibly used, especially those  
which grow along river banks and are subject to having  
their roots exposed by erosion.

Overlay materials were surprisingly few. Xerophyllum  
was generally used as a white background, although  
sometimes it did serve as a design on a gray background of  
other roots. The small leaves of Xerophyllum were used  
to make very tiny baskets. It was burned annually and only  
the newly sprouted leaves used. The leaves were dried, but  
not for "too long" as they would become brittle. The  
Tolowa used a strong concoction of Letharia columbiana to  
color Xerophyllum.

The stipe of Adiantum pedatum was used for the black  
designs in baskets. The Karok, after stripping off the  
epithelium, loosened the fibers by pulling the stipes over a

stick so that the inner strands could be removed and discarded (86). The Yurok and Tolowa simply dried the stipe after removing the pinnae and then soaked them in water before use. If the stipe was light on one side, then the lighter side would be turned inward when making the basket.

The red design in baskets was made with the vascular bundles of Woodwardia fimbriata. The fronds were picked when fully grown, for this is the time when the vascular bundles are the strongest. The stipes were pounded and the two vascular bundles fell away. The strands were cleaned of pith by running a fingernail down them (86) and then dried. Alnus oregana bark was used as a dye. After dying, the strands were coiled and soaked to uncoil prior to use in basketry.

Bark was not used in recent times by the Northwest California Indian. Warburton (101) discusses the use of Alnus bark by these Indians prior to the woven basketry. Indians elsewhere in California (7,8,15,21,23,26,63,72,84) made use of the bark of Cercis occidentalis, which grows well within the reach of the Karok and the Klamath Yurok, but was not used by either of them.

There were three major dyes. Letharia columbiana and Alnus oregana have already been mentioned. Letharia columbiana, identified by Berneice Humphrey (Tolowa), is probably the same folk taxon as L. vulpina, which was identified by my Karok and Yurok informants, and which is often mentioned in the literature as a dye plant (20,69,79,86,94). The

Yurok and Karok used the dye only on porcupine quills, which were also used in basket designs.

The bark of Alnus oregana was peeled off a tree which had been previously selected by testing the color by chipping. The dye was extracted by pounding or chewing the bark. If the bark was chewed, the Woodwardia strands were dyed by running them through the mouth, in which case the mouth would be red for "a week". Mahonia aquifolium (86), M. pumila, M. nervosa (43) and possibly other Mahonia species were used by the Karok to dye porcupine quills yellow. The roots of Datisca glomerata were used for the same purpose, but they were said to produce an inferior yellow (40,43). For further details of basket making, see O'Neal (40), Merrill (72), and Driver (27).

Cordage was another important fiber product. It was generally made with what is presently called "mountain iris" by the Indians, but which consists of a number of modern plant taxa. The plants of the local Iris taxa which grow along the coast were not used. Berneice Humphrey (Tolowa) said that the higher in the mountains that the Iris grew, the better was its quality for use in basketry. The lowest collecting area was Gasquet, ca. 150 m in elevation, where they collected Iris innominata. The Yurok and the Karok used Iris tenuissima which grows farther inland. Iris tenax ssp. klamathensis, one of the taxa used, grows just west of Orleans within a very restricted distribution. Iris macrosiphon of Schenk and Gifford (86) does not extend into the local territory and Karok informants said this plant was not used.

The leaves of Iris were dried and scraped with a mussel-shell scraper to free and clean the fibers (86). The fibers were then rolled on the thigh with the right hand, which had been wetted with saliva. With the left hand the fibers were staggered and new fibers were added to lengthen the string (102). The Yurok women prepared the cordage (102,60), but the Tolowa men did this chore. I have heard of only Karok men making cordage. Although the Iris was used for making several sizes of cordage, from thread to rope, the most important use was for making nets. The Tolowa dyed the nets with an extract of the bark of Lithocarpus densiflora to make them less visible to the fish. The Karok made lashing with stems of Corylus cornuta (79) and Vitis californica. Larger stems of V. californica were used to build foot bridges across the Klamath River. It was used elsewhere in California for cordage (15).

All three tribes used packs for carrying gear while traveling (29). The Karok and Yurok had trapezoidal carrying nets made from Iris fibers, but they also made packs of hide similar to those used by the Tolowa. Pack straps for the hide packs were also made of hide by the Yurok and Karok, but the Tolowa and some Yurok wove straps of a two-ply material. For a more complete description of this, see Kroeber and Elmendorf (34). Straps of this kind were traded inland to the Hupa (24). Loads were also carried in conical openwork burden baskets (60). The Tolowa had special packs for carrying smoked salmon (20). The salmon was placed between layers of fern, and the entire lamination

placed between pack frames. The pack frames were constructed of Corylus cornuta and consisted of a section of sapling forming the circular rim of about three feet in diameter supporting a mesh of withes.

Chlorogalum was used by the Yurok (60) and Karok for making fiber brushes. See the discussion on C. pomeridianum and C. angustifolium in Schenck and Gifford for further details (86).

Karok brooms were made of branches of Chamaecyparis lawsoniana and Calaedrus decurrens, but were inferior to brooms made from the leafless branches of Vaccinium parvifolium (86). The Yurok used V. parvifolium, V. scoparium, and probably other species of Vaccinium as well, according to their availability.

Mats were woven with the leaves of Scirpus acutus by the Karok (86), and with Typha latifolia by the Yurok. The coast Yurok slept on such mats (5). Both Scirpus and Typha mats were a common product of the West Coast Indians (5,15,42,72,77,94) The Tolowa and the Yurok used Polystichum munitum and Blechnum spicant to soften the ground while they slept there. These ferns were used because they were not "good" for anything else.

Plants were not a cardinal constituent of dress. Both men and women wore mainly buckskin, as did most other native californians (60). Carl Meyer supports this in his account of the Indians of Trinidad Bay, but adds that the men of these coastal Yuroks wore no clothes in the summer (73). The women wore a two piece dress, " a narrower front

apron, and a wider hip dress coming around from behind to  
 lie in front, and partly overlapping the apron" (34). The  
 apron was ornamented with Pinus seeds, Viburnum ellipticum  
 seed (34,74), strung on a string of Iris or of braided  
 leaves of Xerophyllum tenax. The Yurok used the leaf fibers  
 of X. tenax and the seeds of Pinus to decorate the buckskin  
 also. The buckskin was slit into fringes and either  
 wrapped in braids of X. tenax or strung with Pinus seed (60).  
 Pendants of X. tenax woven about a sinew or hide strip were  
 sometimes looped at the end to attach abalone (50).

