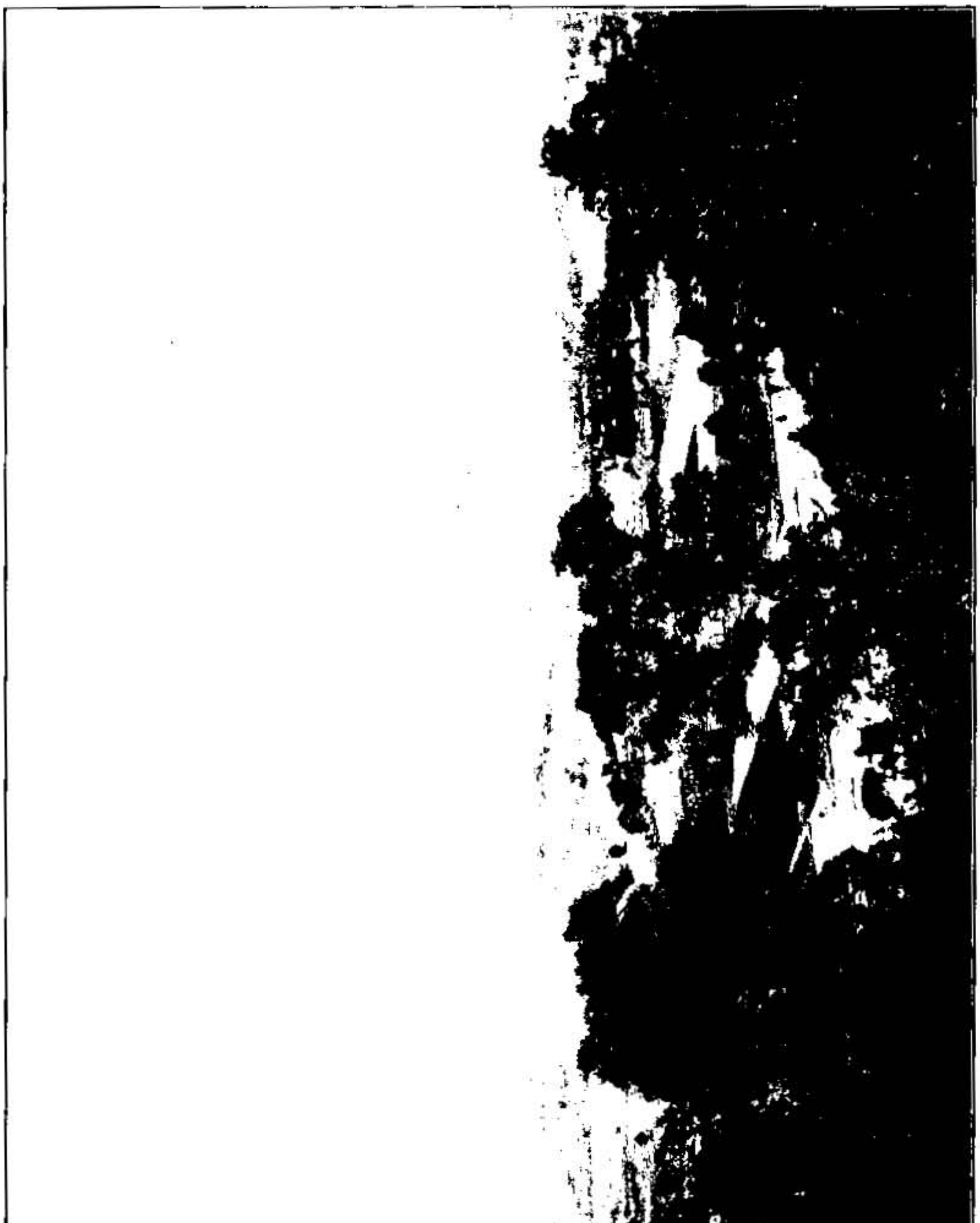


ROUND VALLEY, MENDOCINO COUNTY, CAL.

PLANTS USED BY THE INDIANS OF MENDOCINO COUNTY, CALIFORNIA.

INTRODUCTION.

While in California during the summers of 1897 and 1898, and incidentally in the summer and winter of 1892, the writer had opportunity to make some inquiry into the native uses of plants in the Round Valley Indian Reservation, and in July, 1897, similar inquiries were made at Ukiah. Both of these places are in Mendocino County, which stretches as a band 60 miles broad for 84 miles along the coast, about midway between San Francisco and the northern border of the State.

The floras of these two regions, although they are only 42 miles apart, differ considerably, and both vary a little from that of the redwood belt of the immediate coast line, about 40 miles distant. This third belt was not visited by the writer; but inasmuch as there are few, if any, Indian tribes in the county which are not represented in the reservations or at Ukiah, and since, moreover, many of these visit the coast occasionally, this report may be taken to be fairly representative for the county.

At as late a date as 1849, Round Valley, which is near the northern end of the county and about 200 miles north of San Francisco, was unknown to white men, being then inhabited by a peculiar tribe of very uncommunicative and warlike people, the Yuki, and it was not until 1856 that white people began to settle there. The Yokia and Pomo Indians, who lived in the immediate vicinity of the now flourishing town of Ukiah, were well known at a much earlier date; but it has been since 1880 only that the California Northwestern Railway was extended to the town, which is still the terminus of the road. Connection with Round Valley, which by the compass is 42 miles north of Ukiah, is made by stage over a very circuitous mountain route by way of Laytonville, or by private conveyance over a poorer but more direct road by way of Eden Valley.

Since the Round Valley Indians, the Yuki, have become known to civilization only within the last half century it was thought that a study of their uses of plants would yield better results than would be obtained by a study of the more southern Pomo and Yokia tribes. In 1897, therefore, inquiries were made during July and August in

Round Valley only. Experience proved, however, that these Indians, on account of educational facilities and the generally elevating tone of reservation life, were more civilized in many ways than the Indians near Ukiah; and for this reason, in 1898, in addition to five weeks spent in May and June in obtaining fresh data at Round Valley, two weeks were spent in June and July in making inquiry near the latter place. Although 1898 will long be remembered in California for its drought, rain fell copiously in Round Valley the last week of May, and snow was observed for nearly a week on the tops of the surrounding hills. These particular regions were, indeed, but little disturbed by the drought, and the writer was enabled to collect a very considerable number of plants which were either not mentioned, or were but imperfectly described, by the Indians in 1897.

The present Indian population of Mendocino County may be roughly estimated at from 1,500 to 2,000. It is but a feeble representation of the many thousands which at no very remote period covered the entire region and lived solely upon its native resources. Food was so abundant in any given locality here, and in fact in many other parts of California, that it was not necessary for the Indians to wander long distances for it, as was the case elsewhere in the United States, especially on the Great Plains, where wide areas were inhabited by a single tribe.

In so far as the same plants were to be found in the various districts mentioned above, they were, as may be seen by a comparison with Powers' comprehensive report,[1] used in very similar ways; but since California has different climates even in closely contiguous areas, the native plants vary greatly in these regions, and consequently many of those used by one tribe were totally unknown to others. Numerous tribes were therefore developed, and even in closely adjoining valleys, only 15 to 20 miles apart, it is recorded that people could be found with very distinct dialects. A glance at the maps published by the United States Bureau of Ethnology readily shows the wide diversity of peoples in the State of California. Each tribe, accordingly, was subject to a certain limited environment. Those nearer the sea were extensive flesh eaters, but the oil and fats necessary for the animal economy which were thus supplied were replaced in the interior by oily acorns and oily seeds of many kinds. Sea salt was in like manner replaced by the ash of certain wild plants (*Petasites* and *Mimulus* spp.) which grew in the interior of the county. Each tribe learned its own plants most thoroughly.

At the present time, however, a few tribes only are found in their native homes. Among those visited by the writer the Yuki, Pomo, and Yokia were so situated, and these tribes were therefore studied

[1] Powers, Stephen, Tribes of California. Contributions to North American Ethnology, vol. 3, pp. 635 to 640. 1877.

most closely. The Concow were removed from east of the Sacramento Valley to Round Valley, while the Wailaki and Numlaki were brought into the reservation from the northern part of the State. The Pomo includes several distinct tribes, such as the Little Lakes, Calpellas, and Potter Valleys, but their languages and plant uses are nearly the same.

The method of inquiry which the experience of 1897 proved to be most satisfactory was first to make a fairly complete set of the native plants, and then to take notes on these from representative Indians, refraining as far as possible from asking questions which would lead to an expected answer. By allowing the Indians to do most of the talking, and checking by means of printed blanks the information given by a dozen or more Indians about a single plant, it is hoped that the truth was generally obtained.

Some of the notes here recorded are of no particular economic value, but are worth preserving to show how the natives subsisted in former times. Their free use of nearly all kinds of roots, stems, leaves, and seeds is not only very interesting, but a knowledge of these and how to prepare them for food or medicine may easily be the means of sustaining the life of persons who are obliged to traverse long distances or take long perilous trips where such plants or closely related ones abound. Several, such as manzanita, for its cider, and yerba buena, furnish grateful beverages. No one, even though perfectly familiar with such plants as the Christmas holly (*Heteromeles arbutifolia*), the bay tree (*Umbellularia californica*), the buckeye (*Aesculus californica*), clover (*Trifolium* spp.), the Brodiaeas, or the tar weeds (various Compositae), would ever imagine that any portion of them were edible; yet these are used in great abundance by the Indians. Some, as the buckeye and the acorn, must be subjected to special treatment before they can be eaten. A study of this manipulation furnishes one of the most important lessons to be gained from the native use of foods. The inventive genius developed by these Indians, as a result of untold years of experience, is truly remarkable.[1] In some ways it is very worthy of emulation, especially in the utilization of these substances in the place of animal food. It is undoubtedly true that much valuable native food is allowed to go to waste. The utilization at the present time of such large quantities of clover and acorns for human food suggests some very interesting problems to food specialists and also to ethnologists. The use of such a bulky diet, having been continued for ages under perfectly natural conditions, must have had a characteristic effect upon their physiognomy and their physical and moral character. Some of the native food stuffs, such as the bay nut and the numerous liliaceous bulbs, might be introduced into our markets or at least into our

[1] See pp. 334 to 338 and p. 367.

home gardens for human consumption. Some of the latter would undoubtedly be regarded as delicacies. A comparison of their mode of preparation of acorn bread with the Italian and Spanish methods and the comparative value of the two products would be a very interesting study. Their method of catching fish by means of soap root (*Chlorogalum pomeridianum*), turkey mullein (*Croton setigerus*), and other poisonous herbs, and the real food value of the fish, together with the effect of the poison, also present interesting problems.

In a similar way medicine has yet much to learn from these Indians. Much of their practice is based, to be sure, upon incantations and the use of sweat baths as taken in their temescals,[1] but it was most probably through the agency of the Mendocino County Indians that the use of cascara sagrada (*Rhamnus purshiana*) was introduced, not only throughout the State, but throughout the United States, where it is an official remedy, and everywhere abroad as a most valuable cathartic. Other plants, not recognized in general practice, are widely used by the natives, and others, such as Ceanothus, which are not yet extensively used, have decided properties, and should be investigated. Among the most important of these are Croton, Eriogonum, and Limodorum.

Most of the information here given was obtained directly from the Indians. The notes published in various parts of Stephen Powers's treatise on the tribes of California were kept in mind and verified whenever possible. Considerable assistance was obtained at Round Valley from the various Government employees, especially the principal of the Round Valley School, Mr. George W. Patrick, and two of the teachers, Mr. and Mrs. W. J. Nolan; from Rev. Colin Anderson, who has served for several years as the spiritual adviser to the several tribes, and from Mr. Frank Youree, of Covelo, an intelligent white man, who has lived with the Wailaki Indians for many years. At Ukiah much assistance was obtained from Dr. J. W. Hudson, who, together with Mrs. Hudson, has made an extended study of the Pomo Indians from the medical and artistic standpoints; and from Mr. Carl Purdy, who is extensively acquainted with the flora of the district, and who employs many Indians to gather wild bulbs for him.

The direct stimulus for the work was obtained from two visits made to these various tribes by the writer in 1892 for the purpose of collecting anthropological and ethnological data for the World's Fair at Chicago in 1893, and from a study of Mr. F. V. Coville's Notes on the Plants used by the Klamath Indians of Oregon, as also his Directions for Collecting Specimens and Information Illustrative of the Aboriginal Uses of Plants, both of which were published by the U. S. National Museum. For assistance in the identification of the plants thanks are due to Prof. E. L. Greene, of the Catholic University, and to others

[1] See pp. 309, 351, 393.

mentioned in the report. The photographs and illustrations were made by Dr. W. L. Jepson and Prof. E. R. Drew of the University of California, A. O. Carpenter of Ukiah, W. J. Nolan, of Weathersfield Center, Vt., and by G. N. Collins, F. A. Walpole, and the author, of this Department. The classified summary showing in concise manner the uses to which the various plants have been put is almost entirely the work of Mrs. V. K. Chesnut.

The diacritic marks used to indicate the pronunciation of the Indian plant names are those employed in the Century Dictionary.

ECONOMIC PLANTS BY FAMILIES.

BANGIACEAE. Seaweeds.

Porphyra laciniata (Lightf.) Ag.

Tō-nē' (Little Lake).—A purple, gelatinous seaweed, 3 to 18 inches long, which grows on smooth stones near the low-water mark on the seacoast. The species was identified by Dr. M. A. Howe, of Columbia University, from crude samples obtained both at Round Valley and at Ukiah. It is collected in considerable quantity by some of the Indians who make special trips to the coast after various sea products, including especially this plant, the abalone (a shell fish used for food and ornament), and a kind of clam the shell of which is extensively used for the manufacture of wampum. The favorite method of preparing the fronds for food is to bake them, but the membranous mass, which is very tough when dry, is often chewed in the raw condition. After thorough mastication, a somewhat tedious process, it becomes mucilaginous and fairly digestible. It is valued chiefly for its salt and for its high percentage of mucilage. The same plant is eaten by the Chinese in San Francisco and the natives of southern Alaska. It is probable that the "marine sauce" served with roast meats in Europe is derived from the same seaweed.

HYPOCREACEAE. Ergot Family.

Clavipes purpurea (Fr.) Fl.

The common ergot, a dense, black, parasitic fungus, which permeates the seeds of various grasses and alters them into elongated club-shaped masses, was found growing rather abundantly on the grains of the wild lyme grass (*Elymus triticoides*) in Round Valley. Its general medicinal use is well known to the Indians. No special name was learned for it.

PARMELIACEAE. Lichens.

Alectoria fremontii Tuckerm.

A few specimens of this black, hair-like lichen were observed growing on pine trees near Round Valley. Mr. Coville, in his report on the Klamath Indians, states that this plant was formerly used by those

Indians for food in times of famine. The same use formerly prevailed among the more northerly tribes, the Wailaki, of Round Valley. It grows very abundantly on the pines and firs of Mount Shasta.

Evernia vulpina (L.) Ach.

Ol-gät'-i (Yuki).—The bright lemon-yellow lichen, known as yellow "moss," which is common on fences, the bark of old trees, and more particularly on decaying logs. It was formerly used to a small extent as a bedding material. A thick decoction was also used in former times by the Yukis as a kind of paint, but no particular use appears to have ever been made of it here for dyeing purposes. It has always been considered very valuable by the Yukis and Wailakis for the purpose of drying up running sores and to relieve the accompanying inflammation. Its value in this regard was well corroborated by Mr. C. M. Brown, the gentleman who had charge of the Indians at the Government sawmill at Round Valley.

Usnea lacunosa Tuckerm.

The common grayish-green lichen which so abundantly drapes the slender branches of the great, wide-spreading valley oak (*Quercus lobata*) adds much to their weird beauty. Under the name of "moss" it is sometimes gathered for use as a bedding material.

LYCOPERDACEAE. Puffball Family.

Lycoperdon sp.

Mē-ān''-chip''-ä-soi' (Yuki).—The common puffball, or devil's snuff-box, which was observed growing very plentifully on the ground after a prolonged rain storm in May, 1898. All of the Indians disclaim any knowledge of its really edible qualities.

The leathery outer covering of the same or a similar species was seen in 1892 by the writer in the possession of an Indian medicine man, who used it along with other highly prized paraphernalia in his professional outfit. Several skins, each containing pieces of gravel, were securely fastened to a small stick, and this instrument was used to make a peculiar, rattling sound. It is well known that when fully mature the spores of this plant are discharged from its interior in the form of an impalpable, smoke-like powder. It does not seem at all unlikely that this character has led the Indians to look upon it with superstition. The spores are used to some extent to dry up running sores.

POLYPORACEAE. Bracket Fungi.

Polyporus sp.

Kä-lā' chā'-ā (the ch explosive) (Calpella). A wood-like fungus which grows on the base of alder trees and on logs. It was described as being brown on top, white underneath, and hard and smooth all over

its outer parts, the inner part being soft and salmon-colored when thoroughly boiled and characteristically arranged in horizontal layers. It appears to be more highly esteemed by all the Indians of this region than any other fungus. A white man who has spent a considerable portion of his life with the Indians informed me that it was very fine eating and that the flavor was very much like that of salmon.

BOLETACEAE. Pore Fungus Family.

Boletus sp.

Kō-o' chā'-ā (the k and ch explosive) (given by a Calpella Indian at Ukiah). A fungus, evidently belonging to this genus, which is white on top and has a white fracture that rapidly turns blue and then black. My Indian informant told me that three white men living near Ukiah were made very sick "several years ago" by eating this plant.

Another fungus, probably a Boletus, for which no special name was given, is eaten raw by the Calpella Indians. It grows in the woods and is yellow on top and green beneath.

AGARICACEAE. Mushroom Family.

Agaricus campestris.

Hī-gat' (Yuki).—The common field mushroom (fig. 66), which is elsewhere universally esteemed for its food value. All of the Indians appear to be somewhat superstitious about eating this fungus, but since

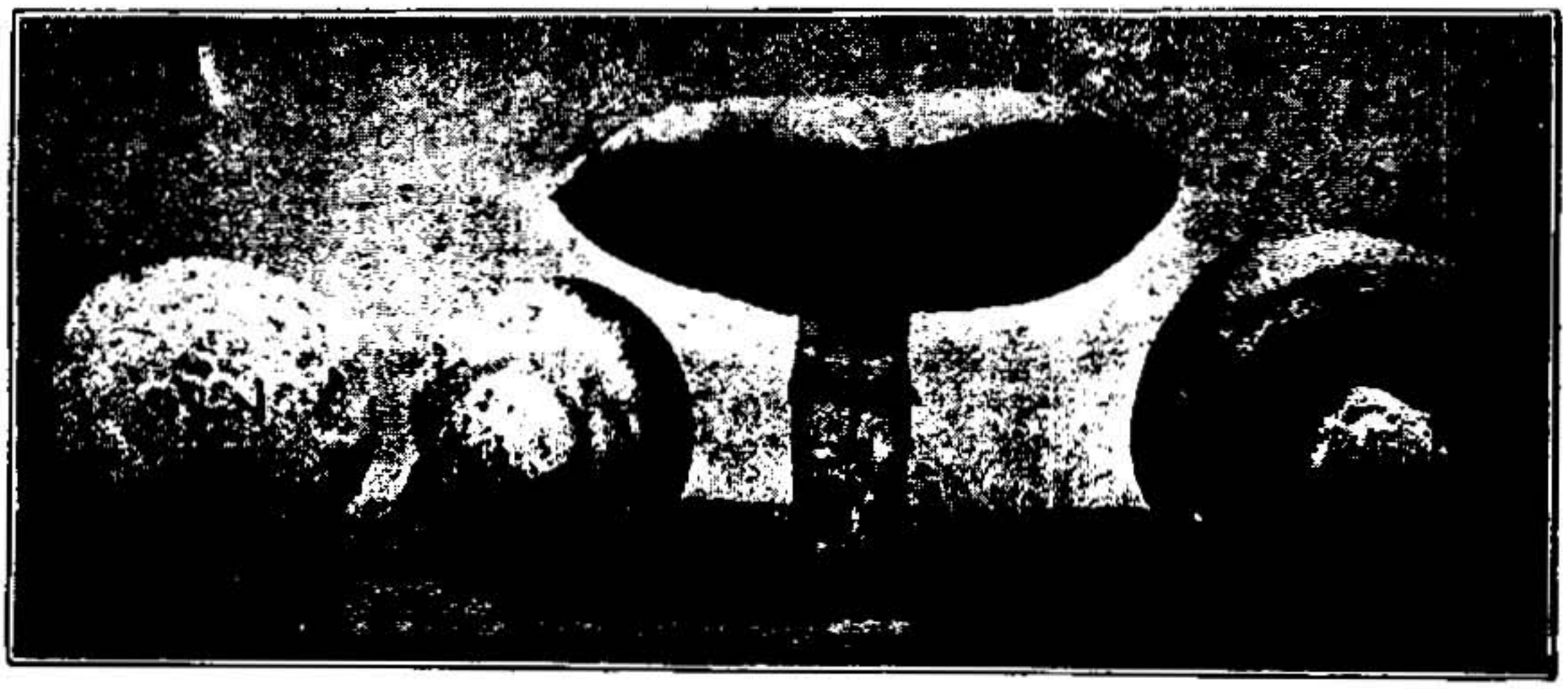


FIG. 66.—Common mushroom, *Agaricus campestris*. Edible. Three-fourths natural size.

they make a practice of selling it to the white people, it is quite probable that they do eat it to a considerable extent. A few of the men expressed the belief that this was the kind that poisoned some white people several years ago.

Amanita muscaria L.

From the history and symptoms of a fatal case of poisoning of which an old Indian (Tony Laycock) was the victim at Round Valley in 1894, related to me soon afterwards, I judge that this fungus (fig. 67) was the cause of death. Other Indians are reported to have been killed at other times by eating fungi.