The Tolowa women made their everyday dress from the  
 bark of Arbutus menziesii or more commonly Acer macrophyllum.  
 Some men also wore a dress of A. macrophyllum (45). The  
 Yurok did not use a dress of this source except for girls  
 during the days of their puberty ceremony, shamans during  
 their noviciate (60), women who were poor, or by women  
 doing "dirty work" (34). Other than their shamans, the  
 Yurok did not wear the A. macrophyllum bark dresses (34).  
 The Karok used the stipes of Adiantum pedatum as decoration  
 on dresses. Mourners of both the Yurok and Tolowa would  
 weave the fibers of X. tenax in a specific manner and wear  
 the strand about the neck.

Basketry caps were commonly worn by all northwest  
 California Indians, especially the women. Work caps were  
 of a drab gray background of conifer roots with a white  
 pattern of Xerophyllum tenax (60). Dress caps had a white  
 background of X. tenax with a design made of Adiantum  
pedatum (black) or the Alnus dyed fibers of Woodwardia

fimbriata (red or both (3,9)).

The Karok used the woody sporophores of the tree fungi Fomes pinicola and Trametes subrosa to polish buckskin. The soft, white fertile layers of the present season's growth was first peeled away and the buckskin rubbed with the dead underlying hymenial layers. A wad of "moss", probably lichen, was used to dry preserved brains used to rub into animal hide to soften it (34).

The Tolowa and Yurok also wove the leaves of Typha latifolia to make a raincoat. The Yurok in the vicinity of Requa used these coats.

A number of plants were used for reasons of vanity and cleanliness. The Tolowa used the Chlorogalum to brush the hair (27). A wooden nose pin was used by the Tolowa who had pierced noses (27).. After softening the septum by rubbing it between the thumb and forefinger with warm water, it was pierced with a smooth wooden needle made of Sequoia sempervirens (30). Vegetable face and body paint was made from a "red fungus" by the Yurok and Karok and from black charcoal by the Tolowa, Yurok and Karok (34,63). The Karok put the dried leaves of Boykinia elata or the leaves of Ceanothus velutinus inside basket caps for fragrance (86) and used the flowers of Ceanothus to clean hair. The Tolowa and some Yurok used the crushed bulb of Chlorogalum to wash hair (27). This was a prevalent use for these plants along the West Coast (4,58,69,77). The Yurok perfumed their hair with "honeysuckle (Lonicera) buds and certain roots from Bald Hill" (27). Trichostema lanceolata was

put in bedding by the Karok to keep fleas away. The Yurok used the leaves of Umbellularia californica for the same reason.

Houses were constructed of wooden planks. Erosion or wind-felled trees were usually used, but the people occasionally felled their own. Most planks were manufactured by splitting the tree with an elkhorn wedge and a stone maul. Sequoia sempervirens appears to have been considered the best tree for construction, since Thuja plicata, which was available to the local people (74), was not used. It was the tree preferred in areas northward where S. sempervirens was not available. Beyond the distribution of T. plicata, Tsuga heterophylla and Picea sitchensis (51) were used (97). Indians southward also preferred S. sempervirens when available (53,77). The more inland people, the Klamath Yurok and the Karok, had little S. sempervirens available to them and used other trees, such as Thuja plicata (53), Calocedrus decurrens, Chamaecyparis lawsoniana and Pinus lambertiana (86), for construction. Chamaecyparis was used by the Karok specifically for building sweat houses. For further details on house construction by the Yurok, Tolowa and Karok, see Warburton (101), Gould (40), Driver (29) and Vastokas (97).

Sequoia sempervirens was also much preferred for the making of dugouts (60,77,85) and was the only tree used with the exception of some "cedar" boats used by the Tolowa (27). Since the Tolowa extend into Southern Oregon, these "cedar" boats may have been constructed outside the

distribution of S. sempervirens. Also, they could have been traded from their northern neighbors. The inland people also used canoes of S. sempervirens which they traded from the Klamath Yurok. For further details on the method of canoe construction, see Warburton (101) and Mason (65).

Several utensils were carved from wood. Most notable was the "acorn mush paddle" which was used to stir the hot rocks while boiling acorn mush. These were carved from Acer macrophyllum or A. circinatum. Acer is a common utensil wood especially or more northern tribes (5,42,94). Although the "mush paddle" of the Northwest California Indians with a decorated handle is considered to be of local development, although the designs are very similar to those of "mush paddles" carved by the Iroquois. The design of the local paddle handle follows a capital, stem and pedestal pattern and the shapes are simple, geometric and idiosyncratic. For further details see Kelly (57).

Also of local development are the round stool and the pillow or headrest, the latter used in the sweat house. (57) Both of these were carved from the wood of S. sempervirens (60). A large wooden storage box (60 to 120 cm long) was also carved from the same species by the Yurok and Tolowa (60,57,63). It, like the stool and pillow, was seldom decorated. The Karok also made these boxes, but probably not from the wood of S. sempervirens. The Yurok and Karok made mostly cylindrical boxes, while those of the Tolowa were rectangular. Wooden meat platters were carved by the Tolowa, Yurok, and the Karok (63). The wood

of Pinus lambertiana was used by the Karok to carve boards and posts for cemeteries (80).

Smaller utensils were carved from hardwood and included tobacco pipes, weapons, spoons, canes, and scraping sticks for acorn mush, netting needles, digging sticks, and fire drills (60,58). Most of these, with the exception of weapons and fire drills (see below) were carved from various species of Arctostaphylos. I found no preferences for any one species. In addition to Arctostaphylos, small articles were carved by the Karok from Taxus brevifolia and Philadelphus lewisii var. gordonianus (86). The Karok made digging sticks from Cercocarpus betuloides (86), which was very hard wood (58). The Klamath Indians of Oregon also used Cercocarpus for this purpose, specifically for sticks used to dig for the bulbs of Camassia quamash (20). The Klamath Yurok used the wood of Taxus brevifolia for an axe handle. The wood used was that closest to the ground for this is where it is hardest (29). The hollow stems of Sambucus was used for feather receptacles by the Tolowa (27). Carving was done in the manufacture of musical instruments, described below. In addition to Arctostaphylos, pipes were carved from Philadelphus lewisii ssp. gordonianus (43,86). The soft pith was removed by poking it out with a stem of Amelanchier. Ceanothus was reported to have been used by some Yurok in pipe construction (85). Pipe making by the Northwest California Indians is described in detail by Harrington (43) and Walker (99).

Vegetable adhesive was made from the resin of Asclepias, Prunus virginiana, Pinus lambertiana, and Picea sitchensis (70,86). The Picea and Pinus resin was used to plug knot holes and to caulk cracks (60) in wood, especially of canoes (70). Prunus virginiana resin was used in weaponry and is discussed further in that section.

The stems of Equisetum laevigatum, E. hemale var. affine, and possibly other species of Equisetum were used as an abrasive for polishing madrone spoons, pipes, arrows (60,86), and for sharpening the edge of mussel-shell scrapers (86) by the Cowlitz and Quinault (42) and the Klamath Indians (20).

Plants were vital in fire technology. The roots of Salix scouleriana and S. sitchensis were used for the standard fire drill and hearth by the Karok and Yurok (60,86). The Cowlitz of Western Washington used Salix lasiandra for a fire drill (42). A "cedar" hearth was also used by the Karok and shredded "cedar" bark was used for tinder (86). Some Yurok used "oak" bark as tinder (27). The fire drill of the Tolowa was made from the root of the "ash" tree possibly Fraxinus latifolia according to Merriam (70).

The Tolowa carried fire for long distances by leaving it smoldering in a mat of Letharia columbiana. Special firewood was often chosen for special purposes. Alnus wood was sought for smoking meat by the Karok (86) as it was with the Twana (34) of Western Washington, as it gave the meat a good flavor. The knots of Picea sitchensis were pulled

from the rotten logs by Yurok to make coals for roasting eels (101). Grain was parched by Karok with the coals of "black oak" (Quercus) bark. Also, only the burning stem of Corylus cornuta would be used by Karok to light a pipe (43). Other species were used especially for firewood during certain rituals.

The main weapon of the Northwest California Indians was the bow and arrow, and the only other made of wood was the wooden war club (29). The bow was made from the wood of Taxus brevifolia which was highly prized by most Indians of the Pacific Coast (5,42,53,58,85). The plants chosen by the Karok were those which grew near a stream and the wood selected was from that part of the stem that faced the water, for this was the smooth wood. Some of the lower Karok obtained the wood from the north side of the tree because "it is the shady side" and it is thought that the wood from this side may be more free from knots, as compared to that from the sunny side because fewer limbs grow from the shady side (27). The Tolowa obtained wood from the east side so as not to "kill the tree". Oregon Coast Indians preferred wood from the east or south side for this is the "stormy side" (5). The wood of T. brevifolia was shaped with a sharp stone (86). After shaping into a bow, it was backed by sinew, which is also used for the string (60). Meyers (73) describes the root of a "fir" tree as having been used by the coastal Yurok (73). Gibbs (36) also reports the use of Fraxinus latifolia and Arbutus menziesii by the Klamath River Indians or Yuroks. Although both of these

woods have been used in native carving (69), I have seen no other reference to their use in native bow-making. For further details on native bow manufacturing, see Kroeber (60), Goddard (39), and Driver (27).

There were several species of plants used for the making of arrows (60,86,70,65). An arrow was made by the Karok from the stem of Physocarpus capitatus for the shaft and a flint tip. This arrow was for larger game. Another Karok arrow was made having a shaft of wood of Philadelphus lewisii ssp. gordonianus, a favorite arrow wood in other parts of California (15,20), and a point of stone or wood of Amelanchier pallida, which has been used elsewhere for the same purpose (15,94). The A. alnifolia tips were fastened with the resin from Prunus virginiana var. demissa. A third Karok arrow was also made with the tip of A. alnifolia wood, but with the shaft of <sup>Corylus</sup> Cornus cornuta wood. Ribes, Salix, and Holodiscus have been reported to have been used for arrow shafts by either the Tolowa, Yurok and Karok. Holodiscus discolor was used for arrow shafts by Western Washington Indians (42). Some arrows of the Tolowa and Yurok were of a single shaft and no head (27). Meyers (73) noted arrows partly of "reed and partly of cedar" with the tips of "volcanic glass", iron or ivory. He also writes "sometimes the arrows are poisoned with the juice of the sumac tree (possibly Toxicodendron diversilobum), but they are only used to slay wild beasts". Arrow shafts were painted by the Karok with a mixture of the flowers of Delphinium decorum, "salmon glue", and fresh berries of

Mahonia aquifolium. The paint was applied after rubbing the shaft with the heated resin of Prunus virginiana var. demissa. For more detailed references to Yurok, Tolowa and Karok arrow technology, see Schenck and Gifford (86), Kroeber (60), Heizer (47), Mason (66), and Driver (27).

The Tolowa rubbed the leaves of Pinus contorta on their bodies to hide their scent from game.

Iris, the most important plant genus of fishing technology, has been discussed. Trees such as Sequoia sempervirens were used by the Yurok to build fish dams. The Yurok weir at Kepel on the Klamath River was constructed of Pseudotsuga menziesii and Lithocarpus densiflora logs for longer poles which were tied with lashings of Vitis californica and Corylus cornuta, split Pinus ponderosa limbs for trap gates, twigs of Sequoia sempervirens packed around the bottom of traps to prevent washing out and logs of Umbellularia californica to weigh the logs down (72). Eel traps were made by the Yurok from species of Salix which grew along the Klamath River. The Yurok sprinkled berries of Gaultheria shallon or Vaccinium species on the bottom of lagoons and shallow portions of rivers, then stretched coarse nets over them. Ducks would dive to retrieve the berries and get stuck in the mesh and drown because of the resistance of the feathers to bending backward (84). The dugout was used very little for fishing (60) although the Tolowa used the dugout to hunt sea lion (84,40) on offshore islands and the Coast Yurok used the dugout to retrieve harpooned sea lion from the shoreline (34). For a detailed account of North Coast fishing, see Kroeber (61).