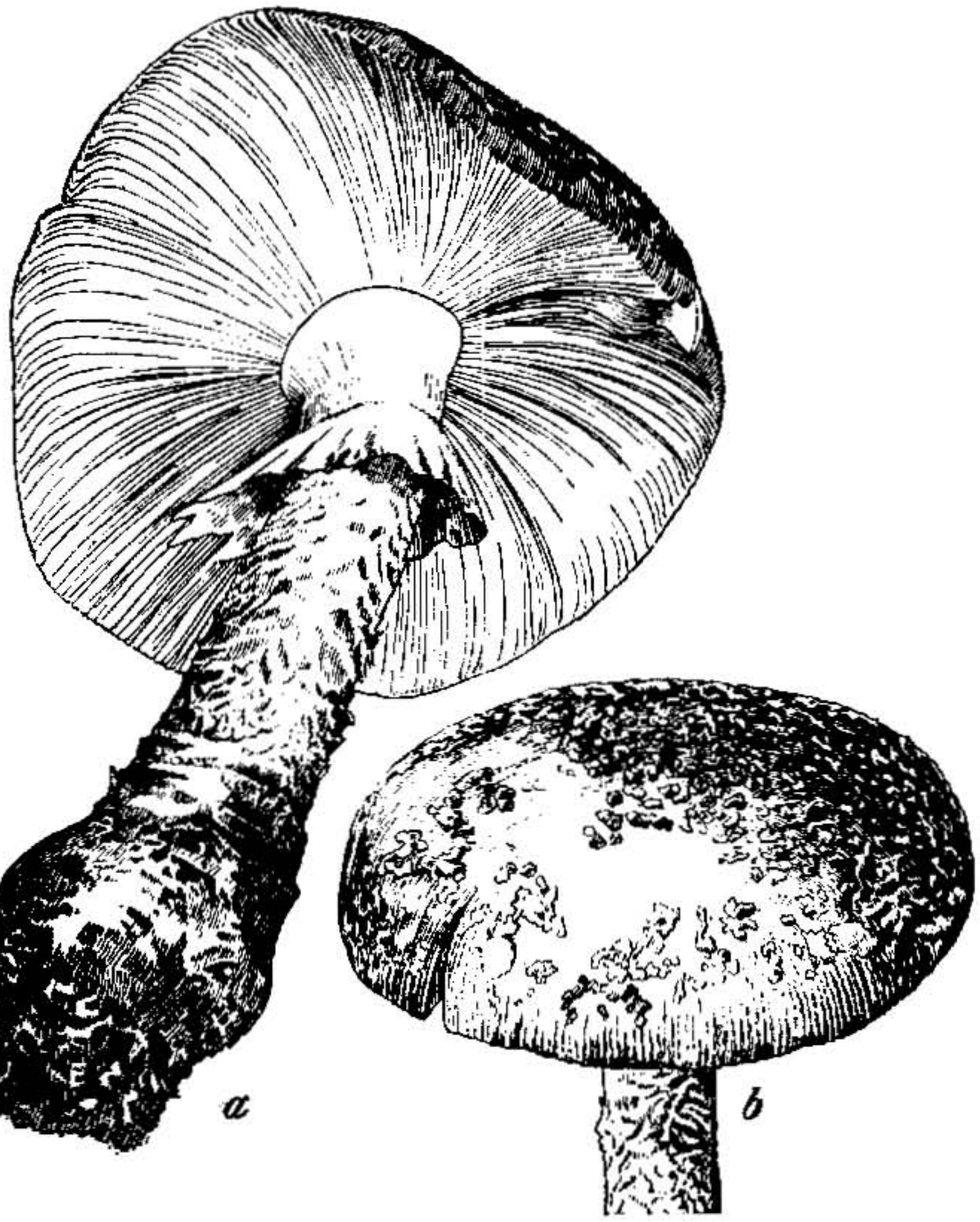


FIG. 67.—Fly amanita (*Amanita muscaria*): *a*, mature plant; *b*, top view of cap, showing corky patches—both one-half natural size.

K'ä'-ē (the k explosive) is the Yuki name applied to an edible fungus 4 to 6 inches in diameter, which was described as growing on the ground in scattering forests of oak and madrone trees, and as having white gills.

BRYACEAE. Moss Family.

Alsia abietina (Hook.) Sullivan.

K'ä-lā' kö'-chē (Little Lake).—A green fern-like moss, 3 to 5 inches high, which almost completely covers the northern side of all the forest trees of the region. It is valued chiefly as a bedding material, especially for babies.

POLYPODIACEAE. Fern Family.

Adiantum emarginatum Hook.

Shnu-chuâk' kä-lā' (Yokia).—The common maidenhair fern, which grows from 8 to 12 inches high on brushy hillsides throughout the district. *Shnu* means ear, *chuâk* is equivalent to stick, and *kä-lā'* is the word for tree. The plant is literally the "ear-stick tree." The smooth, jet-black leaf stems were particularly valued for keeping ear-ring holes open and for increasing their size.

Adiantum pedatum L.

The hard, beautifully-polished stems of the five-fingered maidenhair attain a length of 1 or 2 feet in the redwood belt near the coast, and are there used for the black withes of some of their baskets, especially in those used for hats.

Gymnogramma triangularis Kaulfuss.

No Indian name was obtained for the gold-back fern which is common on open, brushy hillsides and in forests throughout the county. The abundant yellow powder on the underside of the leaf is largely composed of a curious crystalline compound which was isolated and named ceroptene[1] by Dr. Walter C. Blasdale, of the University of California. The leaf is said to have been formerly esteemed by the Spaniards at Ukiah a valuable medicine, the specific use of which I was, however, unable to determine. As in the case of the five-fingered fern, this plant grows much more thriftily nearer the coast. The stems are also used there to a slight extent in the making of baskets. Children are fond of making temporary gold-colored prints of the fern on their wearing apparel by rubbing the back of the frond against the cloth.

Polypodium californicum Kaulfuss.

Jou'-lish fal (Yuki).—The papery-leaved polypody fern, which consists generally of a single, simply pinnate leaf and grows from a few inches to a foot in height on mossy logs and banks in deep canyons.

The Wailakis rub the juice from the bruised root on sores for its healing effect and on the body for the cure of rheumatism. Other tribes use an extract of the root as a wash for sore eyes. A very amusing account was related to me by the chief of the Wailakis to show how the coyotes used one of these fronds as a counter—running to and fro and upward on the zigzag pinnae—in teaching the first elements of arithmetic to his progeny. This animal is most highly admired by all of the Indians for his alertness and cunning, and is imitated and almost deified for these special characters.

---

[1] Erythea, vol. 1, pp. 252 to 258. 1893.

Pteridium aquilinum (L.) Kuhn.

Bi's (Calpella).—The common bracken fern, which is a coarse native weed in this district. The hard root wood is easily split into flat bands, which are sometimes used by the coast Indians for the black strands of their cheaper baskets. They are much less frequently used for this purpose by the Indians of Round Valley and Ukiah, because, although susceptible of a fine polish, they are far weaker and more brittle than the saw-grass roots which compose the weft of their choicest baskets. The black color, which is claimed by some individuals to be natural, was not apparent in the sample of the fresh root collected by myself at Ukiah in July, 1898, but it was made black by chewing it for a short time, a process which, according to one authority, is really adopted by the Indians for the sole purpose of removing certain objectionable greenish fibers which lie parallel to the wood. One of my Pomo informants stated that the black color was developed by burying the root in mud for about a week. The root is said on good authority to be used by some of the Sierra Indians as a staple article of food, but I have no evidence that such is the case in Mendocino County, except that it might be inferred that the chewing process above referred to is intended as much for procuring nutriment as for the production of the black color. In this connection it might be stated that some of the native blacks of Australia are credited with having formerly made use of these roots for food, and that the variety known as *esculentum* is a source of starch in Japan.[1]

The large, somewhat coriaceous-leaved fronds serve as an excellent means of beating down grass fires, and also as a lining for berry baskets when this fruit is to be carried a long distance on horseback. According to Carl Purdy, the hay along the coast sometimes contains large quantities of this fern, and it is eaten by stock with apparent impunity, although it has been suspected in other places, especially in Europe, of being poisonous. The plant has been employed as a diuretic drug for horses, but its action is violent and dangerous.

The Little Lake name for the fern is *bē-bi'*; the Concow *sū-lä-lä'*; the Numlaki, *des*, and the Yokia, *mä-ôr-dä-git'*.

EQUISETACEAE. Scouring Rush Family.

Equisetum variegatum Schleich.

Shân-tum' (Yuki).—The common scouring rush of the region. The highly silicious stems are used to some extent even at the present time as a substitute for sandpaper in finishing off arrows and other woodwork. Although grass was abundant, it was observed that horses

[1] Maiden, J. H., Native Food Plants. Miscellaneous Publication 282, Department of Agriculture, New South Wales, pp. 63, 64. 1899.

would occasionally eat this weed. In their practice of medicine the Indian doctors take grim delight in throwing the hollow stems into the fire so that they may explode, and, by virtue of their continued crackling, stimulate their patients to renewed vigor. One Yuki woman informed me that the plant was a good medicine for sore eyes, but the report was not verified, nor was I informed in what way it was used. The Little Lake name is *shū'-mē*.

TAXACEAE. Yew Family.

Taxus brevifolia Nutt.

Yōl'-lō (Concow).—The Pacific yew, or "yew" as it is most commonly called. The tree grows sparingly in the deepest cañons throughout the northernmost parts of this region, a few specimens having been seen along the stage road leading from Laytonville to Covelo. The wood is remarkably tough and elastic, and for this reason it used to be more highly valued than any other for making the strongest bows. The Indians about Ukiah informed me that they used to purchase yew wood from the Pitt River Indians of northeast California. Very few of these bows are now owned by the Indians.

The bright red, fleshy berry is edible, but the seed is considered poisonous.

Tumion californicum (Torr.) Greene.

K'ä'-hē (Yokia).—The California nutmeg, a small tree which has much the same appearance as a young redwood, from which it may, however, be readily distinguished by its larger, sharp-pointed leaves, its olive-like fruit, and its white or straw-colored wood. The name nutmeg was applied to the tree on account of the resemblance which a cross-section of the kernel of the nut bears to a cross-section of the ordinary nutmeg. Since the flavor is also somewhat spicy, the nut might easily be mistaken for that of the nutmeg. The tree is common in deep canyons in the southern part of the county.

The yellow or reddish membrane which lies between the shell and the kernel, and passes into the white substance by deep convolutions, is bitter and very astringent; the kernel itself is rich and oily, tasting somewhat like cocoanut. When the whole nut is well roasted, however, it has a very agreeable aromatic taste somewhat like that of peanuts. These nuts are highly esteemed for food by the Indians, and they are sometimes gathered in considerable quantity. An assay made by the writer showed that over half of the kernel is composed of an oil[1] that could probably be used in cooking. An oil which is used for this purpose is obtained in Japan from the nuts of another species of the same genus.

[1] For the physical and chemical constants of this oil see a paper by W. C. Blasdale, Journal of the American Chemical Society, vol. 17, pp. 935 to 941. 1895.

The wood, although nearly as soft as that of the sugar pine, is yet very strong and durable. Dr. J. W. Hudson, of Ukiah, showed me two logs, one oak, the other nutmeg, which had been cut down at about the same time. The conditions for preservation were decidedly in favor of the oak, but this was found to be so rotten that it could be easily kicked to pieces, while the nutmeg log was perfectly sound. The wood being strong, close-grained, and flexible, as well as spicy, is admirably adapted for toothpicks.

Several Pomo Indians informed me that some of the best of their baskets were made from strands obtained from the roots of this tree. The rigid, sharp-pointed leaves were formerly used as needles to prick pitch soot into the skin in tattooing. *Kŏ̄'-bē* (the k guttural) and *kē-bē'* are the names used by the Pomos to designate the tree.

PINACEAE. Pine family.

Juniperus californica Carr.

Spö kä-lā' (Yokia).—The sweet-fruited juniper, which grows on the hills near Ukiah. The dry fruit is sometimes boiled and eaten.

Libocedrus decurrens Torr.

Shân-lē' (Yuki).—The incense cedar, or "cedar," as it is more commonly called in this region. The tree grows under much more favorable conditions farther northward, the few trees which grow in the mountains near Round Valley being considerably smaller than the average size.

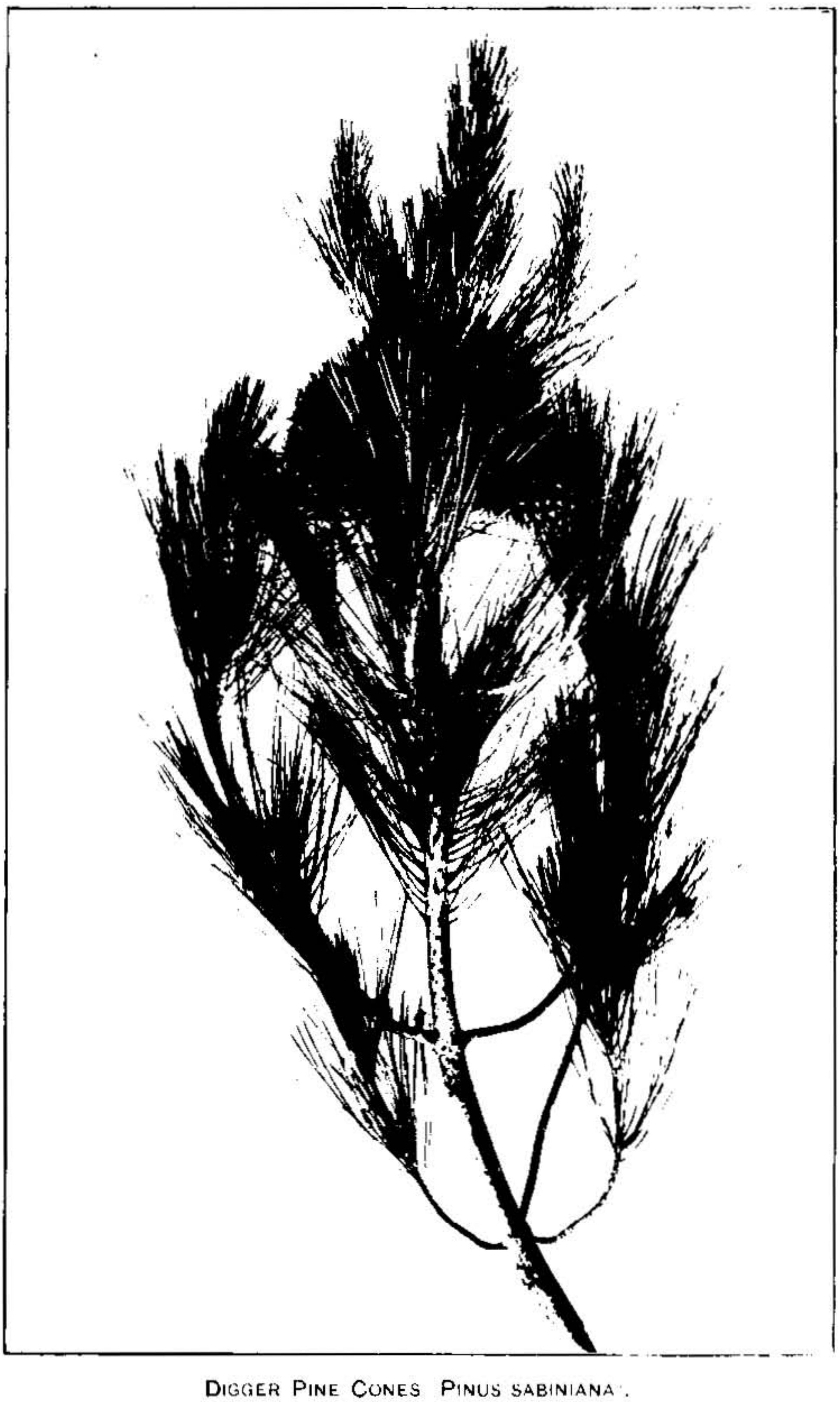
All parts of the tree contain volatile oils, which give off a characteristic odor somewhat like that of incense. The odor from the thick, scale-like leaves is especially pleasing after the more volatile oil has been driven off by heat.

In the process of leaching acorn meal, the flat, intricately divided sprigs are in constant use by the northern tribes now located in Round Valley. As may be seen in the description of this process given on page 336, the object of the use is a double one. The dense leaflets serve to prevent the sand from becoming mixed with the meal, and at the same time impart some of their peculiar flavor to it. The oil contained in the wood makes the latter very resistant to decay when used as an underground timber. The smaller limbs are sometimes converted into bows, and a decoction of the leaves is occasionally used to relieve stomach troubles. *Hŏ'-tä* is the Concow name given for the tree; the Wailaki name is *gos*.

Pinus lambertiana Dougl.

Pä-hut' (the u guttural and prolonged) and *shūk'-ōl* (Yuki).—The sugar pine, which is sparingly represented in the most mountainous parts of the county. As these parts are remote from the Indian settle-

DIGGER PINE (PINUS SABINIANA).



DIGGER PINE CONES PINUS SABINIANA.

ments, the tree is of little value to them. The northern tribes are especially familiar with the valuable cathartic properties of the sugar which is often found as an exudation on the partially burned base of the tree. *Shu-töt'* is the Wailaki name for this product; their name for the tree itself is *nä-tit'-nēs*. The immense long cones yield a large number of nuts which, when obtained in sufficient quantity, are as highly esteemed for food as are those from the Sabine pine described below.

Pinus ponderosa Laws.

Chä-öm' (Little Lake). -The yellow or bull pine which is found sparingly throughout the mountainous districts of the country, especially northward. The wood furnishes a small part of the timber which is used by the Government in the construction of the houses for the Round Valley Indians. It is used occasionally for lodge poles and for fuel. As in the case of the following species, the gummy exudation is used for chewing, and the pitch for its valuable medicinal and adhesive qualities. The nuts are too small to be of any food value.

Pinus sabiniana Dougl.

Pōl'-cum ōl (Yuki).—The well-known round-topped nut or digger pine (Pl. XI), one of the most common, and certainly one of the most characteristic, trees of the region. It grows singly or in small groups on open, dry and rocky hillsides in association with the manzanita or the common blue oak (*Quercus douglasii*), and may readily be distinguished miles away on distant hillsides by its thinly leaved and widespreading branches. In general aspect the tree is airy and extremely picturesque, the grayish-green color of the leaves being well in keeping with the general ashy-gray aspect of the surrounding scenery.

This tree is found throughout the Coast Range and in the foothill belt of the Sierra Nevada, and, since these are the regions which yield to the natives the greatest quantity of wild fruits and food of all kinds, the name "digger" pine, which was applied to the tree by the early settlers, is not altogether inappropriate. The cones (Pl. XII) might well be taken as an emblem of the Digger Indians of California. They are extraordinarily large and heavy, often measuring 8 inches in length by 6 or 7 in diameter and weighing from 2 to 3 or 4 pounds. The nuts are about three-quarters of an inch in length and are very sweet and oily. In order to determine their nutritive value an analysis of the kernels was made by Dr. Walter C. Blasdale, of the University of California, who found that they contained 51.05 per cent of a rich, fatty oil and 28.05 per cent of crude protein. When the State was first settled it was found that, after the summer's crop of native roots had been exhausted, these nuts formed a very important part of the regular Indian diet. At present the supply of flour and cultivated products

renders it unnecessary for the Indians to go through the laborious process of collecting the cones and extracting the seeds, but they are often collected as a pastime both by natives and whites. The cones are obtained from the trees by cutting or beating them away from the branches, and the nuts are beaten out of the cones after the pitchy exudation has been removed and the scales opened by fire. The pine-nut season used to be celebrated by the Numlakis by holding a special dance. The fresh inner bark was formerly used for food when other rations were short during a prolonged winter.

The yellow pitchy exudation found in all parts of the tree is called *kä-wā'* by the Little Lakes and is used extensively both by the natives and whites as a protective and healing covering for burns and sores, and, mixed with corn meal, some white people use it in the form of a poultice as a counterirritant for internal troubles. It is also used to fasten feathers on arrows, and in former times the Yukis used to smear their bodies with it and then cover themselves with feathers in order to present a more formidable appearance in times of battle. All kinds of soot are used in tattooing, but that from burning pine pitch is especially esteemed. The design is pricked into the skin by means of a sharpened piece of bone or sometimes by the sharp awl-like leaves of the California nutmeg (*Tumion californicum*), and the soot is then rubbed in thoroughly.

The gum which often accompanies the pitch is called *jū* by the Wailakis. It is highly prized for chewing by all except the oldest Indians, who have no teeth. White children chew it for pleasure and older persons chew the more pitchy material as a cure for rheumatism, for which purpose I was assured that it was very efficient.

The wood is used very little for poles or timber or for firewood. It has, however, two interesting applications. A quarter cylinder taken from a log which has been well hollowed out by fire was used, before the days of store boxes, as a rude kind of a drum at dances. One end was securely buried in the wall of the temescal or sweat house, while the other projected freely in a horizontal direction. When a dance was in progress, it was some one's duty to thump upon this with both feet and thus assist in a general attempt to insure a proper cadence.

The more pliable wood from the root is the chief source of the material used in the construction of the large V-shaped baskets which are used by the Little Lake Indians and by other tribes for carrying acorns. The root is warmed in hot, damp ashes, and the strands are split off before cooling. They are brittle when dry, but, after being soaked in water, they are easily manipulated in the more simply woven baskets which are made by passing the strands in and out through the numerous vertical withes that make up the skeleton. They are not sufficiently pliable to be used like thread, as sedge roots are, in wrapping round and round a horizontal withe.

The Yokia name for the tree is *nä-hä'*. These people drink an infusion of the bark for consumption, and have a novel way of using the small twigs and leaves for the cure of rheumatism and for bodily bruises. A fire is built over some rocks and allowed to burn down. The pine twigs are then thrown upon the warm ashes and the patient, wrapped well in blankets, lies down upon them. Water is occasionally sprinkled on the rocks beneath, so that steam together with the volatile oil from the leaves is constantly given off. After inhaling this and sweating most profusely for eight or ten hours, the patient is said to be invariably able to move without pain.

The Wailaki name for the tree is *del'-shit*, and the Concow *tä-nē'*, the e being prolonged.

Pseudotsuga mucronata (Raf.) Sudworth.