## SPIRITUAL USES OF PLANTS

Ethnographic data relevant to religion or spiritual practices of the North Coast Indian are difficult to collect for these native people believe strongly such knowledge would be rendered useless if passed to the wrong person. The formulae of shamans are especially confidential. Most of the data gathered, therefore, are of general knowledge; idiosyncratic details of ceremonialism and shamanism being of an enormous potential for further study. The magnitude of variation within the Yurok tribe alone is described by Kroeber, who wrote, "a trait of Yurok formulae is that while those devoted to the same end run along closely patterned lines, no two are alike. One man may even know several formulae serving the same purpose." (60)

Since the Yurok, Tolowa, and Karok performed similar dances (60), it might be speculated that the botanical paraphernalia of such ceremonies is universal to the three tribes. However, there is very little evidence for this. The information listed below, although of fairly common knowledge to the Yurok, Tolowa, and Karok, and to ethnographers, is variable among these three ethnic groups.

Both the Karok and Yurok performed ceremonies which paid tribute to the fish upon which they relied so heavily for food. For the Karok, this was the "First Salmon Ceremony" and for the Yurok the "Kapel Dam Dance". During the "First Salmon Ceremony", Equisetum hyemale var. affine (86) was used in the "cleaning" of "priests". The wood of

Arbutus menziesii was always used for fuel during this ceremony. In preparation for the "Kepel Dam Dance". the "formulist" restricted himself to a diet of thin gruel of Lithocarpus densiflora while visiting a number of sacred locations for a period of ten days (60). During the actual ceremony, poles of Arbutus menziesii were hurled at maidens who wore headresses as protection. If a maiden was struck on the head by a pole, it was thought she would soon lose her virginity (101). A Yurok girl during her puberty ceremony wore a dress made of bark from Acer (60), and for good luck Karok girls at this time were showered with leaves of Arbutus menziesii (86).

During the Yurok "Brush Dance", "pitch-pine" branches (Pinus) were waved over a sick child. Karok children were laden with the foliage of Umbellularia californica so as to drive away "evil spirits". If a Karok child was "goofy", a formula requiring Pyrola californica was performed (60).

The roots of Lomatium dissectum, L. californicum, and Osmorhiza chilensis were generally considered powerful medicines and regularly used in ceremonies and formulae. Lomatium was usually smoked, while the Osmorhiza thrown into the fire. A species of Erythronium, called OX-PO-HA-KNI-KUN-N\*O by the Karok, was fastened to the ceremonial headress (86). If a Karok was ceremonially impure, he was treated with a formula requiring the bark of Fraxinus latifolia (86).

Ritualism associated with death was very important to

the Yurok, Tolowa, and Karok. After a relative had died, Yurok and Tolowa wore necklaces of braided Xerophyllum tenax. During a Karok funeral, split young shoots of Pinus jeffreyi were placed in a basket of cold water and the entire infusion was poured over hot rocks. The Karok say that many years ago, long slabs of Calocedrus decurrens bark were laid over corpses during burial. The Yurok washed corpses with a mixture of "water, herbs, and roots" (60). Any Yurok who had touched the corpse, rubbed himself with the vine, Vitis californica, with which the body had been lowered into the grave (60). All participants of the Karok funeral drank an infusion of Ceanothus integerrimus and washed with it (86). If the body was already decomposing, the burial party stuffed the leaves of Artemisia douglasna in their nostrils. After the funeral, purification was performed with a formula requiring Angelica tomentosa root (86).

Karok ceremonial sweat houses were built with planks of Pinus lambertiana. The boughs of Pseudotsuga menziesii were used as fuel. Each man gathered the boughs from his own select "memory tree" which was remembered after his death. These "memory trees" represented "good luck" (86).

Other plants used in "good luck" formulae were Rhododendron macrophyllum leaves and shoots of Cornus nuttallii. The R. macrophyllum leaves were rubbed into cuts of the upper arm or thigh, and the branches of C. nuttallii were "talked" to and placed in the smoke house fire (86).

The most famous mythological plant of the Yurok was

Alnus oregana, who is a "poor man" because he was born out of wedlock. For this, he was always crying, and hence the reason the leaves are always wet (70). Also, to the Yurok Artemisia douglasiana is the grandmother of Epilobium angustifolium (70).

A number of mythological plants of the Karok are described in Schenk and Gifford (86). These include: Eremocarpus setigerus, Clematis lasiantha, Gnaphalium californicum, G. microcephalum, Pinus lambertiana, Rosa pisocarpa, Salix laevigata and Sanicula bipinnata.

Eremocarpus setigerus was said to be "across-water widower's stinking armpit". This was Verbascum thapsus according to my informants. Since V. thapsus is a plant introduced to the area from Europe (74), my informants probably confused V. thapsus with E. setigerus.

## FOLK TAXONOMY

A folk taxonomy comprises the systems of biological classification and nomenclature as created or understood by a homogeneous cultural group. My primary concern here is ethnobotanical nomenclature, an area of a folk taxonomy which includes the methods of naming plants and the resulting semantic structure. For the foundation of my discussion, I have used the theories of the growth of ethnobotanical nomenclature formulated by Berlin (10,11,12).

Berlin's basic assumptions are that ethnobotanical vocabularies tend to increase in size over time, but are generally fixed within a structure of six universal categories: genus, species, life form, variety, intermediate, and unique beginner. Genera, and hence generic names, are antecedent to the remaining categories, followed by species and life forms, and then by intermediate taxa and varieties. The final category to be lexically marked is the unique beginner, the all-inclusive class for either plants or animals. The unique beginner for plants is rare in folk taxonomies and is not found in the lexicons of the Yurok, Tolowa, or Karok. The category of animal, however, is present, indicating that the systems of ethnozoological nomenclature are more complete.

The systems of folk taxonomy of the Yurok, Tolowa, and Karok were similar to one another and to those found in other New World cultures such as the Tzeltal of Mexico and

the Aguaruna Jivaro of Peru (11,12,14). The botanical lexicons, have atrophied dramatically, however, making it difficult to reconstruct the principles of nomenclature (19). Of a total of 328 taxa shown to the Yurok, Tolowa, and Karok informants of this study, only 39, 21, and 49 names respectively were recorded. This indicates that the least degree of attrition has occurred among the Karok, who have never-the-less experienced, a drastic reduction in the knowledge of their folk taxonomy since 1933 when Schenck and Gifford collected different names of 202 of the 239 plants shown to informants. Also, the majority of the plants that could not be named were of gene pools that were introduced into the Karok area within the last two centuries, indicating the nameless taxa at that time to be very few. (86).

The basic structure and development of the folk taxonomy are consistent with the theories of Berlin for botanical nomenclature (10). Except where otherwise specified, I will use lexemes from the Karok lexicon to exemplify the correlation, because of its relative completeness. The fundamental structure is of a generic level and has less hierarchy than modern international nomenclature. The growth of the nomenclature was primarily through horizontal expansion, a process in which a class is named by comparing it in an analogous manner to a preexisting class. For example, POHIP is the name for Umbellularia californica. Trees of this species grow within the Karok homeland. Another tree type that grows outside of the Karok area and closer to the coast has

the name 00-KUM-PO-HIP (sequoia sempervirens), which means "coast PO-HIP" (86). The analogy in this case is obscure, since little apparent natural relationship exists between the two tree types, although trees of both retain significant numbers of photogynthetically active leaves throughout the year.

Genera have three basic types of etymology: zoological, cultural, and botanical. The zoological may allude to the animal as a whole, as 00N-THIN-NI-TUN-VΔ-000 (Lepidium virginicum), "little tick"; to an animal's anatomy, as 00NNUPUICI (Peramium decepians), "ring tailed cat's ears"; or alluding to an animal's behavior, as PINΔFTOTOPOWO (Clematis lasianthus), "coyote's trap" (86).

Cultural etymologies are technological, as XOWIS (Philadelphus lewisii), "arrow wood"; medicinal as (Sarcodes sanguinea), "itch medicine"; or mythological, as OBCOMXOROK (Rumex conglomeratus), "water monster weed" (86). Names of obscure etymologies, as the example of POHIP and 00-KUM-PO-HIP given above, may also be of mythological origin. Plants are often related mythologically, though unrelated botanically. Generally, when plants are related to in this manner, the lexemes are marked with modifiers similar to those meaning grandson or grandmother.

Traceable botanical etymologies are few. Much of the reason for this is inherent since many plant names are unanalyzable primary lexemes and nontraceable by definition. When considering the analyzable lexemes along, the nonbotanically-related generally outnumber the botanically-related. Some names are difficult to classify,

because they have characteristics of both as XON-ǾÍF-HIǾ PÍR-HI (Symphoricarpos albus), "frog's huckleberry". Most analyzable lexemes of botanical etymology are simply of unanalyzable primary lexemes modified by horizontal expansion. The modifiers that are usually used in the naming of genera are those meaning imitation or false, as MOFUKOFIǾ\* (Boykinia elata), "make believe KOFIǾ\*", although some plants are named according to their habit, as KONYAPXR IǾTOHITIION\* (Trientalis latifolia), "that which grows in the oaks" (86).

Suprageneric and subgeneric taxa are few, although the degree of distinction among gene pools that would allow for the retention of nomenclature at the specific level has diminished greatly, making it difficult to compare numbers of specific and generic taxa. My informants have said that at one time every plant could be designated by a name. Perhaps, therefore, there was once a much higher ratio of specific to generic names than there exists today.

Species are formed when finer distinctions are made among separate plant gene pools. This creates a contrast set which in folk taxonomies is usually comprised of two specific taxa (10), although there are several specific taxa within each of the genera FOθ (Arctostaphylos), KOF (Darmera, Heuchera, Petasites), and KǾ-FIP (Salix) (86). According to Berlin, in the early stages of the division of a genus, the type specific name will be polysemous by maintaining synonymy with the genus name. KǾ-FIP (Salix sitchensis var. coulteri),

\* Translated from Schenck & Gifford (86)

for example, is the type specific name and the name for the genus KÚ-FIP (Salix); and KOF (Darmera peltata) is both the name of the type specific and that of the genus KOF (Darmera, Heuchera, Petasites). The new species is designated by a descriptive modifier as in the name KÚ-FIP FŪR-OK (Salix laevigata), "red KÚ-FIP " (86). Note that two species of the same folk genus KOF, viz. KOF and KOFIO KOMSOS\* (Petasites palmatum), are not only of different genera in international systematics, but of different families. This is an indication that Karok nomenclature is based on relatively few characters. The only characters in common among the members of the genus KOF are suborbicular to peltate leaf form and scapose habit.

The next stage of development in the division of a genus is the modification of the type to distinguish it from the genus name. In the genus FOØ, for example the species are OH COKOMFOC\* (Arctostaphylos canescens), "the FOØ which looks down toward the ocean"; FOC IP (A. manzanita), "FOC tree"; OP-PON-FOØ (A. nevadensis), "ground FOC"; and FOØROHCO\* (A. patula); "round FOØ". In this case the type can still be identified, because the name of the fruit specific to FÓ-IP remains FOØ (86).

Varietal names as in most folk taxonomies are rare and exist only in conjunction with plants of economic importance, especially cultivated plants (10,11). As expressed earlier, plants of Nicotiana bigelovii were the only cultivated in the area. It is not surprising, therefore, that varietal

Table 5. Folk Terminology

Meaning	Yurok	Karok	Tolowa
tree (conifer)	TΔ-ΠΛ	ÍF-PO-HO	TRA-MÉ
bush	KOÓP-Δ'L	PÍR-#S	JEÉ-NE
grass	ÉR-WER	+θÉI-HO	XÚM-SRUN
berry	NÉR-PÉR-#'	OX-RÓO	DA-JÍ
flower	JI-SEP	+θ-RÍ-HO	JO-BΔ-U
inflorescence		+θ-RI-Á-DU'-Δ	
leaf	KOÓP	CÓ-O'N	DÁN'-N
stem	WEC		JEÉ-NE
bark	WAR-KWÉJ	+θ-U'N	
root	WERB-PI-TÉRK		WÁN'-TRE
bulb	WERB-KÉR		
runner	HÚN-U-WA		
branch	WEC-KWÉN'		LÁN'TRE
(cut off)	WÉC-KWEN-ÉT		
seed	HA-LÉB	Ú'-H#S	CE-E'
knot			
stump	MEKW'TA	NÉR-L-ERM-ÉR-ERB	
dead tree		OX-RÓO	
log	TΔK-ÍΛ		
wood	YAB-KÓJ	Ó-HOP	SÉRŠ
pitch	HÓ'-PA	O-XWÓ-HO	SRE
latex			TCOB
thorn	MÉR-N#-PÉR OH'-KU-JÓP'		

Table 5. Continued

Meaning	Yurok	Karok	Tolowa
epidermis	WƏRC-KÚN		
epiphyte			TRΛ-MÉXUM-
medicine plant	MAC-KŪΛ		ÓO-MΛ-MUN'
food plant			SRÍTA'-MUN

names are found only in reference to N. bigelovii.