Nā (Yuki).—The Douglas spruce or "fir," as it is almost universally called in this region. Lumbermen also know it as "Oregon pine." It is the commonest and, next to redwood, the most valuable lumber tree of the county. At Round Valley it constitutes the chief source of the timber made at the Government sawmill for the construction of the Indian huts and for the public buildings. Nearly all of the zigzag rail fences which extend away so picturesquely in every direction throughout the valley were made from timber split from these trees. The larger branches are used to a considerable extent for the manufacture of a superior quality of charcoal, and the smaller ones are, on account of their resinous character, sometimes used as torches in fishing. The smaller roots, about the size of a pencil, are, according to Dr. J. W. Hudson, nearly uniform in diameter for 8 or 10 feet, and are used in the manufacture of some very fine Indian baskets.

The leaves, called *nā fal* by the Yukis, have a very pleasant balsamic odor, and on this account they are highly esteemed by nearly all of the Indians, and many whites, as a substitute for coffee. They are generally used while still fresh and are consequently of especial service to camping parties. A refined half-breed woman assured me that the beverage was "right nice."

The leaves are used medicinally in the sweat bath cure for rheumatism, being considered by a Little Lake medicine woman as even superior to wormwood (Artemisia) for that purpose. The spring buds are used in the form of a strong decoction for some venereal diseases.

Kä-lā' shā and *nä-hä'* are two Yokia names given for the tree.

Sequoia sempervirens (Lamb.) Endl.

Gä-sāl' (Yokia). The giant coast redwood. This tree grows in a continuous belt nearer the coast, but occurs sparingly in sheltered foggy valleys and canyons within a few miles of the town of Ukiah.

It supplies the lumber which the Indians use there for the construction of their houses. The Round Valley tribes make little or no use of the lumber, because it is so difficult to get it into the valley. The coast Indians used to convert the fallen logs into canoes by skillfully hollowing them out by means of fire, and these were often sold to other tribes.

TYPHACEAE. Cat Tail Family.

Typha latifolia L.

No Indian name was learned for this plant, which is the "flag tule" of this region. It is more generally and properly known as cat-tail or cat-tail flag. The roots and the bases of the stems are used considerably for food, and the down of the fruiting part is used to some extent for beds.

ALISMACEAE. Water Plantain Family.

Sagittaria latifolia Willd.

Kä'-bŏ (given by a Little Lake woman, who was specially well versed in plant lore).—A plant, probably this species, which was described as being somewhat similar to the water plantain (*Alisma plantago-aquatica*), a specimen of which was shown her. The name means "water potato," and is given to the plant on account of its fleshy and edible potato-like tubers. The species is common northward, but probably very rare in this district. No specimens were observed, and the Indians seem to have but little knowledge of it.

POACEAE. Grass Family.

The grasses are particularly well represented in the rich adobe land of Round Valley, and, especially in former times, constituted one of its chief sources of wealth, because the live stock fattened upon it could be driven to market. The large cost of transportation at the present time prevents the sale of the hay in the city markets, the nearest of which is the town of Ukiah, 70 miles distant.

Very little direct use is made of these grasses. They are not used for food by the Indians, as is clover, nor are any of them used to make baskets, the so-called "grass baskets" being made from the leaves of a kind of sedge (*Carex* sp.) known as "saw grass."

The first general appearance of grass in the springtime has never, as in the case of other food products of nature, such as clover and acorns, been especially celebrated by a dance or other performance. There is, however, a kind of game into which grass enters very conspicuously and which is therefore called the "grass game." It is a purely gambling sport, which is played by four persons, two of whom manipulate a pair of small cylindrical bones in their hands. These are skillfully concealed in bunches of very finely chopped grass and are

dexterously changed about from hand to hand at the will of the manipulators or the command of their opponents, who are seated opposite to them. One of the bones in each pair is marked by a band of black thread, and it is the object of the opponents to guess in which hand this bone is concealed. Any number of persons may bet on the game, but not more than four do the playing. It has long been the favorite way of gambling, but recently the authorities at Round Valley have forbidden its continuance. It is still played by the Indians who are not under such direct governmental control.

The fresh leaves of any kind of grass were formerly used in tattooing, the green juice being pricked into the skin with a needle or with the sharp awl-like leaves of the California nutmeg. The finer grasses were also formerly used, together with dry oak leaves, for tinder in the process of making a fire by friction.

Avena fatua L.[1]

Si-mĕ'-yä (Yokia, or perhaps the Spanish name, semilla).—"Wild oats," a grass which is common throughout the country, and which is supposed by some to be that from which our cultivated oats (*Avena sativa*) originally sprang. Many botanists claim that this is native only to the Mediterranean region of Europe, but the Pomos claim that they were acquainted with it and that they used the seed for food long before the Spaniards settled the country; and, in fact, one tribe of the Pomo stock—the Potter Valley Indians used to be called *Bal-lō' kī* Pomos, "*Bal-lō' kī*" meaning Oat Valley. As pointed out in a letter from Mr. Davy, however, it is quite probable that this name really refers to the "California wild-oat grass" (*Danthonia californica*), a robust species which resembles the true wild oat, but is of a lower habit. Although now largely exterminated from Potter Valley and the surrounding country by stock, this grass was formerly very abundant there. The fact that the wild oat is, even at the present day, absent from localities in this same region to which men and stock have not had ready access is a strong indication that it is not native to California. In fact, the general distribution of *Avena fatua* throughout California indicates that it is not indigenous.

The seed is hard and slender, and so sharp-pointed and hairy that its use for food is altogether uninviting and, to the uninitiated, apparently dangerous, but it is consumed by the Indians in large quantities.

The process of gathering wild oats and of converting them into flour is the same as that employed in obtaining flour or meal from the seeds of many other plants, and may therefore well be described here as typical.

---

[1] For assistance in the identification of the grasses I am indebted to Mr. J. Burtt Davy, of the University of California, and to Mr. J. G. Smith, formerly of this Department.

The seeds are gathered (Pl. XIII, fig. 1) almost exclusively by an old squaw, who, providing herself with a V-shaped basket capable of holding over a bushel, goes out into the fields at the proper season, and, by means of a piece of basket work made into the form of a tennis racket, beats off the ripe seed into the basket and then carries it home. The hair and the sharp points are singed off and the seeds parched by skillfully tossing them about with live coals in a shallow basket. The parched seed is then ground in a mortar until the flour is as fine as desired. Common salt or the ash from certain plants is added and the flour is generally eaten in the dry condition. *Sĭ-mē'-yü hō* is the Yokia name applied to this flour. The seed has been shown to be easily improved by continued cultivation and careful selection.

The Spanish word "pinole" has come to be almost universally applied both by the Indians and whites to any meal made from parched seeds. *Sĭ-mē'-yü hō* is therefore a special kind of pinole. The same name has applied also to the seeds (Pl. XIII, fig. 2) from which the meal is made. In its original Spanish and later Mexican sense, however, the word was much restricted in application.

Only one kind of pinole seed is usually collected at one time, and each collection is generally kept separate until after the chaff has been removed and the seeds ground into meal. The different kinds may then be mixed to suit the most fastidious taste, some particular kinds being frequently added in small quantity to give a partieular aromatic taste, which is often very appetizing. When the process for the removal of the chaff and the subsequent parching is the same for several kinds of seeds, they are mixed together before the process is begun. The method must necessarily vary considerably with the kind of seed used.

Bromus marginatus Nees.

Kä'-op (the o much prolonged) (Yuki). A rough, hairy grass with a simple, slightly drooping panicle of rather heavy seeds, which grows commonly in separate tufts 2 to 3 feet high in the damp meadows of Round Valley, and is known to the whites as "poverty grass." The seeds were formerly used for pinole. The Little Lake name for the grass is *shä-tä'-ē*.

Elymus triticoides Buckl.

Sē'-hil (Yuki). A tall, slim, very conspicuous gray-green grass, 3 to 6 feet high, which grows all over the meadows and in the hills about Round Valley and near Ukiah. The seed is abundant, and it is so well known to be used for pinole that the plant has been called "squaw grass" by the whites. It is more widely known as "wild wheat." The foliage makes an excellent fodder after most other grasses have been dried up in late summer.

FIG. 1.—INDIAN SQUAW GATHERING PINOLE SEED.

FIG. 2.—PINOLE SEED: 1, CALANDRINIA ELEGANS; 2, RANUNCULUS EISENII; 3, CEANOTHUS INTEGERRIMA; 4, TRIFOLIUM VIRESCENS; 5, MADIA DISSITIFLORA; 6, AVENA FATUA; 7, HEMIZONIA LUZULAEFOLIA; 8, WYETHIA LONGICAULIS; 9, BOISDUVALIA DENSIFLORA. ALL NATURAL SIZE.

Hordeum gussoneanum Parl.

This is a graceful weak-stemmed grass, 4 to 8 inches high, which, much to the detriment of cultivation, often completely covers large areas of low adobe ground in Round Valley. It bears a close resemblance to depauperate forms of the foxtail grass (*Hordeum murinum*). Its seeds are supposed to have been carried into the valley by sheep. While still green the grass makes an excellent fodder, but later it often causes much mischief on account of its barbed florets, which easily separate from the spike and get into the mouth, nose, ears, or eyes of animals, where they inflame or perforate the tissues, and sometimes cause such severe suffering that the animal has to be killed. Several cases were reported where different animals lost their eyesight from this cause. One of the best methods proposed for getting rid of the grass is to burn the fields over in July or August, when the seed is fully mature and the fields are dry.

Sitanion elymoides Raf.

Koi-ē'-kas''-il (Yuki).—A native grass, 1 to 2 feet high, which, on account of its long capillary awns and wide-spreading spike and the consequent resemblance to the tail of a tree squirrel, is popularly known as "squirreltail." It is common along creeks and on dry hills throughout Round Valley. As in the case of the preceding and next species, the grass is excellent for green pasturage; but when dry it is even more dangerous to stock on account of the greater ease with which the sharp barbed florets separate from the spike.

Hordeum murinum L.

Koi-ē'-kas''-il.—The same name is applied by the Yukis to this grass as to the preceding species. It is, however, recognized as something quite different, and is well known as foxtail. This differs from the squirreltail in its coarser structure and less spreading spike. The awns are somewhat less dangerous to animals. The seeds have been, and perhaps are still, used to some extent by the Indians for pinole.

Hordeum vulgare L.

No Indian name was learned for the ordinary cultivated barley. The poorer squaws often go along the edges of a barley hay field after the hay has been cut and gather considerable quantities of the ripened grain.

A decoction of the well-parched seeds is drunk by some of the Yukis as a substitute for coffee, but most of the seed is ground into flour and made into bread. In the process of grinding a very ingenious method is used for separating the flour from the coarser unground particles of the seed. This is carried out by tossing the mixed mass about with a

swift rotary motion in a shallow, obtusely conical basket until the centrifugal force has carried the heavier particles to the top of the basket, whence they are dexterously removed and afterwards reground.

Lolium temulentum L.

Mât (Yuki).—An annual grass universally known as darnel or poison rye grass, which is rather commonly introduced in Round Valley. It has a stout culm which bears at the summit a series of short, sessile, heavily seeded spikelets, which are closely appressed alternately on opposite sides of a slightly zigzag rachis. The grass is much like the commoner perennial rye grass (*Lolium perenne*), but is easily distinguishable by its stouter culm, more erect habit, and larger seeds. Whether from the presence of some specific poison or of some poisonous or poison-producing fungus which grows on or within the grain, the seeds of this species have generally been considered unfit and even dangerous to use in any way for food. I was, however, assured both by one Little Lake Indian and also by the chief of the Yukis that the seed was formerly used for pinole. Both were ignorant of the fact that the seeds were considered poisonous and no special process was used in preparing the pinole. It seems probable that the grain is not poisonous in this locality, but it is possible that the poison is destroyed in the process of parching.

CYPERACEAE. Sedge Family.

Carex spp.

The long, tough rootstocks of several and perhaps most of the local species of sedge or saw grass are used by the Indians of the county for making baskets, and were occasionally used long ago for making ropes. A great amount of patience is exercised in tracing the rootstocks out for a distance of from 2 to 5 feet through the sand and mud and in preparing the strands for use, but the labor is considered well worth while, for a well-moistened strand the size of an ordinary toothpick is nearly as flexible as string and can scarcely be broken by hand. The baskets (Pl. XIV) manufactured from them are known technically as "root baskets" and are the strongest, most durable, and most costly that are made. Sedge rootstocks are the most important of underground material used for such purposes.

Carex vicaria Bailey.[1]

Tē (Yuki).—A coarse, leafy sedge, 1 to 2 feet high, which frequently covers whole acres of marshy land in Round Valley and is commonly known as "saw grass." The leaves shoot up directly from the root

[1] For the identification of the sedges I am indebted to Prof. C. F. Wheeler, of Agricultural College, Michigan.

and form tufts, in the center of which there are several solid three-edged stems, each of which bears at its summit a small spike of inconspicuous flowers or fruit.

When young the foliage is soft and makes excellent pasturage and is sometimes cut for hay, but when old the edges and keel of the leaves become so sharp and harsh that they are apt to cause painful laceration in the mouth. The plant can not then be used for forage. This harsh character of the leaves militates against their use in the making of the so-called "grass baskets," for which purpose those of the two following species are preferred.

Carex sp.

Tä''-tet'-el (Wailaki).—A sedge or saw grass which is similar to the last species, but which grows in large tufts only, its favorite habitat being along streams or near springs in the mountains. The leaves are more slender and more pliable and the edges and keel are not so sharp and saw-like. . As shown above, the roots are used for baskets. The leaves are valued for the same purpose, being specially used by the Wailakis in weaving hats and cheap semiflexible baskets. The hats are now exceedingly rare in Round Valley, but the flexible baskets are common.

Carex barbarae Dewey.

Kä-hŏm' (water gift) (Pomo).—A sedge which grows near Ukiah in rich alluvial soil along streams, into which the white roots often extend in a picturesque way. It differs from *tē* in being taller and in having several cylindrical fertile spikelets at the end of each fruiting stem instead of one unsymmetrical spike. A specimen cultivated as a curiosity by Mrs M. E. P. McCowen, of Ukiah, had leaves some of which measured 11 feet in length, but this length is exceptional. The rootstocks are very often employed in basket making, being used for the white or creamy groundwork of most Pomo baskets. Its value is only about one-fourth that of the following species.

The process of collecting and preparing *kä-hŏm'* has been admirably described by Dr. J. W. Hudson.[1] Men as well as women resort to a favorite locality, and, provided with a clam shell and a stick, begin with hands and feet to dig out the selected rootstocks. An end is grasped between the first and second toes, and while the clam shell serves to scrape away the soil, the stick is used to pry away the stones and other roots and to loosen the ground. A woman will secure from 15 to 20 strands in a day, while a man, on account of the time wasted in his long siesta, averages only about 10. To maintain their flexibility and to soften the scaly bark, the rootstocks are placed in shallow water immediately after they have been dug and are left there until morning, when the bark is removed by the women. One end is

[1] Pomo basket makers. Overland Monthly, vol. 21, pp. 561 to 578. 1893.

chewed until the bark is free and well separated from the wood, and then, being still held in the mouth, while the other end is grasped and held taut by the first and second toes, the bark is carefully scraped away, leaving a remarkably tough white or tan-colored strand about one-half the original thickness. These are arranged in small coils and carried by the women to camp.

Scirpus sp.

Tsū-ish' (Pomo).—An unidentified species of bulrush which I have seen only under cultivation, living specimens having been procured by Mr. Carl Purdy at Clear Lake and sent to the Department. The plant died without flowering, but had sent up a long, leafy stem, and showed a strong tendency to develop new plants from its running rootstocks. The leaves are alternate, channeled, and quite grass-like, except that they are rigid and the older ones have sharp, knife-like edges. As the plant is considered four times more valuable for its rootstock fiber than any other species of sedge, and as there has been considerable doubt as to the character of the fiber, the roots were carefully examined before planting. At the base of the main stalk there was an almost ligneous tuber, proceeding from which there were small fibrous roots and several rootstocks, about one-fourth of an inch in diameter, which consisted of three very distinct tissues. The outer part or skin was brown and like parchment. The middle one consisted of a yellowish brown, friable coating, while the heart had an exceedingly tough, woody structure. The outer surface of this woody tissue, which, judging from an inspection of the baskets in the Hudson collection, makes up the great bulk of the black fiber of the finest Pomo baskets, has a faintly ribbed structure, and varies from light brown to nearly jet black. The interior portion is more or less white. There has been some question whether the strands from these rootstocks are artificially blackened or not, but it is certain that some of them are used just as they are, while others are blackened with the juice of poison oak, or by burying them with charcoal, ashes, and earth for about eighty hours. Whether the more brownish strands only are so treated, or whether all are occasionally subjected to the same process for the purpose of obtaining a darker shade than can be found in nature, I have been unable to determine.

The plant is very rare, if found at all, near Ukiah, the chief supply being purchased at 1 cent a root from plants collected by Indians at Clear Lake and in certain parts of Sonoma County or along the seacoast.

SEDGE-ROOT BASKETS.

In practice the process of making these root baskets (Pl. XIV) is a very tedious one, one which requires such an infinite amount of patience as an Indian squaw alone is able to command. The rootstocks, so care-

PLATE XIV.

POMO INDIAN BASKETS, MADE CHIEFLY OF SEDGE ROOTS.

fully collected during the summer and early fall, must first be split into fine strands for direct use. As carried on at Round Valley under my observation, the process is as follows: The rootstocks, denuded of their two outer coverings, are thoroughly soaked in warm water, and one end of a root is divided to the center by means of the finger nails into three parts. One of these parts is held firmly between the teeth while, by means of the fingers, the whole root is carefully and very evenly split into three sections. Each of these sections is again separated into three parts in the same manner, and the same process is carried out until the strands are as fine as may be desired, the value of the basket depending in great measure upon the fineness of the strands, as well as upon the general beauty of the finished fabric. These strands are used, not like those from the pine root, to wind in and out between vertical withes, which constitute the vertical skeleton of the cheaper baskets, but more like thread to wrap around horizontal withes. In beginning the basket three very pliant withes are so selected that when placed together their combined cross sections will be nearly circular. The use of three "sticks" instead of one, as is sometimes the case in less costly baskets, gives much more elasticity and greater strength to the basket. The strand is wrapped tightly about one end of the compound withe, and as the wrapping progresses the wand is bent into a minute circle. The central hole is filled in by stitching over and over again, and with this as a basis the little plaque is built up by the addition of other coils into the admirably water-tight baskets, which are used by the maker for ornamental and useful purposes, and which, on account of their beauty and durability, are often handed down as heirlooms to her children. Some are used as cooking vessels in a way which is described later on pages 312, 337.

The general shape and plan of the basket must necessarily be carried in the mind, for there is no skeleton to serve as a guide. Infinite care must therefore be exercised, not only in preserving the symmetry of shape, but also the symmetry of the designs, which are worked in with the black and white strands. It requires many months, sometimes years, of leisure work to complete a first-class basket. But when they are complete they are frequently genuine works of art, and are highly prized by collectors of curios, who pay from $2 to $5 or $10 and even as much as $125 for a single basket. Some of the very best are most exquisitely decorated with brightly-colored feathers, the bases of which are woven in with the strands. All are more or less individual in their shape and pattern. The accompanying illustration (Pl. XIV) was reproduced from a photograph of a part of the Hudson collection of baskets, which is now the property of the United States National Museum. It well illustrates some of the prominent styles and patterns.

JUNCACEAE. Rush Family.

Juncus effusus L.

Lol'-um (Yuki). The common rush of the region a leafless plant with numerous wiry flower stalks which shoot up directly from the ground and form clumps 2 to 4 feet high. The small inconspicuous flowers are borne in loose paniculate clusters several inches from the awl-like tip. The plant is common in marshy land throughout the district and is most commonly known as "wire grass" or "spring grass." Cows and horses will eat it in early spring while it is still crisp and tender. When older the wiry stalks are used in various ways for tying and for making temporary baskets. It is with these stems that the Indian children are first initiated into the art of basket making. The basket ware rackets used in gathering pinole seeds are occasionally made from them also. In the Hudson collection of baskets, now at the United States National Museum, there is a cheap and very interesting device for catching fish which is made altogether of this rush. It is a slightly conical, net-like, somewhat rigid structure about 18 inches long by 4 inches in diameter. The open end is provided with a longitudinal slit on one side which allows the opening to be readily dilated at the will of the operator. It is very doubtful if this arrangement is ever used nowadays, but the Pomo Indians who formerly used them were very crafty fishermen. By means of this trap they were, without the aid of either spear or hook and line, able to catch salmon and trout when they were found isolated in deep pools. One or more of the men would get into the pool; the open end of the basket was grasped in the left hand so that the opening lay between the hand and the body, the closed end pointing backward, and the chase was begun. The fish were frightened hither and thither, until one was caught between the vertical bank and the left side of the body when it was frightened into the trap. By holding the opening tightly against the body the capture was completely insured.

It seems probable that this method of catching fish was indulged in more as a sport than as a serious business, for all of the Indians have long been familiar with the use of the spear, and the most unwaltonian method of scooping them in by the bushel after having stirred up a lot of some poisonous plant in the water.

Wire grass is also used in the manufacture of wampum. The small perforated clam shell discs are closely strung on one of the wiry stems, and the cylinder thus formed is rolled between flat stones until all the discs are perfectly circular, when they are all finally polished by rubbing them with leaves and stems of the scouring rush (Equisetum). It is claimed that the stems are made stronger by first placing them in hot water and then drying. *Chä-bä'* is the name for the plant which is used by the Potter Valley, Little Lake, and Yokia Indians; *xĭ'-to* is the Wailaki name.

SOAPROOT CHLOROGALUM POMERIDIANUM.

MELANTHACEAE. Bunch-Flower Family.

Chlorogalum pomeridianum (Ker-Gawl.) Kunth.

Nösh (Yuki).—The plant commonly known as "soaproot" or "amole" (Pl. XV), which grows plentifully on rocky banks and hills throughout the district. It has a radical tuft of flaccid strap-like leaves, and a nearly leafless, paniculately branching stem 2 to 6 feet high proceeding from a bottle-shaped fleshy bulb which is densely covered with coarse brown hair. The flowers, which open only after midday, are white. The bulb is from 3 to 5 inches in length and 1 to 3 in width, and is the most interesting and useful part of the plant, some 8 or 10 different methods of using it having been cited to me by various individuals. For the sake of convenience these uses may be divided into two classes, one dependent principally if not wholly upon mechanical properties, the other upon the chemical properties of the poisonous substance sapotoxin, which the root contains in considerable quantity.