Harrington lists three varieties of this species distinguished by the Karok; CÓ-I-HÁR-OH, river tobacco, wild plants which grow mostly on exposed river bars, TÓ-POC-I-HÁR-O-HO real tobacco (also MO-HI-HAR-OH, mountain tobacco and peoples tobacco), which was the cultivated variety, and H'F-FOP-OH, volunteer plants of the cultivated variety. Definite morphological differences existed among the three varieties, TOPOSIHÁROHO being more aromatic and resinous than COHIHAROH, and more robust than P'FOP.

Suprageneric taxa exist only as life forms, see Table 5. Labeling of life forms appears to have followed analogous marking principles as described for the formation of specific names. In this case, however, instead of greater distinctions made among gene pools, similarities are made and genera are classified together under life forms. The name of a genus, usually with the most cultural significance, becomes polysemous designating both the genus and the life form, as IP-PO-HO which means both tree and juniper tree (Juniperus) (10). Examples of this type are not numerous in the Yurok, Tolowa, and Karok lexicons, however, for the type genus usually becomes lexically marked and eventually only the marking is retained. Most life form names today, therefore, are not polysemous.

Although genera are antecedent to life forms, the process of attrition occurs in reverse (10). This is evident with the Karok, Tolowa, and Yurok designations for the

grass life form (Table 5). While the name of the grass life form remains extant in all three languages, none of my informants could name a single grass folk genus.

Descriptive botanical terminology is composed a set of primary lexemes which designate very basic plant structures, as berry, leaf, bark, and seed; and a set of secondary lexemes marked by descriptive modifiers which designate structures of greater specificity, as bulb, thorn, runner, and plant hair or structures of greater generalization, as chaparral and forest (Table 5). PIR-ĤS-RĪK , chaparral, and ĤP-PO-HO'RĪK , forest, literally translate into bush thick and tree thick. Thus we see a similarity between the growth and structure of taxonomic nomenclature and that of descriptive terminology, primary lexemes or genera antecedent to specific and general terms marked initially by descriptive modifiers.

## Conclusions

Prior to approximately 1850, the Yurok, Tolowa, and Karok relied primarily on animals for sustenance, but plants were of great importance for diet supplementation and balance. In addition to alimentary uses, plants were needed for certain types of medicine, especially as antibacterial agents; and for industrial uses, especially for housing, basketry, wood carving, fishing, hunting, and transportation.

Also there were a myriad of uses for plants, which although may not have been directly necessary for survival, provided each culture with many of its characteristics. Many plants were used for games particular to a region or linguistic group, and of course, of even greater significance were those used for ceremonies. Although plants were used in dress, the basic materials were of animal origin.

A greater variety of plants were known and used by women than by men. The most obvious reason being that the role of the woman in food gathering and preparation, and in parental care preestablished a need for a greater body of botanical knowledge.

Shamans had perhaps the greatest familiarity with plants, plant uses, and folk taxonomy. The total knowledge, both botanical and non-botanical, specific to the shaman required an apprenticeship to learn. Most of their knowledge, however, was idiosyncratic and confidential.

Each plant within the area that a particular group lived,

could be designated by a name, but the number of taxa were few, as compared to those of our present culture. The difference was greater at the species level, and while modern systematists generally divide genera into several species, Indians generally divided them into one contrast set. Indians had very little knowledge of differences among more inconspicuous plant groups. Many of the subtle differences of modern taxa require the aid of a magnifying lens. The Karok, Tolowa, and Yurok systems of naming plants were similar to one another and to other preliterate cultures. They conform well to the principles and speculations of Berlin, who has worked extensively with folk taxonomies.

A great deal of knowledge of the Indian cultures had been lost shortly after the arrival of the whites because of habitat destruction, mass murder, displacement, and systems of assimilation. Major portions of knowledge in many cases were perpetuated by remnant survivors. The last of these was Amelia Brown, mother of Berneice Humphrey, who died in 1979 at the age of 110. Present authorities are children of these survivors who have retained some interest in their culture. Because most of the knowledge was passed only verbally, without direct experience, only a small percentage was retained. For example, the Karok authorities of the present have retained less than twenty percent of the folk taxonomy of the previous generation as studied by Schenck and Gifford in 1952.

## BIBLIOGRAPHY

1. Abrams, L. Illustrated flora of the Pacific States. Stanford, Ca.: Stanford University Press; 1923-1960.
2. Ahrendt, L. W. A. Berberis and Mahonia. A taxonomic revision. J. Linn. Soc. Bot. 57:1-410; 1961.
3. Arnold, M. E. and M. Reed. In the Land of the Grasshopper. 2nd ed. Eureka, CA.: Schooner Features; 1975.
4. Balls, K. Early Uses of California Plants. Berkeley, Ca.: University of California Press; 1962.
5. Barnett, G. Culture element distributions: VII Oregon Coast. Berkeley, CA.: University of California Press; 1937.
6. Barker, L. A flora of the Old Gasquet Toll Road, Del Norte County, California. Arcata, Ca.: Humboldt State University; 1979, Thesis.
7. Barrett S. A. Pomo Indian basketry. University of California. Publications in American Archaeology and Ethnology. 7; 1908.
8. Barrett, S. A. and E. W. Gifford. Miwok material culture. Milwaukee, Wis.: Published by order of the Board of Trustees; 1933.
9. Jean, L. J. Native Californians; a theoretical retrospective. Ramona, CA.: Ballena Press; 1976.
10. Berlin, B. Speculations on the growth of ethnobotanical nomenclature, working paper, No. 39. Language-Behavior Research Laboratory, University of California, Berkeley, Ca.; 1971.
11. Berlin, B. P. Raven and Dennis Breelove, Principles of Txeltal Plant Classification. New York, N. Y.: Academic Press; 1974.
12. Berlin, B. and E. A. Berlin. Ethnobiology, subsistence, and nutrition in a tropical forest society: The Aguaruna Jivaro. Studies in Aguaruna Jivaro ethnobiology, Report No. 1. Language-Behavior Research Laboratory.
13. Bright, W. The Karok language. Berkeley, Ca.: University of California Press; 1957.

14. Bright, J. O. and W. Bright. Semantic structures and the Sapir-Whorf Hypothesis. In: E. A. Hammell (ed.) Formal Semantic Analysis, American Anthropologist 67 (2 (Special issue)): 249-316.; 1965.
15. Chesnut, V. King. Plants used by the Indians of Mendocino County, California. Washington, D. C.: Government Printing Office; 1902.
16. Chuang, T. and L. Constance. A systematic study of Perideridia (Umbelliferae-Apioideae). University of California Publications in Botany. 55:23-24; 1969.
17. Clausen, R. T. Sedum of North America north of the Mexican Plateau. Ithaca, N. Y. : Cornell University Press; 1975.
18. Clute, W. N. Arrow Woods. American Journal of Botany 45:51-53; 1939.
19. Conklin, H. C. Lexicographical treatment of Folk Taxonomies. Householder, Fred W. and Sol Saporta eds., Problems in Lexicography. Bloomington, In.: Indiana University Publications; 1975.
20. Coville, F. V. Notes on the plants used by the Klamath Indians of Oregon. Contributions of the U. S. National Herbarium 5:87-108; 1897.
21. Culley, J. The California Indians: their medicinal practices and their drugs. Journal of the American Pharmaceutical Association 25: 332-339; 1936.
22. Curtin, L. S. M. Some plants used by the Yuki Indians of Round Valley, Northern California. Los Angeles, Ca.: Southwest Museum; 1957.
23. Curtis, E. S. The North American Indian. Volume 13. Cambridge, Ma.: The University Press; 1907-1930.
24. Davis, J. T. Trade routes and economic exchange among the Indians of California. Ramona, Ca.: Ballena Press; 1974.
25. Densmore, F. Plants used by the Makeh. Bulletin of the Bureau of American Ethnology 124:307-321; 1939.
26. Dixon, R. B. Basketry designs of the Indians of Northern California. Bulletin of the American Museum of Natural History 17:1-32; 1902.

27. Driver, H. E. Culture elements: Northwest California. Anthropological Records 1:297-433; 1939.
28. Driver, H. E. Indians of North America. Chicago, Ill.: University of Chicago Press; 1961.
29. Drucker, P. Cultures of the North Pacific Coast. San Francisco, Ca.: Chandler Publishing Company; 1965.
30. Dubois, C. A. Tolowa Notes. American Anthropologist 34:248-262; 1932.
31. Ehrendorfer, F. New chromosome numbers and remarks on the Achillea millenfolium polyploid complex in North America. Oesterreichische Botanische Zeitschrift 122:133-143; 1973.
32. Elford, R. C. and Max R. McDonough. The climate of Humboldt and Del Norte Counties. Eureka, Ca.: University of California Press; 1964.
33. Eliot, W. A. Forest trees of the Pacific Coast. New York, N. Y.: G. P. Putnam's Sons; 1948.
34. Elmendorf, W. W. and A. L. Kroeber. The structure of the Twana culture: with comparative notes of the structure of the Yurok culture. Washington State University Research Studies 28 (supplement No. 2.); 1960.
35. Gayton, A. H. The narcotic plant Datura in Aboriginal American culture. Berkeley, Ca: University of California, Berkeley; 1928, Dissertation.
36. Gibbs, G. Observations on the Indians of the Klamath River and Humboldt Bay, accompanying vocabularies of their languages. Two 19th century ethnographic documents of the Wiyot and Yurok of Northwest California. Berkeley, Ca.: University of California Press; 1973.
37. Gifford, E. W. Californian Balanophagy. In: Essays in Anthropology Presented by A. L. Kroeber, pp. 87-98. Freeport, N. Y.: Books for Libraries Press; 1968.
38. Gills, W. T. The systematics and ecology of poison-ivy and the poison oaks. (Toxicodendron, Anacardiaceae). Rhodora 73(793): 72-159; 1971.
39. Goddard, P. E. Life and Culture of the Hupa. University of California Publications in American Archaeology and Ethnology 1:1-88; 1903.

40. Gould, R. A. Ecology and adaptive response among the Tolowa Indians of Northwestern California. Bean, L., Blackburn, T. eds., Native Californians: A theoretical retrospective. Ramona, Ca.: Ballena Press; 1976.
41. Gould, R. A. Archeology of the Point Saint George site and Tolowa prehistory. Berkeley, Ca.: University of California Press; 1966.
42. Gunther, E. Ethnobotany of Western Washington. Seattle, Wa.: University of Washington Press; 1945.
43. Harrington, J. P. Tobacco among the Karok Indians. Bulletin of the U. S. Bureau of American Ethnology 94; 1932.
44. Harshberger, J. W. Phytogeographic influences in the arts and industries of American aborigines. Bulletin of the Geographic Society of Philadelphia 4:25-41; 1906.
45. Haskin, L. L. Wild flowers of the Pacific Coast. Portland, Ore.: Binford and Mort; 1967.
46. Heizer, R. F. Aboriginal California: Three studies in cultural history. Berkeley, Ca.: University of California Press; 1963.
47. Heizer, R. F. and M. A. Whipple. The California Indians; a source book. Berkeley, Ca.: University of California Press; 1971.
48. Heizer, R. F. The destruction of California Indians. Santa Barbara, Ca. and Salt Lake City, Ut.: Peregrine Smith, Inc.; 1974.
49. Heizer, R. F. A collection of ethnographical articles on the California Indians. Ramona, Ca.: Ballena Press; 1976.
50. Heizer, R. F. et. al. Handbook of North American Indian; Volume 8, California. Washington, D. C.: U. S. Government Printing Office; 1978.
51. Hitchcock, C. L. and A. Cronquist. Flora of the Pacific Northwest. Seattle, Wa.: University of Washington Press; 1973.
52. Hoover, R. L. Aboriginal cordage in Western North America. I. V. C. Museum Society, Occasional Paper 1: 1-51; 1974.
53. Hoover, R. L. Industrial plants of the California Indians. Pacific Discovery 25:25-31; 1972.