The coarse, horsehair-like outer portion of the bulb is sometimes gathered into bunches and made into small brushes, which are used especially in connection with the process of grinding acorns for meal. It used to be gathered in very large quantities and sold to dealers to be used as a substitute for hair in mattresses. As these proved unsatisfactory to the white people who used them, the demand soon ceased, and now the fiber is used for beds only occasionally by the Indians. About 50 pounds of this material was observed at an Indian hut near Ukiah.

The fresh green leaves are, on account of their flexible and half-succulent character, especially esteemed in summer, when most other leaves are dry, in the process of baking acorn bread. The dough is completely covered with them before being placed on the hot rocks and covered with other leaves and ashes. The parallel markings of the veins are as distinctly shown on the bread as they are on some pieces of fossil-bearing coal, which, when old, the bread very closely resembles. The green leaves used to be pricked into the skin to form green tattoo marks.

When the substance of the bulb is roasted a viscid juice is exuded. This formerly served as a substitute for glue in attaching feathers to arrows. When diluted with water it was smeared over the back of a bow, to which soot was then quickly applied in order to produce a permanent black color, which caused the bow to appear old.

Intermediate between the mechanical and chemical properties, the use of the plant for food and for soap should be mentioned. I have no clear evidence that the bulb itself is eaten, but the young shoots gathered in March are consumed by nearly all the Indians. Some of those who were most highly civilized pronounced these shoots to be as

sweet as sugar when they are thoroughly roasted. It seems probable that this part does not contain much sapotoxin or saponin at this season.

The last-named substance is the principle which gives to the bulb its value as a detergent, or soap. This use was quickly learned by the early Spanish settlers, who called the plant *amole*. When crushed and rubbed into any fabric with water it froths up like ordinary soap. Long before the advent of the white man this was most extensively used for soap by the Indians, and even now many old squaws use it in preference to the ordinary article. Others prefer it especially in cleansing baskets and in washing their hair; and, indeed, on account of the absence of any alkali it is really preferable for washing silk and any delicate fabrics. It is used considerably for the special purpose of removing dandruff from the scalp. The hair is left very soft and glossy.

Besides this use as a hair wash, the roasted bulb is used antiseptically as a poultice for sores. The Wailakis rub the fresh bulb on the body for cramps and for rheumatism. This same tribe, and perhaps others, use a decoction of the bulb as a diuretic and laxative, and also for stomach ache characterized by an accumulation of gas in that organ. One Pomo Indian informed me that a white man advised him to use the soapy juice as a lotion for the cure of poisoning by poison oak (Rhus).

Second in importance to the use of the bulb as a substitute for soap is its use as a means of stupefying fish and thus procuring them for food. Large quantities were caught in this way in early days, but now this practice is forbidden by law. The method as carried out on the Russian River near Ukiah and described to the writer by a Pomo chief, is substantially as follows:

After the last June freshet, when the river was running very low, all of the inhabitants of a village or of several neighboring rancherias would assemble together at some convenient place on the river. The squaws were each provided with a quantity of the fleshy bulbs, which they deposited in a common heap and proceeded to mash up on the rocks. A weir 6 to 7 feet high had in the meantime been constructed by the men by driving willow sticks into the river bed and then lashing them together by means of redbud bark. Bushel after bushel of the crushed pulp was thrown into the water and thoroughly stirred in. Much of the finer material passed through the weir; the larger pieces were again taken out and again crushed and thrown into the water. The Indians, stationed all along the stream for 3 miles or so, added fresh bulbs here and there and kept the water in a state of thorough agitation. After a very short time all of the fish, and also the eels, but not the frogs, were so stupefied by the poison that they floated to the surface and were quickly captured, either by hand or by the use of a shallow, coarse-meshed basket.

Certain portions of several other plants are sometimes used either alone or together with soap root to produce the same effect, but none except the turkey mullein (*Croton setigerus*) (Pl. XIX), is esteemed as equally effective. After the fish have all been gathered together each Indian, rich and poor alike, is given an equal quantity. As much as 100 bushels was captured at one time and thus divided. Such wholesale poisoning was not indulged in very frequently; the general practice was and is in remote districts still carried on to a limited extent by a few individuals, who select small streams or deep pools for their operations. No ill effect has ever been noted as a consequence of eating fish caught by any of these "fish poisons," the reason being perhaps that the quantity required to kill a few fish is very small compared to the greater size of a man and that much of the toxicity is lost in the cooking, although no special method is employed in preparing it.

The Wailaki name for the plant is *gos'-chū*, the Numlaki, *shlā*, and the Pomo *äm*.

Zygadenus venenosus Wats.

Mās (Yuki). On account of its poisonous qualities and its resemblance to the true camas (Quamasia) a most highly esteemed food plant, this is known throughout the West as "poison camas" or "death camas." It is common in Round Valley and grows along with the true camas in moist rich meadows and along the borders of creeks. It is a slender bulbous perennial, one-half to 2 feet high, with rather stiff, mostly radical, grass-like leaves and a short simple raceme of greenish white flowers. In late summer, when the camas bulbs are gathered for food, the poison camas may be distinguished from the other by its less rigid stem, and by its fruiting capsules which are smaller and consist of three nearly distinct valves; in camas the parts are consolidated into an ellipsoidal capsule. The bulbs are very nearly identical in size and shape. Late in the summer, when the stems are often broken off, it is especially difficult to distinguish the bulbs, and it is at this time that cases of poisoning do sometimes occur.

Among the Indians no plant is more commonly known to be poisonous than this one. In cases of human poisoning the root is the part responsible, but the leaves are known to be fatal to sheep. Three distinct cases of human poisoning were cited by as many different tribes. Two of these terminated fatally, the symtoms as described being burning and smarting in the mouth and esophagus, dumbness, nausea, profuse vomiting, foaming at the mouth, dizziness, and mania. Death is almost sure to follow if the patient does not vomit freely.

Notwithstanding its well-known poisonous effect when taken internally, it is rather generally used as an external cure for boils and rheumatism and to alleviate pain caused by strains and bruises, it being

preferred in the latter case to the well-known brands of painkiller. The bulbs are generally cooked, mashed, and bound as a poultice to the affected parts for about twelve hours. If the pain has not then entirely abated a fresh application is made.

For the cure of rheumatism the fresh bulb is mashed and rubbed on the affected joints twice a day for a period of about a month, that length of time being necessary for a complete cure. The plant is known as *tsin* by several tribes of the Pomo stock; the Wailakis call it *kĕ'-gus*.

LILIACEAE. Lily Family.

Nowhere in the world is there a more characteristic abundance and variety of bulbous-rooted liliaceous plants than in California, a provision of nature by which the primitive inhabitants have long been benefited. The bulbs (Pl. XVI) of all of the species here noted, with the exception of the soap root, are edible. All are highly nutritious when cooked, and many, especially the species of Calochortus, have a very agreeable nut-like flavor when raw.

Clover is eaten in early spring, pinole in late summer, and acorns in winter. These bulbs assure them of a plentiful larder for late spring and early summer. It is on account of this extended use that the Indians have been called "Diggers." All of these plants have distinctive Indian names, to which in the case of some tribes the word "*bŏ*" is appended to denote the bulb. The same name is given to the ordinary potato, and is used to designate the corm, tuber, or bulb of any plant used for food, and even a few, such as the soap root, which are not so used. In speaking of these plants to me the Indians almost invariably called them "Indian potatoes." I speak of them collectively as bulbs, although they are mostly corms. Figures 3 to 5 represent some of the fleshy-rooted plants most commonly eaten.

Many are uncommonly handsome, and, indeed, a great many species are collected and cultivated as garden plants. Indians are employed to collect the bulbs at the proper season, but it is often only with great difficulty that they are restrained from eating some of the "nutty" kinds as fast as they are gathered. Some are eaten raw, as stated, but most of them are steamed in pits, as described below under "Quamasia."

Allium bolanderi Wats.

Shēp (Yuki).—The same Yuki and the same Pomo name is applied to this diminutive rose-flowered species and to the following. This grows in considerable abundance in loose rich soil along the banks of streams. Its spherical corms are only from ¼ to ⅜ of an inch in diameter, but they are very easily gathered and therefore used to some extent for food.

EDIBLE LILIACEOUS BULBS: 1, HOOKERA CORONARIA: 2, DICHELOSTEMMA CAPITATUM; 3, TRITELEIA LAXA; 4, CALOCHORTUS PULCHELLUS; 5, CALOCHORTUS VENUSTUS; 6, QUAMASIA LEICHTLINII. THREE-FOURTHS NATURAL SIZE.

Allium unifolium Kell.

Shēp (Yuki).—The wild or Indian onion, which grows 1 to 2 feet high in rich, damp meadows throughout the region, and very closely resembles the young form of our ordinary cultivated onion, which is called by the same Indian name. The leaves are much more slender and the bulb never grows much longer than an inch. The bulb and the base of the leaves are fried and eaten to a greater or less extent by nearly all the tribes. One Indian considered them poisonous; another told me that quail eat the leaves in early spring and that their flesh then becomes worthless for food, because the odor of the onion pervades it. *Kō-bī'-yē* is the Pomo name applied both to this plant and the cultivated onion.

Calochortus maweanus Leichtl.

Tom'-tē bō (Pomo).—A delicate, tulip-like plant, whose purplish white flowers grow in the grass on open hillsides in early spring. The petals are hairy at the base, a character which has given the plant its name of "cat's ears." It is one of several species that have the same common name and are also called "star tulips." The corms are eaten in small quantity, mostly by children, and are described as "good sweet potatoes."

Calochortus pulchellus Dougl.

Bē-shā' bō (Yokia).—The exquisite lemon-yellow globe tulip (fig. 68), which is very common along roadsides and in loose earth in thin woods throughout the district, especially southward. The corms are small, being only occasionally as large as one's thumb, but they are easily gathered in considerable quantity. They are eaten raw or are roasted in the ashes for about an hour. The Yokia name means "deer potato," and is applied to the plant because deer are said to feed upon the corms. *Kä-lā' bō*, the Pomo name, means "tree" or "forest potato." The peculiarly fringed and closely overlapping petals, together with a peculiar saccate depression on each, and the arrangement of the inner hairs suggest an interesting adaptation for insect fertilization.

Calochortus venustus Benth.

Bā-töm' (Yokia).—The commonest species of the Mariposa or butterfly lilies (fig. 69), which grow, often in great tracts, on open hillsides throughout the region. The large, showy flowers are white or lilac-colored, and are marked, as indicated in the figure, with varying shades of brown, red, or yellow. The corms are very sweet and make good "potatoes."

Dichelostemma capitatum (Benth.) Wood.

Bō lä (Yokia).—A very common plant with a small fibrous-coated bulb from which spring 2 or 3 grass-like leaves and a long, slightly tortuous scape which bears at the summit a small head of violet-colored,

FIG. 68.—*Calochortus pulchellus.*

FIG. 69.—*Calochortus venustus.*

hyacinth-like flowers. It is an exceedingly common plant on rocky hillsides throughout the county and is often found as a weed in gardens. The bulbs are eaten raw, but are sweeter when cooked in ashes.

Erythronium giganteum Lindl.

No Indian name was obtained for this magnificent yellow "fawn lily," or dogtooth violet. It has a narrow corm 1 to 2 inches long, and is rather abundant in moist places in woods throughout the country. It is eaten, but not in large quantity. The Wailakis use the crushed corm as a poultice for boils and have a peculiar superstition that if they wash themselves with a decoction of it they can stop a rattlesnake from having dreams, which, they say, make them more irritable and dangerous.

Fritillaria mutica Lindl.

Bŏ tē (Little Lake). The beautiful brown and green spotted lily which grows commonly in damp woods throughout the region. It has a depressed bulb with rice-like bulblets on top, a stout, succulent stem with whorled leaves, and a beautiful raceme of large brown and green spotted bell-shaped flowers. Although classed with the potatoes, the bulb is apparently not used for food. The Wailakis call the plant *jü-jin'-jī* and have a superstition that if the roots are dug up the acorns will drop off the oaks.

Hesperoscordum lacteum (Lindl.) Greene.

Hō bŏ (Yokia).—The white brodiaea which has radical grass-like leaves, and capitate clusters of white hyacinth-like flowers. It grows abundantly in rich valley land throughout the country. The bulbs are eaten either raw or cooked.

Hookera coronaria Salisb.

Da-ul' bŏ (Little Lake). An apparently leafless plant, about a foot high, which has a single flower stock with a terminal umbel of blue funnel-shaped flowers and is commonly known as the "harvest brodiaea." The radical leaves usually dry up before the flowers appear in May or June. It is exceedingly common in grain fields and on dry, grassy hillsides throughout the region. The brown-coated corm is about ¾ of an inch in diameter and is greatly relished by sheep as well as by the Indians. It is sweet after roasting for a day. The Yuki name is *ānt-pot'*.

Quamasia leichtlinii (Baker) Coville.

Hoi-ānt' (Yuki).—A species of camas, 2 to 4 feet tall, which grows in very great abundance in the rich, damp meadows of Round Valley and northward, but which is practically unknown to the Indians about Ukiah. The plant has an onion-like bulb about an inch in diameter,

which bears 3 or 4 long grass-like leaves and a single robust but succulent and leafless stem, which in June is graced by a long raceme of large blue flowers which are open only at night. This is the largest and by all odds the best of all the Indian potatoes, and on account of its abundance at Round Valley it is there consumed in much greater quantity than all of the other species combined. The plant is inconspicuous in the daytime, but at night whole meadows may be seen to be covered with it. The name camas is very seldom used by either the Indians or whites. *Ket'-en* is the Wailaki name which was given to me for the plant by Mr. Frank Youree, of Covelo, who stated that the name *Ket'-en chow* given to an adjoining valley was applied to it on account of the great abundance of these plants which were found there. This valley is especially noted as a fine hog country. These animals fatten better on the bulbs than they do on corn.

The bulbs are not eaten so much at present as they were in former years, but during the specially dry summer of 1898 a great many of them were consumed. They are dug up in June or July by squaws with a "potato stick," a simple sharp-pointed instrument made originally of mountain mahogany (Cercocarpus), or nowadays of iron, and are brought together in varying quantities for roasting or cooking. They are sometimes boiled, but the general method as described to me by a Yuki squaw is as follows: Several families get together in the evening with their supply of the bulbs. A hole of appropriate size is dug in the ground and lined with stones. A fire is then built in the hole and after it has died down the ashes are thickly covered with pine needles. The bulbs are spread upon this, another thick layer of pine needles is added, and the whole is well covered with dirt. A small fire is kept burning over the hole for the remainder of the night and all next day, when the bulbs are removed and divided among the owners. While raw the substance of the bulbs is crisp, white, and very mucilaginous, but almost tasteless; when cooked as described above, however, they are remarkably sweet, the long baking having evidently converted the mucilaginous substance into sugar.

Great care is exercised in preventing the poisonous bulbs of Zygadenus from becoming mixed with the mess. The two are almost precisely alike in general form and appearance.

Wä-chöl' and *chū-ös'* are two other names less frequently used for the plant by the Yukis; *bi-tē'* is the Pomo name. A very similar bulb is called *lom'-chē* by the Little Lake Indians. It is described as flowerless and as being very bitter when raw.

Triteleia laxa Benth.

Tē-lī' bō (Little Lake).—The most abundant and widespread of all the Indian potatoes (fig. 70). It grows in fields, especially on the hills, and is known as the "highland potato." In one clump observed

FIG. 70.—*Triteleia laxa.*

by the writer it was estimated that there were over 200 plants in 1 square foot of ground. The plant very closely resembles the harvest brodiaea (*Hookera coronaria*), but the flowers are more numerous—from 10 to 30—and narrower, and have a much less succulent texture. The figure here given represents a plant cultivated in the greenhouse at Washington. The sweet bulbs are especially esteemed for food by the Yukis, who call the plant *ānt-pot'*. The Yokia name is *bö lä*, the Wailaki *gön'-cha*.

Triteleia peduncularis Lindl.

Lat (Yuki).—A white-flowered brodiaea, very similar in general form to an overgrown specimen of the last plant. All of the parts, however, are larger and the flowers are more numerous. It is a very handsome species, which is rather common in the wet meadows of Round Valley but attains its most robust development in proximity to springs on the open mountain sides. The bulbs are used to some extent for food.

CONVALLARIACEAE. Lily-of-the-Valley Family.

Trillium sessile giganteum Hook. & Arn.

Zhâl-zhoi'-ē (Yuki).—The common liver-colored or white trillium, which grows in the shade in damp valleys and along shaded streams throughout the district. The tuber-like rhizomes are used in medicine, but are so intensely bitter that the Indians use them internally only as a last resort. The exact application could not be ascertained, but the Wailakis and Yukis drink a decoction of it apparently for the purpose of preventing deep and lasting sleep. They describe it as good for "any kind of sick." Both the bruised leaves and crushed root are used as a poultice for boils. One application lasts for two or three hours, after which time it is renewed again and again for about two or three days when the boil has been brought to a head. The Wailaki name for the plant is *bē-cha'-te-chū*; the Little Lake *ki-kä'-hī-um*. It is considered of no value by the latter tribes; the Concows consider it poisonous.

SMILACEAE. Smilax Family.

Smilax californica Gray.

This, the only native species of Smilax in California, does not occur in Mendocino County, but is common along the head waters of the Sacramento. The fine long trailing limbs are exceedingly strong and are used to some extent in Round Valley and perhaps at Ukiah for basket making. The Indians state that the strands have a natural brownish-black color.

IRIDACEAE. Iris Family.

Iris douglasiana Herbert.

Si-lim' (Pomo—several tribes).—The common flag of the region, which grows in clumps a foot or so high, on hillsides throughout the country. The edges of the leaves are as fine and strong as silk and used to be gathered for the purpose of making the strongest kinds of nets and ropes. As the margin of the leaf is alone used, the work of making anything from it was exceedingly laborious. The silky strands were separated from the leaf and thoroughly cleaned from other tissues by means of a sharp-edged oblong piece of abalone shell, which was fastened to the thumb and used to scrape the fiber. Frank Youree informed me that it took nearly six weeks to make a rope twelve feet long. The rope, which was exceedingly strong and very pliable, was especially valuable in making snares to catch deer, and on this account it was known as "deer rope." Very few of the snares are now in the possession of the Indians, but one man at Round Valley recently made several to sell to a dealer in Indian curios at Ukiah.

A very novel use of the leaves was made a long time ago by the Yokia squaws and was related to me somewhat as follows: When, in their search after manzanita berries on hot, dry hillsides, they were compelled to take their babies with them, they would wrap them up well with the soft, flexible green leaves, and thus, by retarding perspiration, save them from extreme thirst. The Yuki name for the plant is *chē-wish'*; the Wailaki, *zhe-lä'-tsä''-chit*.

ORCHIDACEAE. Orchis Family.

Limodorum giganteum (Dougl.) Kuntze.

Hō-dim' (Yokia).—The leafy brown and green flowered swamp orchis, which grows along mountain streams throughout the region, sometimes known as *Epipactis gigantea* Dougl. Specimens were collected near Ukiah and shown only to the Indians in that locality. They drink a decoction of the roots to combat mania and the most severe cases of illness, when they are "sick all over" and can neither walk nor move.

SALICACEAE. Willow Family.

Populus fremontii Wats.

Pät'-mil (Yuki).—The common or Fremont cottonwood, which is native to the region and is commonly cultivated as a shade tree. A decoction from the bark is used as a wash for bruises and cuts, especially for the sores on horses caused by chafing. The wood is used to a slight extent for fuel.

Populus trichocarpa Torr. & Gray.

Pät'-mil (Yuki). -The same name is applied to this tree as to the above species. It is commonally known as the "black cottonwood" or "balm cottonwood." It grows sparingly along the larger mountain streams, and is also cultivated for shade and ornament. In summer the leaves fill the air with their sweet balsamic perfume, which vies strongly with that from the buckeye, the wild lilac, and some of the tarweeds in making the whole air redolent. No special use was noted for any part of the tree.

Salix argyrophylla Nutt.

Bäm kä-lā' (Pomo).—The shrubby white-leaved willow, which is common along the broad, gravelly bed of the Russian River near Ukiah. It is not found at Round Valley. In both regions, however, it is considered to be the best willow for the coarse baskets usually seen lying about the Indian villages. The Round Valley Indians often carry back small supplies of the slender wands when they return from hop picking near Ukiah, but their coarser baskets are not usually made of willow though this is the case with those manufactured near Ukiah. The roots are more highly valued in making certain baskets, but the kind was not ascertained. The straight wands are made into arrows, and the larger limbs are frequently used in making weirs in which to catch fish. The Yokia name of the plant is *kä-läl'-nō*.

Salix lasiolepis Benth.

Shkä (Yokia).—The commonest willow of the region, a tree 40 to 60 feet in height, with smooth bark and coriaceous, lance-like leaves 4 to 6 inches long by about 1 inch in width. No flowering or fruiting specimens were observed, but the tree most probably belongs to the above species. It grows along streams in wet soil. When a recently cut sapling is placed in wet ground it will generally continue to grow. At one place in Round Valley an inclosure used as a dancing place had been made by planting the recently cut poles within an inch or two of each other and arranging them in the form of a circle around a small tree, leaving a wide opening for the entrance. The leaves, which soon sprouted all along the poles, together with the dead leafy branches arranged on top, afforded ample protection from the sun and wind. The branches are very commonly chopped down and used for shade around houses, being thrown up as a rude kind of thatching. The wood is more highly esteemed for fuel than is oak.

In former times the tough, fibrous inner bark, called *sē-äm'* by the Pomo, was collected in spring and manufactured into rope, and into a rude garment or cowty, called *mä-lō' mä-lō'*, which consisted of a large number of vertical strap-like bands, each of which was fastened closely

together at one end to another band which served to girdle the garment over the loins. A portion of the inner bark was also used by the Indians as a substitute for chewing tobacco. It was gathered in quantity at the proper season, dried, powdered in a mortar, and thus preserved for future use. One white man who had learned to use it many years ago told me that he still preferred it to tobacco, although he was also fond of the latter article. The dried and powdered leaves are also sometimes mixed with tobacco and used for smoking.