54. Hoover, R. L. Anthropologische bemerkungen zur ethnobotanik der Indianer Kaliforniens. *Anthropos* 69:505-516; 1974.
55. Irwin, W. P. Geologic reconnaissance of the Northern Coast Ranges and Klamath Mountains, California. California Division of Mines, Bulletin 179:3-80; 1960.
56. Jepson, W. L. Yampah and filaree. *Madrono* 2:109-110; 1933.
57. Kelly, I. T. The carver's art of the Indians of Northwestern California. University of California Publications in American Archeology and Ethnology 24:343-360; 1930.
58. Kingsbury, J. M. Poisonous plants of the United States and Canada. Englewood Cliffs, N. J.: Prentice-Hall; 1964.
59. Kroeber, A. L. and E. W. Gifford. World-Renewal: A Cult system of native Northwest California. *Anthropological Records* 13:1-155; 1949.
60. Kroeber, A. L. Handbook of the Indians of California. Bulletin of the Bureau of American Ethnology 78; 1925.
61. Kroeber, A. L. Fishing among the Indians of Northwestern California. Berkeley, Ca.: University of California Press; 1962.
62. Landon, J. W. A new name for Osmaronia cerasiformis (Rosaceae). *Taxon* 24(1):200; 1975.
63. Lloyd, R. M. Ethnobotanical uses of California Pteridium by Western American Indians. *American Fern Journal* 54:176-182; 1964.
64. Luer, C. A. The Native orchids of the United States and Canada excluding Florida. New York, N. Y.: The New York Botanical Garden; 1975.
65. Mason, O. T. Aboriginal American basketry. Annual Report of the Smithsonian Institute 17:185-547; 1902.
66. Mason, O. T. The Ray collection from Hupa Reservation. Annual Report of the Smithsonian Institute 1:205-239; 1886.
67. McNeill, J. A generic revision of Portulacaceae tribe Montieae using techniques of numerical taxonomy. *Canadian Journal of Botany*. 53:789-809; 1975.

68. Mathiot, M. Noun classes and folk taxonomy in Papago. *American Anthropologist* 64:340-350; 1962.
69. Mead, G. R. The ethnobotany of the Indians of California: a compendium of the plants, their uses and their users. University of Northern Colorado Museum of Anthropology Occasional Publication in Anthropology 30 (part I); 1972.
70. Merriam, C. H. C. Hart Merriam collection of data concerning California tribes and other American Indians. Available at the Bancroft Library, University of California, Berkeley, Ca.
71. Merriam, C. H. Ethnographic notes on California Indian tribes. Robert F. Heizer, ed. University of California Archaeological Survey Reports 68; 1967.
72. Merrill, R. Plants used in basketry by the California Indians. University of California Publications in American Archeology and Ethnology 20:215-242; 1923.
73. Meyer, C. Nach dem Sacramento; Reisebilder eines Heimgekehrten. Aarau, Switzerland: Saverlanders Verlag; 1855.
74. Munz, P. and D. D. Keck. A California Flora. Berkeley, Ca.: University of California Press; 1959.
75. Munz, P. A. Supplement to A California flora, Berkeley and Los Angeles, Ca.: University of California Press; 1968.
76. Niehaus, T. F. A biosystematic study of the genus *Brodiaea* (Amaryllidaceae). University of California Publications in Botany 60:1-66; 1971.
77. Nomland, G. A. Bear River ethnography. *Anthropological Records* 2:91-126; 1938.
78. Norton, J. Genocide in Northwestern California. San Francisco, Ca.: The Indian Historian Press; 1979.
79. O'Neale, L. M. Yurok-Karok basket weavers. University of California Publications in American Archeology and Ethnology 32:1-184; 1932.
80. Page, B. M. Geology of the Coast Ranges of California. In: *Geology of Northern California*. Edited by: E. H. Bailey. California Division of Mines, Geologic Bulletin 190:225-276.
81. Palmer G. Shuswap Indian Ethnobotany. *Thesis* 8:29-81; 1975.

82. Parsons, T. Director of the Center for Community Development, Humboldt State University: Arcata, Ca.: Personal communication.
83. Pilling, A. R. Cloth, Clothes, Hose and Bows: Non-sedentary merchants among the Indians of Northwestern California. Robert F. Spencer, ed. Migration and anthropology: Proceedings of the annual Spring meeting of the American Ethnological Society: 1970; Seattle, Wa.: University of Washington Press; 1970.
84. Powers, S. The Tribes of California. Contributions to North American Ethnology 3:419-431; 1877.
85. Ring M. Flora for an Indian garden. Masterkey 4:69-77; 1930.
86. Schenck, S. M. and E. W. Gifford. Karok Ethnobotany. Anthropological Records 13:377-392; 1952.
87. Schmid, R. and M. D. Turner. Darmera, the correct name for Peltiphyllum (Saxifragaceae), and a new combination in Peltaphyllum (Thiuridaceae). Madrono 24:68-74; 1977.
88. Seavery, S. R. and P. H. Raven. Experimental hybrids in Epilobium (including sect. Zauschneria) species with N=15. American Journal of Botany 64:439-442; 1977.
89. Smith, A. R. The California species of Aspidotis. Madrono 23:15-24; 1975.
90. Smith, H. I. Materia medica of the Bella Coola and neighboring tribes of British Columbia. Bulletin of the National Museum of Canada 56:47-68; 1927.
91. Steedman, E. V. The ethnobotany of the Thompson Indians. U. S. Bureau of American Ethnology, Annual Reports 45:441-522; 1928.
92. Stuhr, E. T. Manual of Pacific Coast drug plants. Lancaster, Pa.: The Science Printing Company; 1933.
93. Sudworth, G. B. Check list of the forest trees of the United States; their names and ranges. Washington, D. C.: U. S. Government Printing Office; 1927.
94. Teit, J. A. Ethnobotany of the Thompson Indians of British Columbia. Annual Report of the U. S. Bureau of American Ethnology 45:441-523; 1930.
95. Turner, N. C. The Ethnobotany of the Southern Kwakiutal Indians of British Columbia. Economic Botany 27:257-310; 1973.

96. Valory, K. D. Yurok doctors and devils: a study in identity, anxiety and deviance. Berkeley, Ca.: University of California, Berkeley; 1970. Dissertation.
97. Vastokas, J. M. The importance of the forest to the Northwest Coast Indian. Forest History 13:3; 1969.
98. Vogel, V. J. American Indian Medicine. Norman, Ok.: University of Oklahoma Press; 1970.
99. Walker, W. M. California Indian pipes. Berkeley, Ca.: University of California, Berkeley; 1928.
100. Wallace, W. J. California Indian chewing gums. Master Key 46:27-33; 1972.
101. Warburton, A. D. Indian lore of the North Pacific Coast. Santa Clara, Ca.: Pacific Pueblo Press; 1966.
102. Waterman, T. T. Yurok georgraphy. Berkeley, Ca.: University of California Press; 1920.
103. Woodward, A. Karok dance paraphernalia. Indian Notes 4:257-271; 1927.
104. Woodward, A. Some Tolowa specimens. Indian Notes 4:137-15-; 1927.