Very considerable use is made of the bark in medicine. A strong decoction is used externally as a wash for the itch; internally it is used as a tea to cure the chills and fever, and in large quantities to cause profuse sweating in almost any disease. The root bark is preferred in the latter case. An infusion of the leaves is said to be useful in checking diarrhea. The Pomo name given by Dr. Hudson for the tree is *be-hé*.

BETULACEAE. Birch Family.

Alnus rhombifolia Nutt.

Um'-sē (Yuki).—The common mountain alder of the region, a large tree, 30 to 50 feet in height, with smooth white bark and velvety glutinous leaves. It grows along the larger mountain streams and in wet places generally, a little clump of the trees frequently marking the presence of springs, which are often known as alder springs.

The bark is very astringent and somewhat bitter, and contains a peculiar dyestuff. A decoction is made of the fresh or dried bark which is used copiously to produce perspiration, as a blood purifier, and sometimes to check diarrhea caused by drinking bad water. In appropriate doses it is used to allay stomach ache, to facilitate childbirth, and as a cure for consumption by checking hemorrhages. For the latter purposes it is claimed to be "better than doctor's medicines." Mixed with Indian tobacco it is used to produce emesis.

The fresh bark is used occasionally to color basket material, and was formerly used to a slight extent to color deerskins, the color being imparted in some way by the smoke or perhaps the vapors from the slowly burning bark. A still more novel use of the dyestuff consists in the practice formerly made by the Wailaki Indians of chewing the fresh bark and coloring their bodies with the red saliva for the purpose of facilitating the capture of the red-fleshed salmon, which, during the spawning season, run up the rivers and large streams in immense numbers. The color, which is somewhat resistant to water after having been thoroughly dried on, is supposed to favor the success of a big catch. The fish are driven into the nets by naked Indians. The trick is believed to be one, as the chief of the tribe explained, which was first made use of by the crafty coyote.

Arrows were sometimes made out of the young shoots, and the soft

wood was particularly valuable for tinder. The dry rot from the wood when mixed with the powdered bark of the Bigelow willow (*Salix lasiolepis*), is considered to be an excellent poultice for burns. *Jus-ki-at'* and *kus* are two Wailaki names applied to the tree; the Pomo name is *gä-shēt'-i*.

Corylus californica (A. DC.) Rose.

Ol mäm (Yuki).—The hazelnut, which is very common in open hillside woods and in canyons throughout the county. The rich, nutritious nuts are gathered by the sackful in autumn, and a supply is kept on hand all winter and the following spring. The slender twigs are very commonly used in place of willow at Round Valley for the coarse sieve baskets and for vertical withes in the saw-grass baskets. A baby-carrying basket observed at Ukiah was made by a man out of hazelnut wands, and several fish traps observed at Round Valley were probably constructed out of the same material. The traps, which are designed for catching salmon, consist of two very coarse-meshed conical baskets, one of which, the outer, is from 5 to 6 feet long and about 3 feet wide at the mouth. The other is of equal diameter at the mouth, but only a foot or so high, and has the apex cut off so as to leave a hole large enough for the salmon to pass through. The two baskets are fastened together in telescope fashion and securely placed in an opening in the weir or dam constructed for the purpose. The salmon are easily caught in the trap in their attempts to pass along in the stream. Frequently, however, they are frightened into it by the Indians. The Concow name of the plant is *gōm'-hu''-ni*; the Wailaki, *ch'kō*; the Little Lake, *chä-bä'*.

FAGACEAE. Beech and Oak Family.

Castanopsis chrysophylla (Hook.) DC.

No Indian name was learned for the "golden-leaf chinquapin," or "California chestnut," which not infrequently attains the dignity of a large-sized tree in this county. In general appearance it is much like that of the Eastern chestnut, but the burs and nuts are smaller, and the leaves are short, with entire margins. The lower surface is densely covered with yellowish scales. Two or three Indians informed me that they sometimes collected the nuts for food. They are eaten to a greater extent by more northerly tribes.

Quercus spp.

ACORNS AS FOOD.

The great bulk of the vegetable food stuffs formerly supplied by nature to the Indians of the interior part of Mendocino County consisted unquestionably of acorns, and even at the present day this nut

enters very largely into their diet throughout the whole year. The broad and stately white oak (*Quercus lobata*, Pl. XVII), is the most characteristic tree of the best farming land of the region, but in every locality throughout the county there are one or more different species of oak which furnish in good seasons a great abundance of acorns, which, although not edible in the raw condition, are converted by simple processes into a very satisfying and wholesome diet. The Con-cows especially, who are not used to eating much meat, claim that they never get sick from eating the mush and bread made from acorns. As a class these nuts are oily, and hence they replace in a measure the oily fish more largely consumed by the coast Indians. They are, however, lacking in proteid matter.

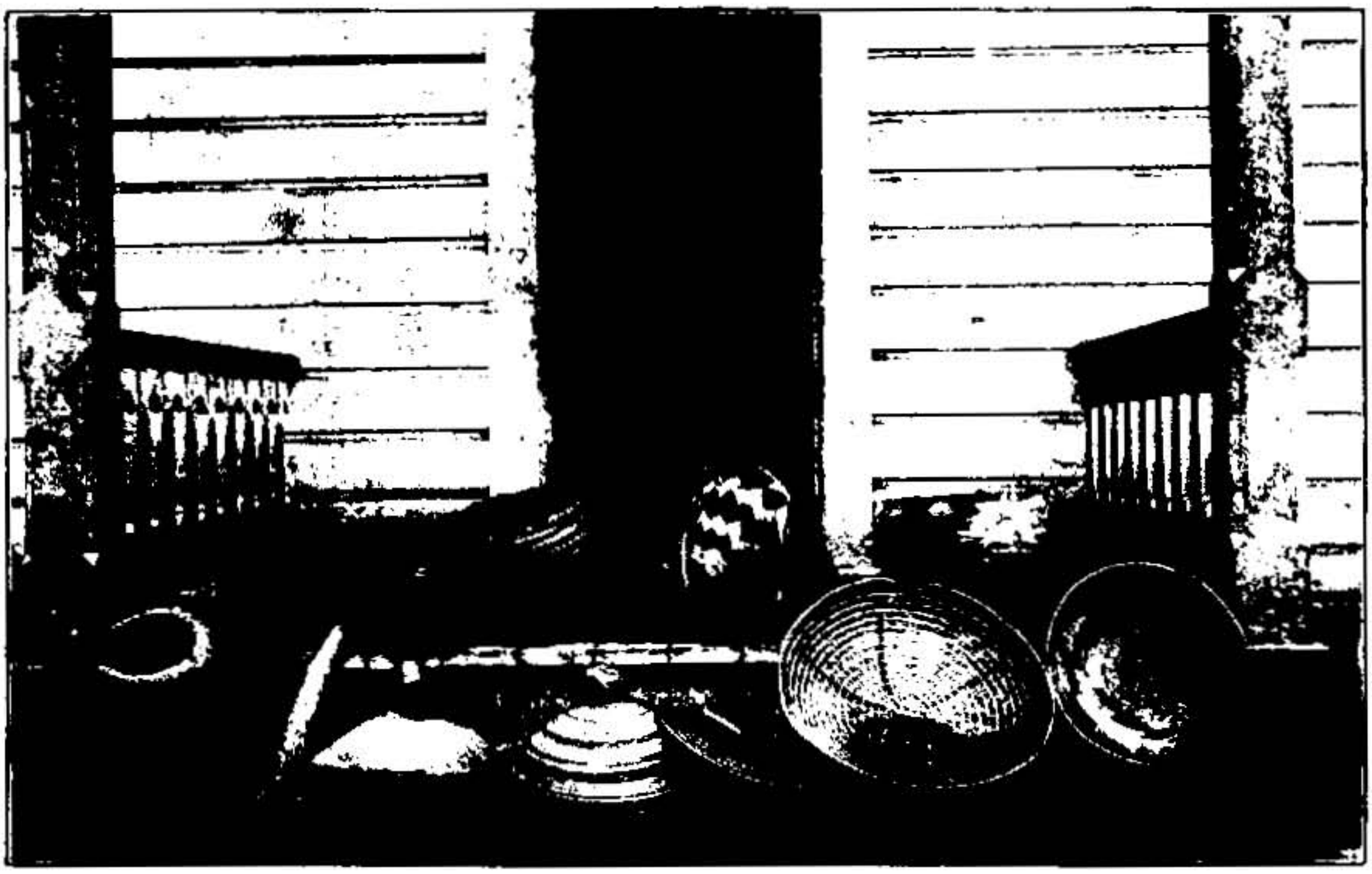


FIG. 71.—Acorn flour outfit.

All contain a small quantity of tannin, which produces an astringent effect upon the tongue, and a greater or less quantity of some glucoside, which causes them to taste bitter. Both of these substances must be removed before the acorns are eaten. This appears to be occasionally accomplished by burying the acorns in a sandy place with grass, charcoal, and ashes, and then soaking them in water from time to time until they become sweet. This method was seen in operation at only one place in Round Valley. The usual method is very different, far more interesting, and in several ways exceedingly instructive, both to the farmer and to the scientist. The whole process of soup and bread making, as I have seen it carried out both at Round Valley and at Ukiah, is here given in detail.

When the acorns are ripe in autumn the men go out and beat them off the tree or cut off the small branches and throw them to the ground.

The squaws collect them in a large conical carrying basket like that represented in fig. 71. These are carried on the back, but are suspended by a broad band from the forehead. Both hands are therefore free for picking up the acorns, which are thrown backward with unerring aim into the basket. As much as seven or eight large basketfuls—some 400 or 500 pounds may thus be gathered by one family for a year's supply. At home the nuts are first spread out in the sun until thoroughly dry, when they are sometimes cracked either with the teeth or by means of a small stone and still further dried for future use, or are stored away in the houses with the shells on. In former years special receptacles made of coarse withes were erected and these

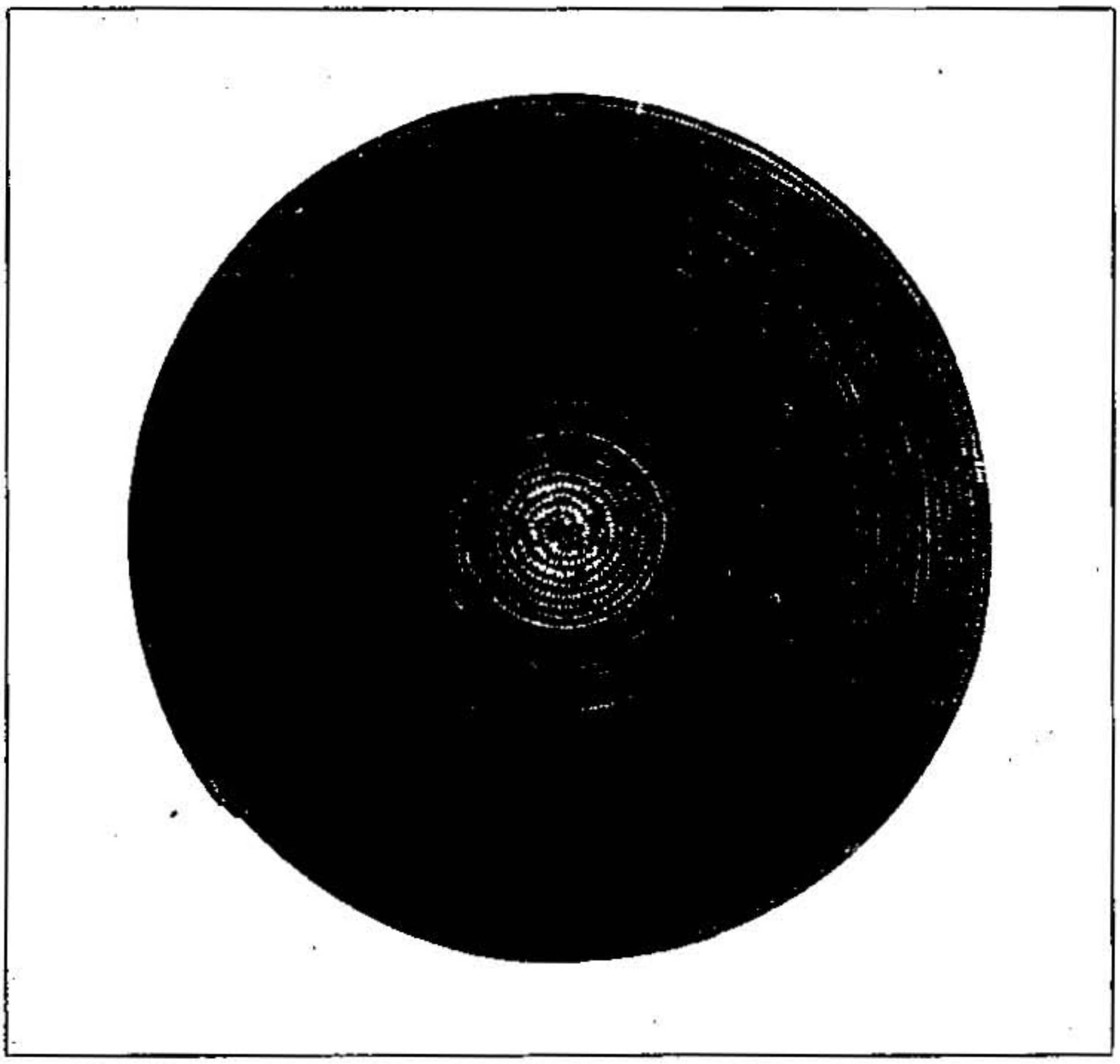


FIG. 72.—Separator for removing coarse particles of acorn meal.

were more or less directly exposed to the weather. Considerable care is exercised in keeping them from becoming moldy.

When ready for use the kernels are usually dry and rather brittle. They are first thoroughly pulverized in a curious mortar, which consists essentially of three parts—a large, flat stone; a shallow, basin-like, but bottomless basket, and a stone pestle. These various parts are shown in Pl. XVIII, fig. 2. The basket is held in place on the stone by the legs of the operator—always an old squaw or a superannuated brave, who alone has the requisite patience and unlimited time—and the pounding is done upon the flat stone, as shown in the figure. The basket serves admirably to prevent the particles from flying away,

and it fits so closely and is held so firmly to the stone that no meal is lost. This process requires a very considerable amount of time, and consequently the everlasting thump, thump, thump, of the pestle is a characteristic sound heard at many of the Indian settlements about midday.

Although the meal thus produced is quite fine, it is mixed to a greater or less extent with coarser particles, which are most carefully removed in the following manner: The meal is spread out evenly on the separator, a circular piece of basket-work shown in fig. 72, and then the separator being held inclined toward the body, the meal is, by vigorous shaking, thrown up and down upon it until all of the coarser particles have rolled off into the basket which has been placed to receive them. This product, however, is not considered fine enough. The meal is easily loosened up by tapping the plaque gently. The shaking operation is then repeated again and again until at about the seventh time it adheres so firmly that it has to be beaten off by sharp blows with a long bone which is kept at hand for the purpose. Any stray bits of meal that have dropped around the baskets are carefully scraped up from the ground by means of a brush made of the outer fibers of soap root (*Chlorogalum pomeridianum*) and carefully added to that which has to be reground. Very little dirt gets into the meal in this way, for the ground is either so selected as to have a hard, damp, and even surface which can be kept free from superfluous dirt by sweeping, or, which is more generally the case, it is already hard and greasy from long-continued use.

The meal thus carefully ground is still astringent and bitter on account of the tannin and the bitter principle which the acorns contain in quantities varying with the different species. Both of these substances are deleterious to health and interfere with digestion, and hence it has been found necessary to remove them as completely as possible before the meal can be used for food. Water will remove both. It would, however, be practically impossible to dissolve them out from such an oily material if the meal were not first ground to an impalpable powder. The reason for taking so much pains in that process is therefore quite evident; a very great additional advantage lies in the fact that the finer the meal the more easily and fully it is digested.

The process of removing the bitter substance and the tannin is essentially the same with all the tribes, and consists in mixing the meal with water in a shallow depression which is made in sand or some porous material and allowing the water to percolate through the mass until the bitter taste has disappeared. A couple of hours are usually required for the operation. As originally carried out this filtration was done in sandy soil, and that is the kind of place still preferred; but since the Indians have been located on farms of their own, several have erected special sand filters and a few of them have substituted

other material. One consisted of a low framework supporting a lot of dry pine needles which were arranged in the form of a basin and covered with a piece of ordinary gunny sacking. This had the advantage of keeping the meal entirely free from sand. Very little of that material is mixed with the meal in the ordinary process, however, for precautions are taken to guard against it. The sand is patted down well and sometimes a bed of leaves serves for a foundation. In pouring fresh supplies of water on the meal some thick material, like the leafy branch of the incense cedar (*Libocedrus decurrens*) or a small tule mat, is first spread over the top so that the water will flow gently all over the meal. The cedar is preferred on account of the balsamic flavor which it imparts to the meal, and it is used in subsequent operations also for the same qualities.

The acorn meal after this process has the consisteney of ordinary dough. It is sometimes converted into bread while still in the sand by building a fire around it; but this method is objectionable on account of the sand which adheres to the bread and the loss of the oil, which, when hot, passes into the sand. A considerable quantity is scooped out from the center of the depression, and this, which is entirely free from sand, is reserved and afterwards made into bread. The remainder of the dough, with, perhaps, a little of the adhering sand, is rubbed up with varying proportions of water in a large "feast basket" like one of those shown in figure 71, and in this it is converted into soup. The sand rapidly settles to the bottom and does not, therefore, contaminate the soup in any way. Water-tight baskets were the only cooking vessels which the natives originally possessed, and they are still very largely used in the process of soup making, the source of heat being hot rocks, which are placed in with the meal and water. Two pieces of green wood, used like a pair of tongs, serve to carry the rocks from the fire to the basket and again to the fire. Before being placed in the basket, however, each is sometimes washed free from ashes by plunging it once or twice into a basin of water. When cooked, the mush has very much the same appearance as corn-meal porridge, but is usually brownish red. It has a slightly sweetish taste, but it is, on the whole, rather insipid and unsavory. Nevertheless, it is very much esteemed by nearly all of these Indians even at the present time, and many Americans who are more or less accustomed to it prefer it to other kinds of mush. According to its consisteney, or to the whims of the eaters, it is eaten by dipping one, two, or three fingers into the basket, which serves as a common receptacle, and thus conveying the thick, gruel-like soup to the mouth, or it may be dipped out by a big mussel shell. This shell is known to the Yukis as *nok*, a name which they apply to spoons also. Spoons and separate dishes have been recently introduced. No salt is used in the mush, although it is generally used with all kinds of pinole.

The dough selected for acorn bread is mixed with red clay before it is baked, the proportion being about 1 pound of clay to 20 of dough. This clay, several Indians explained, makes the bread sweet. Others stated that it "acted like yeast." The mixture is placed on a bed of soaproot, oak, maple, or even poison-oak leaves, which in turn rests on a bed of rocks previously heated by a small fire. The dough is then covered with leaves and a layer of hot rocks and dirt and cooked gently in this primitive oven for about twelve hours, usually over night. When removed the next morning the bread, if previously mixed with clay, is as black as jet, and, while still fresh, has the consistency of rather soft cheese. In the course of a few days it becomes hard, when, on account of the leaf impressions stamped upon it, it might easily be mistaken for a fossil-bearing piece of coal. It is not at all porous, being as heavy as so much cheese. It is remarkable for being sweet, for the original meal and even the soup are rather insipid. The sweet taste is very evident, and is due in great measure to the prolonged and gentle cooking, which, favored by the moisture of the dough, gradually converts some constituent of the meal into sugar, as in the case of camas bulbs.

One or two specimens of bread observed, which were made without the addition of clay, were also sweet. These varied only in color. They were not black, but varied from light tan to dark, reddish brown. All were oily, and about equally heavy. It is evident, therefore, that neither of the above explanations given by the Indians for the use of the clay is satisfactory.

Among the explanations given by others for the use of this material the following are of interest: The preference for black colors, as shown in the uniform practice of blackening basket materials, and in several ways; the absorption by the clay of the oil, which might otherwise be lost in cooking; the dilution of the bread, to make it last longer, or to assuage hunger temporarily, a purpose for which it is claimed by many persons clay is used by primitive people in tropical or subtropical countries throughout the world; ceremonial purposes; the killing of intestinal worms; for the arsenic contained in it; or, finally, for the bone-forming material it contains, this being held to be especially important in the case of people who get most of their nourishment from vegetable matter. It is not my desire to discuss here these various explanations, but I wish to give a scientific explanation which has suggested itself to me. It seems certain that the clay is used for a very scientific and useful purpose, and that is to convert the last trace of tannin still remaining in the dough into an insoluble form. The black color is unquestionably due to the tasteless insoluble compound formed at the baking temperature, under the influence of air and moisture, by the action of the tannin of the acorn with the oxide of iron contained in the clay. An analysis of a sample of this clay, made by Dr.

Walter C. Blasdale at the University of California, showed that it contained no arsenic nor any other interesting ingredient, except the hydrated red oxide of iron, which was readily extracted with hydrochloric acid, and was present to the extent of 10 per cent by weight. Experiments made by Dr. W. D. Bigelow, of the Division of Chemistry, and by myself, showed that acorn meal containing 6.63 per cent of tannic acid was made black, and at the same time sweet, by simply keeping it heated in the moist state at a boiling temperature, with a 1 per cent addition of ferric oxide for about twenty-four hours. A mixture of tannic acid and oxide of iron also turned black after exposure to the same treatment. The absence of disagreeable properties in the clayless bread may be accounted for by the use of an acorn containing less tannin, or by assuming that the meal was more thoroughly washed. An analysis made by Charles D. Woods, director of the Maine Experiment Station, of a sample of bread made without clay from the acorns of the valley white oak (*Quercus lobata*) showed that, while the unleached meal contained 6.63 per cent of tannin, the bread itself contained only a trace. Professor Woods's analyses of the acorn meal and bread are given by percentages in the accompanying table:[1]

Composition of meal from the acorns of the valley white oak (Quercus lobata) *with the bread made from it.*

	Laboratory No.	Refuse.	Water.	Protein.	Fat.	Total carbohydrates.	Ash.	Food value per pound determined.
Acorn meal	6184		8.7	5.7	18.6	65.0	2.0	2,180
Acorn bread	6185		60.3	2.2	9.9	27.0	.6	1,003

All of the processes as above described are the more interesting because they are undoubtedly wholly original with the aborigines of California. For untold centuries they have been thus using a crop which is particularly abundant throughout California, and of which little use is made by the white people of to-day, other than as a means of fattening hogs. These animals are commonly allowed to run wild through the forest the whole year round, and are slaughtered only in late autumn, when they are in splendid condition for the market. This is a good practical illustration of the food value of acorns to hogs. Let us see how experimental results and popular usage elsewhere emphasize this value.

An inspection of the above table and a further comparison of figures, published in Professor Wood's bulletin above referred to, show that the white-oak acorn (California), which is probably an average for many kinds, is comparatively rich in its contents of carbohydrates and especially fat. Very few nuts contain so much of the former, and the

[1] Maine Agr. Expt. Station, Bul. 54, pp. 79, 80. 1899. Also in letter to author.

fat content far exceeds that of the almond and is nearly equal to that of the hickory nuts. The calorific power exceeds that of the chestnuts, filberts, cocoanuts, Brazil nuts, almonds, and a few other nuts. An Englishman who had had considerable experience in fattening hogs for the British market estimated that if a hog is fed a peck of acorns, together with a little bran, it will increase a pound a day for two months together. The same authority states that horses, cattle, and sheep may be taught to eat acorns, and that chickens eat them readily after they have been softened by boiling. An extensive, interesting, and very satisfactory experiment in fattening hogs with acorns was made in 1898 by G. W. Carver, director of the Tuskegee Agricultural Experiment Station, Tuskegee, Ala. One great advantage in their use in France is the production of a quality of lard which is especially esteemed in large factories for absorbing the odor of flowers. In this capacity it becomes the vehicle of the most delicate perfumes.

In England crude acorns have occasionally been condemned as fatal to hogs, but no such complaint has to my knowledge been made anywhere in California. It would seem, therefore, that the tannin and bitter substance can be ingested by these animals with impunity. It is difficult, however, to conceive why they should not be affected thereby, and it seems certain that if such good results are obtained by allowing the animals to eat the crude nuts, far better results would accrue if care were taken to grind the acorns and to leach out their objectionable constituents.

For human food different kinds of acorns have been especially esteemed in ancient Greece and in France, and are now used throughout the Mediterranean region, Mexico, and the southern United States. In most cases, only the sweet acorns, which contain little or no tannin, have been used, and in no case, except in California, so far as I have learned, has any extensive manufacturing process been adopted to prepare them for eating. One process was, however, employed in the eastern United States in early times. The nuts were boiled by the Indians in water containing the ash of maple wood, in order to extract the oil, which was used with their meat. In Spain and Italy, according to Memmo,[1] sweet acorns are used by the poorer people to the extent sometimes of 20 per cent of their total food. The tannin is not extracted and the nut is not even reduced to a fine meal for better or more complete digestion. Nutrition experiments made on men showed that over 10 per cent of the acorns passed undigested in small fragments into the feces. Much of this loss and the consequent deficiency in food value is unquestionably due to the lack of proper preparation. Its value as a fattener was admitted.

All kinds of acorns are appreciated by the Indians of Mendocino

[1] Memmo, Giovanni, The Alimentation of Individuals of Different Social Conditions (trans.). Ann. d. Ist. d' ig. sper. d. Univ. di Roma, n. ser. vol. 4. 1894.

County for their fattening power, and it is remarkable, especially in early life, how fat they become on this diet. Those acorns which contain the most oil are most highly valued for food, and it was the meal from these that used to be employed by the squaws to groom their warriors after they had returned from battle. The annual harvest was in former days heralded by a kind of thanksgiving dance, and during this performance a special acorn song was sung. The Concow version of this, given by Powers,[1] is as follows:

Hu'-tim yo'-kim koi-o-di'.

The acorns come down from heaven.

Wi'-hi yan'-ning koi-o-di'.

I plant the short acorns in the valley.

Lo'-whi yan'-ning koi-o-di'.

I plant the long acorns in the valley.

Yo-ho' nai-ni', hal-u'-dom yo nai, yo-ho' nai-nim'.

I sprout, I, the black acorn, sprout, I sprout.

The possession of specially fruitful areas of oak trees was not wholly common a half century ago to the particular tribe, but certain trees and certain small tracts were owned and cared for by a single individual or by a family. Among the Pomos especially the possession of a greater or less number of oaks, manzanitas, peppernuts, and, perhaps other trees, was to some degree a measure of wealth. The parched acorns were to a slight extent used with barley as a substitute for coffee by some of the Spanish settlers. As the bitter principle is still present in the decoction, it is quite probable that some physiological effect is produced by it.

OTHER OAK PRODUCTS.

A few notes on the medicinal use made of oak galls and bark are given under *Quercus lobata*. No particular application seems ever to have been made of the filtrate from the acorn meal. It could be very easily collected in the modern processes of filtration.

Oak wood is used very little for fuel or timber, but some kinds are frequently used for making tool handles, mauls, and paddles. The bark taken from the fallen trees is especially useful in the process of baking and in parching pinole seeds in baskets, because it burns slowly without flame for a long time. Fresh oak bark is occasionally used, together with water and some rusty nails, as a means of blackening basket material. The leaves of the evergreen oaks, especially of the black oak, furnish fodder to stock in exceptionally severe winters. The dried and powdered leaves were formerly used a great deal for tinder.

[1] Tribes of California, p. 308.

Quercus californica (Torr.) Cooper.

Mom (Yuki for the acorn). The California black oak, a medium-sized tree with broad, pinnately-lobed, deciduous leaves 4 to 6 inches long, and oblong, obtusely pointed nuts an inch or so in length. It is found here and there in forested mountain districts throughout the county. These acorns are not particularly plentiful, but they are considered to be the second best kind for bread and soup because they are especially rich in oil. The Concow name for the acorn is *hom'-shöl*, the Wailaki *tol* (the "l" very prolonged) the Yuki, for the tree, *mm*, the Little Lake, *dū-shē' kü-lā'*.

Quercus chrysolepis Liebm.

Jē'-jē (Yuki for the acorn).—The canyon live oak, which often grows to be an immense tree in deep canyons throughout the district. It has white, flaky bark, white or pale green, oblong leaves and oval acorns ½ to 1½ inches long. The inconspicuous scales of the shallow cup and the under side of the leaves are often covered with dense glandular yellow hairs. The leaves are rigid, and the margins are often provided with sharp, stout spines, which have given the name pin oak to the tree. The Yuki name signifies sharp-leaf acorn. These acorns are not produced plentifully and the trees are generally more inaccessible than other kinds, and for these reasons the nuts are very little used. One man stated that they were poisonous when raw, and that the meal required more washing than that from other species. The Calpella and the Little Lake name for the acorn is *qä-shä'*; the Yokia, *jesh*.

Quercus densiflora Hook. & Arn.

Shō'-kish (Yuki for the acorn). The tan-bark oak, a slender evergreen tree which is found in Round Valley, but is more common in moist woods nearer the coast, where the bark is a commercial article, much used for tanning purposes. The pale, oblong leaves, 2 to 6 inches long, with their spiny margins, the erect clusters of flowers, and the long linear scales of the acorn cup are very characteristic, and present strong points of resemblance to the chestnut. The acorns contain a large quantity of deleterious matter, but after being leached they are said to have a very agreeable acid taste. On this account and on account of the extra large amount of oil which the acorns are said to contain, they are preferred to all other kinds. The Concow name for the acorn is *hä'-hä*.

Quercus douglasii Hook. & Arn.

Milk; mē'-lē (Yuki names given for the acorn).—The blue oak, a deciduous tree very abundant on low, dry foothills throughout the county. The sparse foliage, consisting of small, oblong bluish-green

VALLEY WHITE OAK (QUERCUS LOBATA).

FIG. 1.—VALLEY WHITE OAK ACORNS.

FIG. 2. YUKI SQUAW GRINDING ACORNS FOR SOUP AND BREAD.

leaves, gives the tree a very characteristic appearance. The thick acorns are a little over an inch in length. They are very largely used for soup and bread.

The Little Lake name for the acorn is *kä-bä'-tä;* the Yokia, *kä-kūl'*.

Quercus dumosa revoluta Sargent.

Bät'-sōm (Pomo).—The curl-leaf scrub oak, an evergreen shrub 3 to 8 feet high, with small, rigid, convex light-green leaves, and small, oval acorns less than an inch in length. It forms dense, impenetrable jungles on dry hills south of Round Valley, and on San Hedrin Mountain. On account of the abundance of the shrub on this mountain the Pomos have called it *bät'-sōm dä'-mō*, the latter word being the name for mountain. The acorns are small and extremely bitter, and are therefore used very little for human food.

Quercus garryana Dougl.

Mā-lē' (Yuki).—The Pacific post oak, or, as it is more commonly called in this region, mountain white oak. It resembles the valley white oak both in size and appearance of several of its parts, but may be readily distinguished therefrom by its larger and more prominently veined leaves, its hairy winter buds, and the small lanceolate and slightly pubescent scales of the shallow cup as well as by its habitat, it being confined principally to the lower hills instead of the level valleys. The acorns are used for food in the same manner as other acorns are used.

Quercus lobata Née.

Kī-yäm' (Yuki for the acorn).—The common valley white oak (Pl. XVII), a stupendous wide-spreading tree often 80 feet in height. One tree measured 24 feet 3 inches in circumference, but they are occasionally much larger. It grows in broad, fertile valleys throughout the district, and as the individuals always grow scattered in grassy meadows they give the valley a magnificent park-like appearance. The drooping branches tasseled with moss add much to their picturesque beauty. The long acorns (Pl. XVIII, fig. 1) are very characteristic of the tree, since they often vary from about 1¼ up to 2½ inches in length. They are the largest of all the acorns, and since the enormous trees generally yield an abundant harvest which is conveniently located with respect to the Indian villages they are the chief source of the acorn supply. The bread made from them is called *pä'-önsh* by the Yukis. The bark is used to a very slight extent by the Yukis to check diarrhea and to a slight extent also by the Concows to blacken strands of the red bud for use in basket making. Rusty iron is added to the water extract of the bark to produce a black solution, in which the strands are allowed to remain for some time. The Wailaki name for the acorn is *shin'-chön;* the Little Lake, *sē-pä'*, and the Concow, *lō-ē'*.

Many individual trees of this species, apparently diseased forms, are very abundantly covered with large galls, usually a couple of inches in diameter, which are called *fä-hut'* by the Yukis. In July and August, when they are still green, these are nearly solid, the interior having the consistency of a rather juicy, ripe pear. The juice, which may be readily squeezed out of them, is light green in color and is certainly very rich in gallo-tannic acid. It is used to a considerable extent in medicine and for ink, as mentioned below. The galls remain adhering to the tree indefinitely, but change in color from light green to black, and in texture from a fleshy to a light pithy interior, which is surrounded by a woody exterior. The abundance of the galls and their apparently large content of gallo-tannic acid would seem to indicate that they might be used very considerably as a substitute for the Turkish galls (from *Quercus infectoria*), which are most widely esteemed in commerce.

The Indians have been taught to make ink from the juice of the fresh galls by allowing it to remain in contact with rusty iron, and one old Indian told me that by simply dipping an old steel pen into the gall one could write freely. The experiment was tried by myself with very satisfactory results, several hundred words having been written. The color produced was nearly as black as that produced by ordinary ink and proved to be permanent after a year. The Redwoods, Concows, and Numlakis all value the fresh galls as a remedy for sore eyes, when diluted and used as a wash.

MORACEAE. Mulberry Family.

Humulus lupulus L.

No Indian name was learned for the common hop vine. It is cultivated very extensively near Ukiah and has escaped from cultivation to a slight extent both at that place and at Round Valley, where it was formerly grown under Government supervision. The hops are soaked in warm water and applied as a poultice for swellings or bruises.

LORANTHACEAE. Mistletoe Family.

Phoradendron flavescens Nutt.

Tsī mä-är'-shē (Little Lake).—The common mistletoe, which is parasitic on trees, chiefly on the oaks of the region, it being so abundant on some trees that they are actually killed by the growth. It is asserted by the Indians that it also grows on the buckeye (Aesculus) and that its leaves, which are of a glutinous character, are then particularly valuable in medicine. They are chewed "all day long" to relieve toothache, and a tea is made of them to produce abortion. Those from certain trees are regarded as poisonous both to man and to cattle.

Razoumofskya occidentalis (Engelm.) Kuntze.

Shâ-lĕ'-kō-em (Yuki).—A light yellow, leafless plant, 2 to 5 inches high, which is parasitic on the digger pine. A decoction of the plant is made and used to a limited extent as a tea to relieve stomach ache.

ARISTOLOCHIACEAE. Birthwort Family.

Asarum caudatum Lindl.

No Indian name was learned for this plant. It is common in damp woods and in deep canyons throughout the district and is commonly known as wild ginger. Little opportunity was found to inquire into its uses, but it is so remarkably aromatic that it is probably used to some extent by the medicine men. It was noticed that the dried roots retained their delightful fragrance for many months. They would undoubtedly prove to be an acceptable perfume to be worked into sachet powders.

POLYGONACEAE. Buckwheat Family.

Eriogonum latifolium Smith.

Al-bō'-tē (Yuki).—The white woolly plant called "sour grass," which grows about 2 feet high on open, rocky hillsides and along open streams throughout Round Valley. The woolly leaves are all at the base of the stem, and the inconspicuous flowers are arranged in a small capitate cluster at the end. The leaves, stem, and the woody root are very considerably used in the form of a decoction for pain in the stomach, for headache, and for female complaints. The root is especially good for these purposes and may be used over and over again. A decoction of the root is also used for sore eyes. The young stems have a very agreeable acid taste, and are eagerly sought after by children in May or June, before the flowers have been developed, when they are still crisp and tender.

Polygonum aviculare L.

No Indian name was obtained for the common yard grass, or goose grass, which is an introduced plant very common around houses throughout the region. Geese are fond of the leaves, and the seeds are gathered in small quantity by the Indians for pinole. A decoction of the whole plant, together with oak bark, is used as an astringent both by the Indians and the whites.

Rumex crispus L.

Ō'-pē-ōl (Yuki).—The common dock, with long, undulate leaves. It is one of the very worst of the garden weeds throughout the district, growing especially in land which has been covered with water for a

considerable part of the year. The leaves are used, and even cultivated, for greens, and the seeds were formerly used to a very small extent for mush.

CHENOPODIACEAE. Goosefoot Family.

Chenopodium album L.

No Indian name was obtained for the pigweed, or lamb's-quarters, which is a common weed about houses. This plant was unknown to the Indians originally, and but few of them have any uses for it. One Indian informed me that the old leaves were good to relieve stomach ache, and several stated that they had been taught to use the young leaves for greens. The first boiling water is always thrown away on account of its bad taste.

AMARANTHACEAE. Amaranth Family.

Amaranthus retroflexus Linn.

No Indian name was learned for this plant, which is well known as hogweed throughout the district. It is an exceedingly troublesome weed to those Indians who attempt to do much farming, but to many its small, shiny black seeds, which are yielded in great abundance, are a source of good pinole.

PORTULACACEAE. Purslane Family.

Calandrinia elegans Spach.

Jin-net' (Numlaki). -A small, low annual, with very showy rose-red flowers and succulent leaves and stems. It is an early spring flower which grows in open fields in many parts of California. Several pounds of the tiny jet-black seeds, which look like so many grains of gunpowder, were observed in the possession of a Numlaki squaw, who used them for pinole, and who had gathered them near the former home of her tribe in Tehama County, where the plant is probably very abundant and productive. A very similar but smaller-seeded species, *C. menziesii*, grows to some extent in Round Valley, but so far as learned the seed was not used for food.

Claytonia perfoliata Donn.

Gō-shin' (Yuki).—A plant which is conspicuous for its tuft of succulent, long-stemmed, orbicular leaves, from the center of the upper side of which a few inconspicuous white flowers protrude. It is a common plant under oak and laurel trees in winter and is well known as Indian lettuce. This whole plant is either eaten raw or cooked up with salt and pepper for greens. It is used by white people also.

NYMPHAEACEAE. Water Lily Family.

Nymphaea polysepala (Engelm.) Greene.

The common yellow pond lily of California, known by some authors as *Nuphar polysepalum* Engelm., grows profusely in shallow lakes and winter ponds in the moist coast region, but is only very sparingly represented in Round Valley. The fleshy roots are a favorite food of deer, and the rich, nutritious seeds are eaten by the Indians whenever they can get them.

RANUNCULACEAE. Crowfoot Family.

Clematis ligusticifolia Nutt.

No Indian name was learned for the common virgin's bower, or pepper vine, of the region, a conspicuous vine climbing high over trees and in summer displaying large clusters of dull white flowers or silky, feathery achenes. The stem and leaves have an acrid, peppery taste and are chewed for the purpose of curing colds and sore throat.

Delphinium hesperium Gray.

Mâl-chā'-lēz (Yuki).—The common blue larkspur, which is abundant on dry, grassy hillsides, and appears sparingly in grain fields throughout the region. Another common name for the plant is "rattlesnake flower." It is suspected of being poisonous to cattle.

Delphinium nudicaule Torr. & Gray.

Sō-mä' yem (Calpella).—The common red larkspur of the region. The name signifies "sleeproot," the root being accredited by one of the Calpella Indians with very marked narcotic properties, which are made use of in causing an opponent to become stupid while gambling. The name "lady's slipper" was applied to the plant by an educated Yuki.

Ranunculus eisenii Kellogg.

Wē (Yuki).—The common five-petaled buttercup of the region. The smooth, flat, orbicular seeds are gathered in great quantity in May and are used either alone or mixed with other seeds for pinole, a favorite mixture being *wē* and *ch'o'-mel* (Achyrachaena). Both of these seeds may be gathered in May. The acrid principle so characteristic of plants belonging to this group is entirely destroyed in parching the seed.

Tē-lä', the Little Lake name of the seed, is also the name applied to the tick. There seems, however, to be no resemblance between the two. The Yokia name of the seed is *tä-loch'-dō*.

Thalictrum polycarpum Wats.

Hōl'-gä-shēn'' (Yuki).—The common aromatic meadow rue of the region, a plant 3 to 4 feet high with finely divided leaves and inconspicuous staminate or pistillate flowers. The name means "coyote angelica" and the same translation holds good for the Yokia name *ē-wē' bich-ō'-a*. Other tribal names mean substantially the same thing. An instance of the accidental poisoning of a white child by eating the stem by mistake for that of angelica was cited by one Indian. Angelica root is the universal charm and panacea of the Indian, and the coyote symbolizes their ideal of cunning. They have an idea that the coyote is able to eat the meadow rue with impunity, and since it is aromatic like angelica, they call it coyote angelica to distinguish it from the true article. The symptoms of poisoning in the case above mentioned, as described by my informant, were the same as for strychnine. If, however, the poison is analogous to that isolated from a European species (*T. macrocarpum*), the symptoms should be more like those of aconite; but all are somewhat alike in action. The Wailakis have a supersition to the effect that this plant is capable of making dead Indians have bad dreams if it is allowed to grow on their graves. When, therefore, their living friends feel their conscience troubled, they go out to the grave, and, if they find the plant growing there, they dig it up, and, as a sort of propitiation for their neglect, wash their heads with the juice from the crushed stems and leaves. It is also used in this way to cure headache. The Wailaki name for the plant is *chin-dun''-gä'-chit*, the Little Lake *ē-wē' shi-shä'*.

BERBERIDACEAE. Barberry Family.

Berberis repens Lindl.

No Indian name was learned for the Oregon grape or creeping barberry, a low shrub with holly-like pinnate leaves and short clusters of small, sour blue berries, which is common in bleak, rocky hillsides. The yellow root bark is gathered in large quantity and used in the form of a decoction for the cure of stomach troubles and as a blood purifier.

BUTNERIACEAE. Strawberry Shrub Family.

Butneria occidentalis (Hook. & Arn.) Greene.

Sī kä-lā' (Pomo).—The western spice bush or calycanthus, a beautiful shrub with large opposite leaves and solitary velvety-red flowers. It is fairly common in shaded ravines throughout the region. The bark, leaves, and flowers are delightfully aromatic, especially when crushed, and the flower retains its fragrance a half day or so after wilting. The bark is peppery as well as aromatic, and the leaf is

slightly bitter. Specimens were shown to but a few individuals. Both the wood and the bark from fresh shoots are used in basket work, and the pithy shoots used to be particularly valued by the Yokia Indians for making arrows, the preference being rated by one individual in the ratio of about twenty to one against all other material.

LAURACEAE. Laurel Family.

Umbellularia californica (Arnott) Nutt.

Pŏl'-oom ŏl (Yuki). The California laurel (fig. 73), the most characteristic and beautiful, and at the same time economically interesting tree of the region. It is an evergreen, pyramidal tree, 10 to 100 feet

FIG. 73.—Laurel (*Umbellularia californica*.)

in height, and grows in canyons and damp woods, and sparingly on high rocky knolls where vertical strata permit the tree to send its roots into the ground for water to a great depth. It is most highly characterized by the pungent quality of its leaves. These contain about 7½ per cent of a volatile oil which has an effect upon the tongue and skin somewhat like that of camphor and menthol. The odor from the freshly crushed leaves may provoke headache and bring tears to the eyes, but when this is largely diluted with air it is more or less agreeable and soothing in its effect. All parts of the tree, including the wood, contain aromatic or fixed oils, the characteristic effect of which

is more or less irritant and acrid, an effect which the early settlers compared with pepper and therefore called the tree pepperwood, or, on account of the general use of the nuts for food by the Indians, peppernut tree.

These nuts (*pōl'-cum*) are thin-shelled and nearly spherical, being about one-half inch in diameter. They contain a large kernel and are surrounded by a fleshy covering which makes the fruit look very much like an olive. Both the flesh of the ripe fruit and the kernel are used for food, but the upper two-thirds of the former is rejected on account of the larger amount of acrid oil which it contains. The taste is not at all disagreeable, as might be suspected. The kernel is altogether too acrid to eat until the nut has been thoroughly parched, and even then it has a slight pungency, which is, however, rather agreeable. It was difficult to find out to what extent and for what purpose the nuts are used for food, but a single family often uses 3 or 4 bushels in one year, and many Indians have a considerable supply on hand throughout the whole of the year. Not more than a dozen or two are consumed at a single meal, and therefore it seems probable that they are used either as a relish, condiment, or stimulant. Several Indians informed me that they often took a quantity of the nuts with them when they were forced to take long tramps through the woods or to go a long time without food. The Indians compare them with coffee, and indeed the parched fruit tastes considerably like that substance. They are never used, however, to make a drink of, although the bark of the root is so used, according to an intelligent half-breed Concow. On the other hand, the kernel contains some starch and from 40 to 60 per cent of a peculiar fatty oil which may have some food value. The nuts are roasted and eaten, often with clover, or are roasted, shelled, and pounded up into a small mass, which on account of the large content of oil is easily molded. When so prepared it is called "bread" (*pōl'-cum hŏt'-mil*) by the Yuki.

A chemical investigation of the fixed oil contained in the nut was made by Prof. J. M. Stillman and Prof. Edmond O'Neil[1] at the University of California, but no dietary or pharmacological work was done upon it.

The medicinal use of the leaves is extremely varied. Their value depends almost entirely upon the pungent volatile oil which they contain, and they are mostly applied externally in the form of a decoction, either for their cooling, irritant, or insecticidal and germicidal effect. To cure headache, a portion of a leaf is either placed in the nostril or several are bound upon the forehead or under the hat, or the head is washed with a strong decoction of the leaves. This is done also to kill vermin on the head. As a counterirritant for chronic

[1] Am. Chem. Journ., vol. 4, pp. 206 to 211. 1882–83.

stomach complaints a large quantity of the leaves is often tied around the body and left for a couple of days. A decoction is sometimes taken internally to cure both the stomach ache and headache. To cure rheumatism, which is now a common complaint among the Indians, a quantity of the leaves is thrown into a large amount of hot water, which is used for bathing purposes twice a day for two or three days. The oil causes the skin to smart and this necessitates thorough rubbing. The remedy seems to be a good one, for several white people have adopted it. Among the latter, however, the leaf is rubbed up with lard, and used thus in the form of an ointment. It is also claimed that the oil is the chief ingredient of some patent medicines. It is now being distilled in considerable quantity at a few places.

The aromatic vapor from the leaves thrown upon a slow fire is highly esteemed as a cure for many diseases, although the leaves are not used in the so-called sweat baths. I am assured that it is not a very uncommon sight to see an Indian standing in the smudge produced by the use of these leaves.

The leaves appear to be very valuable for driving fleas away. One Indian said that they are very effective if strewn about the yard, and one white man assured me that, after spending $10 to $15 on flea powders in a vain endeavor to drive these insects away, he had used laurel leaves with very marked success. The Pomo name for the nut is *bā-he'*, and for the tree *bā-hem'*. *Bok* is the Numlaki, and *sō-ē'-bä* the Concow name for the tree.

PAPAVERACEAE. Poppy Family.

Eschscholtzia douglasii (Hook. & Arn.) Walp.

Hö-yö-em'-el (Yuki).—The light yellow California poppy, which grows in prodigal abundance in open ground throughout the region. The fresh root is placed in the cavity of a tooth to stop the toothache, and an extract from it is used as a wash or liniment for headache, suppurating sores, and to stop the secretion of milk in women: internally, to cause vomiting, cure stomach ache, and, to some extent, as a cure for consumption. An extract of the leaves is used to a slight extent to stop stomach ache. One individual stated that he ate the leaves for greens, but was careful to throw away the water in which they had been boiled. Powers, in his Tribes of California, also notes the use of poppy leaves for food. The root is said to be used secretly by some of the Indians in gambling for its stupefying effect. The Little Lake name for the plant is *tä'-sha-lē;* the Yuki, *do-shū-tit'-is-dō*, and the Wailaki, *tso''-tä-tä-sit'-chö.*

Platystemon californicus Benth.

Pāl'-but, ink-ō'-um (Yuki).—The common "cream cup" of the region, a slender hairy annual with small nodding poppy-like buds, and

erect cream-colored flowers an inch or so in diameter. It is common in valleys and on grassy hillsides. The green leaves are said to be eaten for greens, but the use is probably rather restricted.

BRASSICACEAE. Mustard Family.

Brassica campestris L.

The common yellow mustard is an introduced annual for which there is no Indian name. It is one of the worst weeds in grain fields. Indians are frequently employed to weed it out by hand pulling. The extensive use of the young leaves for greens by the early settlers has been imitated by the natives.

Bursa bursa-pastoris (L.) Britton.

The common shepherd's purse, a slender introduced annual, the seed of which is used to a slight extent for pinole.

Roripa nasturtium (L.) Rusby.

The common water cress, an aquatic annual, which was introduced by the early settlers, and has now become quite abundant in Round Valley. The leaves are eaten as a relish.

Thysanocarpus elegans Fisch. & Mey.

Ōl-lō'-bich (Yuki).—A slender annual, a foot or so in height, with a long raceme of inconspicuous white flowers, which develop into peculiar lace-fringed, lens-shaped seed pods a quarter of an inch in diameter. The plant grows on low hillsides and is known as "lace-pod." The slightly pungent seeds are used in pinole mixtures and a decoction of the whole plant is sometimes used to relieve stomach ache. The Wailaki name, *bā-ō''-zhe-lä'-dit*, refers to the faint suggestion which the appearance of the fruit has to a dainty Indian basket.

SAXIFRAGACEAE. Saxifrage Family.

Philadelphus gordonianus Lindl.

Hän'-li (Yuki).—A species of syringa or mock orange, which is commonly called arrow wood in Round Valley. It is a magnificent shrub, 6 to 12 feet high, with opposite ovate leaves and clusters of large orange-like flowers. It is not found near Ukiah, but is very common in canyons and damp bushy meadows in Round Valley and is frequently seen in cultivation throughout California and elsewhere. The older, less pithy wood was formerly used to make bows, and the younger, very pithy shoots were, on account of their straightness and their light weight, especially prized for arrows by the Yukis and Wailakis.

Several old-time arrows were observed which were tipped with a solid, sharpened cylinder of oak, mountain mahogany, or dogwood,

inserted into the pith at the end of the shaft and neatly bound to it with sinew. Other arrows made by boys for sport were tipped with the butt of a French or wire nail. The feathers, commonly taken from the quail and hawk, are three in number, and are fastened to the shaft with sinew or with pitch. The pithy stems are also valued, on account of their lightness, for the manufacture of baskets used by women for carrying babies. *Kä'-kus* is the Wailaki name for the bush, and *shön'-a-hī* is the name used by the Little Lake Indians.

Ribes californicum Hook. & Arn.

Gol-lē' (Yuki).—The common thorny gooseberry of the region, which has a light-red fruit from ¼ to ½ inch in diameter, thickly covered with sharp bristles. It is rather common on dry, rocky hillsides, especially southward. The fruit has a very agreeable, acid taste, but it requires some skill to avoid the prickles. Children eat the fruit directly from the bushes, but some of the older Indians occasionally collect it in quantity and singe off the prickles in a basket with red hot coals before eating it. *Lōm* is the Pomo name for the bush and *tä-rä-tit'* the Yokia name.

Ribes divaricatum Dougl.

Äl-tē''-hēz'-mil (Yuki).—The smooth-fruited species of gooseberry, which grows plentifully in damp ground in canyons, on northern hillsides, and in bushy meadows throughout the region, especially in Round Valley. It has a small black berry which is very juicy and delicious. It fruits well and is eagerly sought after by old and young.

Tellima affinis (Gray) Boland.

Kīn-göt-gō' sä (Yuki).—A slender perennial about a foot in height, with a tuberous rootstock, small, palmately-lobed root and stem leaves, and a short raceme of white flowers which have five irregularly cut petals. One individual informed me that the root was chewed to relieve colds or stomach ache, but this information was not volunteered by others, and it may, therefore, be erroneous.

Therofon elatum (Nutt.) Greene.

No Indian name was learned for this delicate aromatic-scented perennial, sometimes known as *Boykinia data*, which grows about a foot in height on wet, mossy banks near the creek, in deep canyons. It has large, thin, palmately-lobed leaves and a terminal raceme of small white flowers. A Yuki Indian informed me that the roots were used medicinally, but for what particular purpose he did not know.

ROSACEAE. Rose Family.

Cercocarpus betuloides Nutt.

Kos-chet'-tsi (Wailaki).—The shrub very familiarly known as mountain mahogany. It grows 6 to 15 feet high, and is very common on dry, brushy hillsides throughout the region. It is easily distinguished by its small, distinctly pinnate-veined leaves, its long, feather-tailed seeds, and the extreme hardness of its wood. The wood was formerly used for arrow tips and furnished the tool used by women in digging "Indian potatoes" and worms out of the ground. For this purpose a straight, pointed stick was used, and this was taken as a badge of the gentler sex. Many of the women now use iron for digging the bulbs. The larger sticks were also used for spears and for war and fighting clubs. One old Indian related a story about a bear fight which he had seen his father, a very powerful man, engage in when he was a boy. His only weapon consisted of a stick of mountain mahogany, about 7 feet long, which had a large knob on one end and a sharpened point at the other. He placed the child in a tree for safety. As the enraged bear made a dash at the Indian, he, jumping skillfully to one side, hit the animal a terrible blow on the legs as it passed. Again and again, as the bear dashed forward, it was struck on the legs until it was nearly disabled, when it was speedily dispatched with the sharp end of the club.

Fragaria californica Cham. & Schlecht.

Pol-put' mäm (Yuki). -The wild strawberry, which is fairly common on wooded hillsides. The berry is much like that from the cultivated plant, but smaller. It is never gathered in quantity, but is eaten, especially by children, direct from the vines.

Rosa californica Cham. & Schlecht.

Käl'-ē (Yuki).—The wild rose which forms a considerable part of the brush fields in damp soils in Round Valley. It has an abundance of semifleshy fruit, but this is very rarely used for food.

Rubus parviflorus velutinus (Brewer) Greene.

Wä'-sā (Concow). -The well-known thimbleberry, a thornless, wide-leaved shrub, 3 to 8 feet high, with showy white flowers. It is abundant on brushy hillsides throughout the country. The berry is red and has much the appearance of a raspberry, but is more nearly hemispherical. Further south the berry is rather dry and insipid, but the more abundant rainfall of this region, together with the fogs which frequently cover certain areas, develops a more fleshy and finely flavored berry. It is never gathered in quantity, but is eaten directly from the bush by old and young alike.

Rubus leucodermis Dougl.

Tē-täm' kä-lā' mäm (Yuki).—The wild black raspberry of the region, a wide-spreading shrub with greenish-white, excessively thorny branches, 3 to 5 feet long, and a delicious black, juicy fruit. The fruit, the under side of the leaves, and the young branches are covered with a white powder or bloom which gives the plant its specific name. The Indian name signifies "mountain thorn berry" and is equally descriptive with the above. This is the most important of all the wild berries of this county. The fruits are eaten in the fresh state, and when gathered in considerable quantity are dried or canned for winter use. Special trips are taken into the coast mountains after the berries in July, when they are usually ripe.

Rubus vitifolius Cham. & Schlecht.

Gol-lē' (the g very guttural) (Yuki).—The common blackberry. The black, juicy berries are eaten directly from the vines and are occasionally dried for winter use. The infusion of the root is the most common remedy used for checking diarrhea. The Little Lake name for the vine is *ti-ti-mē'*; the suffix *yem* is added to indicate the root. The Concow name for the vine is *wân-hö-mil'-ē*.

PYRACEAE. Pear Family.

Amelanchier alnifolia Nutt.

No Indian name was obtained for this shrub. It grows 8 to 10 feet high along streams in the hills and is well known as service berry. The black, glaucous berry is somewhat juicy and is used in the fresh state to some extent for food. The wood was sometimes used for arrows.

Crataegus rivularis Nutt.

Äl-tē''-hez'-mil (Yuki).—The common thorn, a bush or small tree, 10 to 15 feet high, with numerous clusters of small, white, sweet-scented flowers. It is sparingly armed with short, woody thorns, and bears numerous clusters of diminutive, apple-like fruits, which ripen early in the fall. The fruit is so bony that it is used very little for food. The wood is used to some extent for fuel, but care is taken to avoid the thorns, which are considered to be more or less poisonous. *Löm'-kä-lā'* is the Little Lake name for the tree; *hē* is added to designate the wood from it.

Heteromeles arbutifolia (Ait. f.) Roemer.

Mil-kö'-chē (Yuki).—The common toyon or Christmas berry of California, an evergreen tree, 10 to 25 feet high, which is characterized by rigid, sharply serrate leaves and large clusters of holly-like fruit.

These ripen very late in the autumn and are much used as a substitute for the true holly for Christmas decoration. They are also quite largely used for food by the Indians. They are occasionally eaten direct from the tree, but they are generally cooked first. This is sometimes done by boiling, but most frequently by roasting a bunch of them over red-hot coals or by tossing them about with hot coals in a basket. The cooking is said to change the disagreeable acid taste to a sweet one, but I had no opportunity, on account of the season, to test the truth of the statement. A decoction of the leaves and bark is used to allay stomach ache and various pains and aches. The Pomo name for the tree is *but''-zä'-zä;* the Yokia, *k7-yī'*.

AMYGDALACEAE. Peach Family.

Cerasus demissa Nutt.

Pō-mä' mäm (Yuki). —The deciduous wild or choke cherry, known by some authors as *Prunus demissa*, which has pendant racemes of large, shining red or black berries, a third to a half inch in diameter. It grows commonly in openings in oak and Oregon spruce forests, and especially in open valleys, throughout the region. The fruit is very astringent while still red, but when black and fully ripe it is quite edible, although rather tart. The tree fruits very abundantly in Round Valley and large quantities of the cherries are consumed either in the fresh or dried state. A few Indians have recently been taught to can the fruit and to make jelly out of it. This is not done on a large scale, however, because so much sugar is required in the process.

The inner bark is gathered in large quantities by some individuals for its medicinal value as a tonic, to check diarrhea, and to relieve nervous excitability. The Yokia name for this cherry is *hō-sä' kä-lā';* the Wailaki, *nin-kōs'-jē*.

Prunus subcordata Benth.

Gos'-i (Concow). The wild plum, a scraggly deciduous shrub, 3 to 10 feet high, which yields in favorable localities an abundance of delicious red or purple fruit nearly an inch in length. The bush is not very common in this region, nor does the fruit develop well, but it is sometimes gathered for food, and used to be dried in some quantity when long special trips were made for it.

CASSIACEAE. Cassia Family.

Cercis occidentalis Torr.

Chā'-ā (Yuki).—The common redbud of the region, a magnificent wide-branching shrub, 8 to 20 feet high, which is conspicuous in early spring for its wealth of small reddish blossoms and in summer and fall

for the beauty of its large, thin, kidney-shaped leaves and its abundance of thin, green and red seed pods. It is very common on brushy hillsides and the margins of valleys throughout the district. Both the bark and the wood from the young sprouts are gathered in the fall and used for the strands of some of the finer baskets. They are used either like thread or merely as woof to twine in and out in the so-called twining baskets. The wood is also used for withes in making up the skeletons of some baskets. Baskets made of redbud are very common and are often very pretty, but they are not so durable as those made from roots, especially those of different species of saw grass or Carex. Considerable ingenuity is exercised in the collection and manipulation of the material to produce a varied result. The branches are sometimes cut down in winter or early spring so as to insure suitable material for use the next fall. The color of the bark is then slightly red, but this is often changed into a darker red by exposing it to smoke, and is blackened in various ways, as by soaking it in dirty water or in water and ashes, or in a decoction of oak bark to which scraps of old iron have been added. The bark is separated by first steaming the wood and then peeling. It is entirely separated when it is to be used as thread, but some of the wood is left adhering to it when the strands are to be used for twining. By so doing the strand appears white on one side of the basket and red on the other. The bark is said to be used by the old settlers as a substitute for quinine in chills and fever. The Little Lake name for the bush is *mū-lā'* and the Yokia name *kä-lā' ä kä-lā'*. The Concow names given are *dop* and *tal'k*.

VICIACEAE. Vetch Family.

Lathyrus watsoni White.

Jol'-lish fal (Yuki).—A stout, scrambling, pea-like vine which has light-green tendril-bearing leaves and showy clusters of brownish yellow flowers. It so completely covers wide areas of level land in Round Valley with its tangled growth that it is very difficult to walk through it. It makes excellent fodder for horses and cattle and is sometimes cut for hay. None of the Round Valley people admitted that they ate the plant, but a Yokia Indian informed me that at the present time it is frequently cooked and eaten for greens when only about 3 inches high. The older plants are sometimes boiled and applied as a poultice to swollen joints. The Yokia name is *kal-kä-tzä'*.

Lupinus carnosulus Greene.

Māl-chū'-lēz (Yuki).—A stout, succulent, annual lupine, 1 to 2 feet high, which has a loose verticillate raceme of showy deep-blue flowers in early spring and grows thickly together in large patches in damp valley land throughout the region. The young roasted leaves were

formerly used to some extent for greens. The Little Lake name for this little annual is *koi-ē' kä-lā'*, which signifies "raven tree." I was unable to learn the connection between the two names.

Lupinus luteolus Kellogg.

A plant which is referred rather doubtfully to the above species is one of the most serious weed pests of Round Valley, often completely covering wide areas of bottom land with such a uniform and profuse growth that one is readily led to believe that it was planted as a staple crop. It is a smooth, very stout-stemmed, wide-branching annual, 3 to 5 feet high, with yellow, sessile, verticillate flowers, and silky, two-seeded pods. No Indian name has been applied to the plant and it appears to be an introduced species. The white people know it as "seven-year weed" or "butter weed," the latter name referring to the color of the flowers, the former to the erroneous idea that it appears only every seventh year. Horses eat the tops sparingly in June when they are still succulent, and earlier in the year they are eaten for greens by a few Indians. Care is taken to throw away the first water in which the leaves have been boiled. I was informed by one individual that the seeds were used also for food after they had been pounded into flour and leached like acorn meal, but the statement appears to be somewhat questionable.

Medicago denticulata Willd.

The common bur clover is an introduced annual which has no Indian name. It grows in the grass everywhere and also on gravelly river bars. It is a valuable forage plant, the seeds as well as the leaves affording much nourishment. Sheep often eat the dried seed pods in summer after they have fallen to the ground. Powers records a statement that the Wailakis used to have a dance in spring when the plants became crisp and ready to eat. It seems probable, however, that in Round Valley these Indians now prefer various species of true clover.

Psoralea macrostachya DC.

Hoi'-tā (Concow). -A light-green, woody perennial, 6 to 12 feet high, which has soft, trifoliate leaves and numerous silky, oblong or oblong-oval clusters of rather inconspicuous purple flowers. The plant does not grow in Round Valley, but is rather common along streams and river beds near Ukiah. The inner bark is very strong and fine and was formerly used by the Concow and Yokia tribes for thread. The strong root fibers are still sparingly used in the manufacture of hunting bags and for rope. This fiber was first noticed in the possession of a Concow Indian at Round Valley, who informed me that he obtained it near Ukiah. He called my attention to the pleasant aromatic odor which the fiber had retained for over a year, and from his

description and his name I was enabled to collect and fully identify the plant at Ukiah a few weeks later. The Yokia Indians told me of its former use for thread and of its manipulation with a certain bone of the common gray tree squirrel as a substitute for a needle, but the Pomo Indians near by seemed to know nothing of the plant. The root fiber is now very little used, but it was formerly considered superior to the fiber from dogbane on account of its pleasing perfume and white color. The large roots have to be pounded most vigorously before the fibers separate and become flexible. The best-known Indian name for the plant is *mat'-ka*, the Yokia name.

Robinia pseudacacia L.

The ordinary Eastern locust has been cultivated in the Indian reservation for ornament and shade. The Wailaki chief informed me that chickens are fond of the seed and I have noticed horses eating sparingly of the leaves.

Trifolium spp.

Sō (Pomo).—This Pomo name is very nearly the equivalent of the word clover, but inasmuch as it is applied to a few other plants, such as pepper grass (Lepidium), which belong to entirely different groups and orders, it is to be regarded as a broader term, which in general signifies any plant the leaves of which are eaten green and in the uncooked state. Each different kind—sweet, acid, mountain, and tree clover—is designated by a special syllable, used generally as a prefix but occasionally as a suffix. The Yukis do not appear to have one special generic name, but *sik* and *pots* are frequent as suffixes in their names.

Many kinds of clover grow in great profusion in the limy soils of the West, and as a class they are considered excellent forage for all kinds of animals. In other parts of the world some of them have been occasionally eaten for food by man. In Ireland, for example, the dried flowers and seed heads of the common white or Dutch clover have in times of famine been ground into flour and converted into bread, and in the Eastern and Southern States the poorer negro families occasionally eat one or two species with vinegar as a salad. With the Indians of Mendocino County, and especially of Round Valley, however, clover enters into their diet as an essential element even at the present time. The fresh green foliage taken before flowering is the part most generally eaten, but the flowers of three or four species and the seeds of one or two are also used. After flowering the leaves are apt to be tough and bitter. From the beginning of April along into July it is no uncommon sight to see small groups of Indians wallowing in the clover and eating it by handfuls, or to see an Indian squaw emerging from a patch of clover and carrying a

red bandanna handkerchief full of the crisp stems. Under the present system of separate and restricted farms the latter method is now usually adopted. At home the clover is often placed out of doors in the grass and carefully shielded from the withering effects of the sun by a blanket. Old and young and even the more civilized Indians of Round Valley tell me that they eat clover and that some of the species, especially the sweet clover and the acid clover, are very good and nutritious food. The facts are certainly unquestionable, but it is presumable that habitual use, and perhaps inherited character, as well as the extended use of condiments, must have some particular effect on the digestibility of the material. According to chemical analysis the leaves contain most of the essential food ingredients.

As in the case of cattle, however, it sometimes causes bloat, which, according to Powers, is relieved in case of the Patwin Indians of the San Francisco Bay region by the internal use of a decoction or extract of soaproot or by rubbing or treading upon the stomach. One case was cited to me where an old squaw died in the middle of a clover patch from the effects of bloating due to the clover which she had eaten. It is quite probable that the Indians have learned to eat other substances along with the clover which aid in the digestion and tend to prevent bloating. Pepper nuts seem to be so used, and nowadays the clover is often dipped into salt water before eating, a practice which formerly was not generally observed. So extensively has the prodigal abundance of clover entered as a factor into the lives of these Indians that it is not only used as a food, but special dances were formerly held to commemorate its appearance in spring. Powers shows also that it enters into the games of some of the tribes.

Trifolium bifidum decipiens Greene.

Sā pots (Yuki).—A small, sparsely-leaved and rather tough-stemmed annual. It is eaten very sparingly and only when quite young. One individual stated that the seeds make good pinole.

Trifolium ciliolatum Benth.

Choi'-ē pots (Yuki, "jaybird clover").—A small, smooth, tough-stemmed annual which grows under trees, and is consequently called *kä-lā' sō* (tree clover) by the Pomo. There is a very considerable difference of opinion in regard to the edible quality of this species. The Yuki, some of the Pomo, and especially the Concow, claim that it is not fit to eat, and one of my best informants in the latter tribe cited a case where a young girl was said to have been poisoned by eating it. One Yokia and one Wailaki informant told me that it was good to eat. Horses are said to eat it with impunity.

Trifolium cyathiferum Lindl.

Mūl'-sic (Yuki).—Another tough-stemmed clover which is very little eaten by the Indians, but greatly relished by stock. It grows among grass, especially in the mountains, and is therefore known as "mountain clover." A woman was observed eating the flowers. The Pomo name is *mä-tas' sō*.

Trifolium dichotomum Hook. & Arn.

Pä-shō'-lā (Yokia).—A tough-stemmed clover which bears numerous terminal clusters of showy red-purple flowers an inch in length, and has large seeds. It grows most abundantly in open fields near Ukiah. The leaves are sparingly eaten when very young and the seeds are sometimes gathered for pinole.

Trifolium obtusiflorum Hook.

Kā sō lök (Pomo).—A stout, erect clover, 1 to 3 feet high, which grows late in spring and in early summer on well-drained soil, near stream banks in the open country. It has narrow, sharply saw-toothed leaflets and rather large, reddish-purple and white flowers, and is very distinctly characterized by the peculiar sticky exudation which even at midday in June covers the flower heads and growing stems like dew. This exudation has a strong acid taste and on this account the clover is variously known as "sour" or "salt" clover. The name "spring clover," which is sometimes applied to it, was given because it so often grows near springs in the mountains. Notwithstanding the sharp acid taste, it is considered to be one of the very best clovers for green food. It is sometimes eaten just as it is, but the leaves are generally eaten only after the acid exudation has been washed away. Dipping in salt water gives considerable relish to the plant. The Yuki name is *sä-cöm'*; the Numlaki, *jä-gilt'*.

Trifolium variegatum Nutt.

Pē-ni-mē' (Yuki).—An annual clover, with numerous heart-shaped leaves, small dull-purplish heads of flowers, and slender stems, which form dense tangled growths in damp valley land. It is common throughout the region and is considerably used for green food.

Trifolium virescens Greene.

Sik and *bät* (Yuki).—These two names were given me for a clover which grows in large patches about Ukiah and in Round Valley, especially on the western side. It is readily distinguished by its large succulent stems, ovate leaflets, and large inflated yellow and pink flowers. All parts of the plant are sweet, and on this account it is well known as sweet clover. It is unquestionably the favorite species for

eating. The herbage is eaten even when the plant is in flower, and the flowers and seed pods are likewise used for food. The seeds are not separated and made into pinole, but eaten raw. The Pomo name is *bä-hā'*.

Trifolium wormskjoldii Lehm.

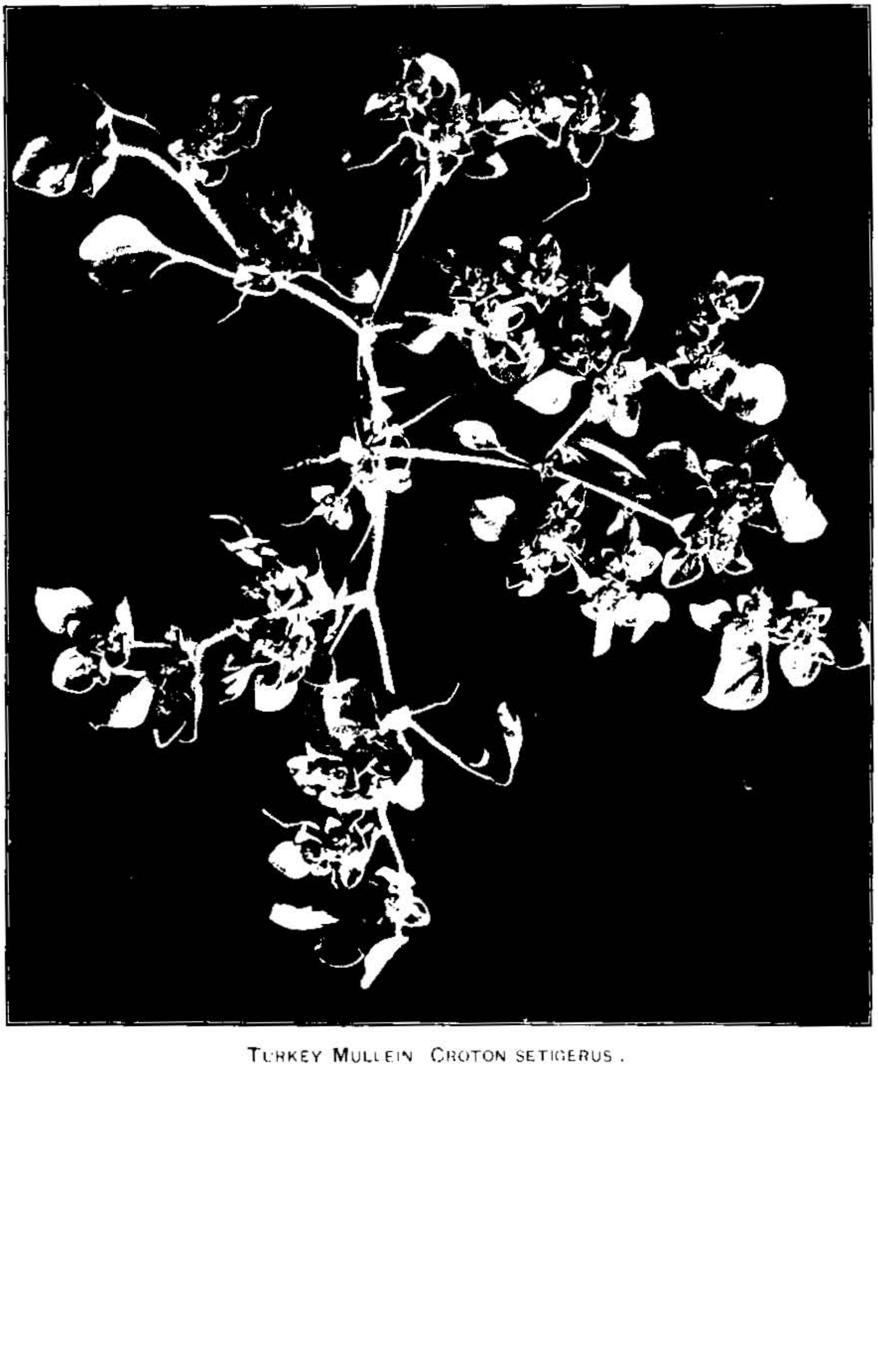
Pē''-ai-pēn-sil' and *sä-ēūn'* (Yuki). These names were given to me for a robust succulent perennial, a foot or so high, which has ovate leaflets three-fourths of an inch in length and numerous showy heads of purple and white flowers an inch or so long. It grows in tangled masses in damp valley land throughout the region, often occupying

FIG. 74.—Clover eater.

wide areas, to the almost total exclusion of other plants. Toward the last of June this is the only species that is gathered and eaten in large quantity. Figure 74 represents a woman leaving one of these large fields with a handkerchief full of the clover. The flowers are eaten as well as the leaves. Two Pomo names were given for the plant, *bē-tä' sō* and *kä sō*.

Vicia americana Muhl.

Pōl''-jē-pāl-mök' (Yuki).—A weak scrambling or climbing pea-like vine, with thin tendril-bearing leaves and small clusters of bright purple flowers. It is common in grassy fields and in brush throughout the region. It makes very good fodder, and, when young, is often cooked and eaten for greens by various tribes. The



TURKEY MULLEIN CROTON SETIGERUS.

cooking process formerly consisted, on account of the lack of vessels suitable for boiling, in baking the stems, but since the introduction of tinware they are now more frequently boiled. The Yuki name given above refers to the use of the stout roots in tying. One individual informed me that they were remarkably strong. For some reason or other a small bunch of these roots is said to be kept in the pocket for good luck while gambling. The Little Lake name given for the plant is *shä-wä-kä'*.

EUPHORBIACEAE. Spurge Family.

Croton setigerus Hook.

Shä' om (Pomo).—A very low, gray weed (Pl. XIX), native to California, and popularly known as "turkey mullein." Some authors give it the technical name *Eremocarpus setigerus*. It grows abundantly in black adobe soil everywhere throughout the open country from July to November, and is very conspicuous on account of its dainty, mat-like appearance. Its circular outlines are very prettily arranged in flat, leafy rosettes, as shown in the plate. The white, bristly hairs which cover the whole plant in the greatest profusion are very characteristic, each bristle being a part of a compound hair, which radiates outward from the leaf in all directions. Both the flowers and the fruit are inconspicuous. The shining, bean-like seeds, only a sixth of an inch long, are borne in great abundance, and in summer and autumn constitute one of the favorite foods of the wild mourning dove, which flocks to localities where the plant is particularly abundant, a circumstance which the Indians take advantage of in order to kill them in large numbers for food. Turkeys feed on the seed also, and on this account, and on account of the wooly, mullein-like appearance of the leaf, the plant has been called turkey mullein. The Indian name above given signifies "fish soaproot;" for, as the name implies, the bruised leaves are used as a substitute for soaproot in the process of catching fish by stupefying or poisoning them. It is hardly inferior to soaproot for catching fish, but this use has not been known to some of the tribes, especially the Yokia and Pomo, for so long a time, having been taught to them in this instance by more southern tribes. The early Spaniards were well acquainted with the use of this plant, and therefore called it yerba del pescado (the fishing herb). A recent popular name which suggests the intoxicating action of the plant is "fish locoweed." The plant is altogether too commonly used both by the Indians and whites for catching fish. It is used in precisely the same manner as is described under *Chlorogalum pomeridianum*.[1] The exact cause of the stupefying or crazing effect is not known. Some Indians attribute it to the stellate hairs, which, they

[1] Page 320.

say, attach themselves to the eyes and gills and make them frantic. If these should become thus attached, they would undoubtedly cause great distress, but the chemical qualities of the plant may easily account for the effect. Not only is the odor very strong, but the taste is exceedingly acrid, as it is in most of the members of the spurge family to which it belongs. A cursory examination of the eyes and gills of fish caught by means of the plant would probably settle the question, for the stellate hairs are exceedingly characteristic of the plant.

The Concow are particularly acquainted with the plant, and use it for medicinal purposes as well as for catching fish. The fresh leaves are bruised and applied to the chest as a counterirritant poultice for internal pain; a decoction of the plant, or some of the fresh leaves, is put into warm water which is used as a bath in typhoid and other fevers, and a weak decoction is taken internally as a cure for chills and fever. White people sometimes use it for the latter purpose, but so far as known it has not yet been widely used in such a way. The Yuki name is *kĕ-chil' wä-ĕ-mŏk'*.

ANACARDIACEAE. Sumac Family.

Rhus diversiloba Torr. & Gray.

Ma-tū'-yä''-hō (Pomo). —The shrub commonly known as poison oak, which is common in valleys and on hillsides everywhere throughout the county. It is much less vine-like than the eastern poison ivy, but is equally as poisonous to the touch. The older full-blooded Indians are not readily poisoned by it, and in fact several of them use it for various household purposes, and have even been seen to eat a dozen leaves or more without distress, but the half-breeds are often badly affected by handling it. According to Dr. Hudson, *ma-tū'* means doctor. *Yū* is the Pomo name for south, and *hō* means fire. The bush is therefore the southern fire doctor. Its principal medicinal use is to burn out and remove warts from the hands. The practice is carried out by cutting the wart off to the quick and then applying the juice. I was told that after a few applications the root is totally removed inside of one or two days. It is used in a similar manner to remove ringworms. One Indian, a Wailaki, informed me that if the fresh leaves were quickly bound to the wound made by a rattlesnake the effect of the venom would be counteracted. The fresh leaves were formerly used by the older squaws not only to wrap up acorn meal for the baking process, but, as the late Dr. Charles Mohr informed the writer, from personal observation among the Concows near Marysville, to mix with it. The object was not ascertained. The slender stems are still occasionally used for circular withes in basket making. The fresh juice turns black rapidly on exposure to the air, and is some-

times used on this account to make temporary tattoo marks on the skin. These disappear as soon as the skin is renewed, but the color, as a rule, is very permanent. Some of the purest black strands seen in the Pomo baskets are produced, according to Dr. Hudson, by applying the fresh juice to them.

The fruit, which ripens at Round Valley in June and July, is freely eaten by the common yellowhammer and by squirrels, and hogs are said to fatten upon both the leaves and the fruit.

For remedies in case of poisoning the Indians have commonly been taught to apply saleratus, and possibly the use of soap root as a paste was taught to them by the early settlers, but this appears doubtful. One undoubtedly original cure consists in applying a strong decoction of the root of the sunflower (*Wyethia longicaulis*) to the affected parts.

The Wailaki name for the plant is *kots'-tā*.

Rhus trilobata Nutt.

Bö-bö'-ē (Yokia).—The wild red-fruited sumac, a shrub 2 to 5 feet high, with very aromatic leaves and yellow flowers. It is rather common in open sunny spots around Ukiah, but was not observed in Round Valley.

One of the leading men of the Yokias informed me that seventy or eighty years ago, when smallpox was particularly prevalent in Anderson Valley, and few, if any, white men were around, the fruit, which is rather viscid and acid in taste, was used as a remedy against this disease. The ripe berries were dried and then finely powdered. While the pox were still dry, water was added to the powder, which was then applied as a lotion. When the sores were open and moist, the powder was dusted upon the surface. This is quite probably the smallpox remedy which a Round Valley medicine woman referred to, but said that it did not grow inside the valley.

The wood is used by the Indians in southern California for making baskets, but it does not appear to be extensively used for such a purpose in Mendocino County.

ACERACEAE. Maple Family.

Acer macrophyllum Pursh.

Pal-gön'-shē (Yuki).—The large-leaved maple of the district, a tree 50 to 90 feet high, often 2 to 3 feet in diameter, which bears characteristically large, five-lobed leaves, measuring from 5 to 10 or more inches across. It grows in the valley near streams and in moist situations in the mountains. The inner bark when taken from the tree in springtime "looks very white and new," and is especially valued by the Concow for making baskets. In the fall it is not so desirable. I was told that in former years it constituted the chief material from which this tribe made their baskets. From the bark

also they made a crude dress which consisted of a horizontal girdle with broad, vertical streamers.

A very singular use to which the bark is applied in catching deer was made known to me by the chief of the Wailakis, Captain Jim. In the case recited a number of men were engaged for several days in gathering the bark, cutting it into bands about an inch in width and fastening it together as a continuous roll which looked much "like a roll of barbed wire," but was very considerably larger. This band was suspended "like a telegraph wire" on stakes about 4 feet high so that an immense letter V was formed, the apex of which extended out into the valley, while the ends terminated at the mouths of two adjacent canyons. The V line was, therefore, over a mile in length. The space included in the V was selected for the excellence of its pasturage, and especially on account of the fact that deer were known to feed there. After everything was arranged three Indians disguised like animals and armed with brittle sticks, a piece of smoldering oak bark, and a bone dagger resorted to the open end of the inclosure and if any deer were within the V stationed themselves at the end of the lines and in the middle, and then stealthily proceeded on the approach. If a deer came near to the maple band one of the Indians would shake the band and thus frighten it back; if one attempted to pass a man he would break a stick or expose the glowing piece of oak bark; finally, when through sheer fright they were coralled at the apex, the Indians would suddenly jump up and kill them with the bone daggers.

AESCULACEAE. Horse Chestnut Family.

Aesculus californica Nutt.

Dē-sä' kä-lā' (Pomo).—The California buckeye or horse chestnut (Pl. XX), a more or less shrubby tree 10 to 40 feet in height, which bears a great abundance of fragrant clusters of white flowers from May to July, which, in autumn, are partially replaced by large luscious-looking fruits 1 to 2¼ inches in diameter. The 3 to 7 fingered leaves usually drop off the tree a month or two after flowering time and thus expose the fruit, which often hangs on until the beginning of winter. The Pomo translation for their name is "fruit tree." No name could be more appropriate for the particular use of all the Indians, both at Ukiah and Round Valley, for without exception all of the tribes eat the fruit in considerable quantity even at the present time. Some state that when properly cooked it is "awful nice," or that "it is better and healthier than potatoes," and even some of the more well to do and refined state that it is "pretty good." When raw, however, it is commonly regarded as poisonous and recognized by at least one of the tribes near Ukiah as a means of committing suicide. The fruit is undoubtedly poisonous in the fresh state. Two or three

CALIFORNIA BUCKEYE, 'AESCULUS CALIFORNICA'.

methods are used in preparing it for food, but they consist essentially in roasting and then washing out the poison. The buckeyes are placed in a hole lined with rock and willow leaves in which a fire has previously been built, more willow leaves are added and the whole is covered with hot ashes and dirt and allowed to remain from 1 to 8 or 10 hours. The fruit then has the consistency of boiled potatoes, and may be either sliced, placed in a basket, and soaked in running water for from 2 to 4 or 5 days, depending upon the thinness of the slices, or mashed and rubbed up into a paste with water (when the red-brown skin floats and is removed from the surface) and placed to soak from 1 to 10 hours in sand, as in the case of acorns. A wider and deeper hole is used because the water drains off more slowly. After this process the resultant mass, which has the consistency of gravy, is ready for consumption. It is frequently eaten cold and without salt. Buckeyes decay or sprout very rapidly and are therefore not preserved for future use for long periods. After sprouting the taste is said to be disagreeable. The buckeye fruit is also a favorite food for squirrels, but hogs will not eat it. It is claimed that they are very useful for expelling bot worms from the intestines of horses, and that when they are eaten by cows they are very apt to cause abortion.

The leaves or young shoots are probably used to a slight extent by the Yuki and Concow to poison fish, but for this purpose they are inferior even to blue curls (*Trichostema lanceolatum*). Sheep and cattle nibble at the leaves, and cattle, especially, seem to get fat on them. A large cattle owner informed me, however, that cattle when thus fattened lose their flesh with remarkable rapidity when driven over the country to any considerable distance. The bark is apparently the only part of the tree used medicinally. Small fragments are placed in the cavity of a tooth to stop the toothache. One well-authenticated case of the fatal poisoning of goats from eating the bark was recently investigated by the writer. The mistletoe which occasionally grows upon it is said to be used as an abortifacient.

The wood, which is quite soft, was formerly used as twirling sticks in the process of making fire by friction. The Yokia name for the tree is *bä-shā'*, the Yuki, *sympt'-ōl*, and the Numlaki, *fär'-sökt*.

RHAMNACEAE. Buckthorn Family.

Ceanothus cuneatus (Hook.) Nutt.

Yūk (Yuki).—A low evergreen species of California lilac 6 to 12 feet high, which has small, thick opposite leaves, rigid branchlets, white flowers, and large, three-horned resinous fruit. It forms impassable thickets on the edges of the valleys and on low, dry hillsides. The brush is useful on account of its rigid branches in building fish dams. Deer feed on the leaves and squirrels are fond of the seed, which is

produced in great abundance. The white flowers are called *yük-kuml'* and are probably used for some purpose. The Pomo name is *bä-käm'* and the Wailaki *hit.*

Ceanothus integerrimus Hook. & Arn.

Hē'-bē (Concow).—A blue or white flowered species of the California lilac 5 to 12 feet high, which has long, flexible branches, thin, alternate, ovate leaves, and elongated racemes of flowers followed by three-lobed fruiting capsules. It is common on brushy hillsides, especially in forests of yellow pine and Oregon fir. The Concow squaws gather the young flexible shoots for the circular withes of baskets, and also collect considerable quantities of the seed for pinole. The taste of the bark is somewhat like that of wintergreen, but I could not learn that it was put to any medicinal use, nor could I find that other tribes made use of the shrub. The fruiting capsule, exclusive of the seed, is exceedingly bitter and would probably repay a chemical investigation. The fruit is borne in great abundance.

Rhamnus californica Esch.

Hō-sä' kä-lā' (Yokia).—A bush or small tree 4 to 20 feet high, with thin, herbaceous, narrowly elliptical leaves, small green flowers, and black, berry-like fruit ⅛ to ½ an inch in diameter. It grows on rocky hillsides and near streams throughout the region and is well known there, together with *Rhamnus tomentella*, as pigeon berry and pigeon bark. Wild pigeons eat the berries. Elsewhere the shrub is known under the old Spanish name of *cascara sagrada* (sacred bark), and also as coffee berry, the fruit and seeds bearing considerable resemblance to those of coffee. Neither is edible. The flowers are borne in the greatest profusion and attract one's attention in passing, either on account of their delicate perfume or by the hum of bees, flies, and other insects which sip their nectar. The bark is a valuable cathartic and kidney remedy. With some of the Yokia it is regarded as almost a specific for grippe. Their method of preparation and use, which is different from that of other tribes, is as follows: A handful of the bark is thrown into a gallon or so of water and boiled "until it tastes like wine." The bitter taste is said to disappear entirely on long boiling, but the extract, if swallowed, is still nauseating and causes dizziness. It is taken as freely as possible. Three cups is said to have cured a man who had such a bad case of mania that he could be held down only with the greatest difficulty. The Yuki name is *um'-pē* or *tun'-ti;* the Concow, *pö*, and the Wailaki *shast-kēt'-ä.*

Rhamnus purshiana DC.

This species differs from *R. californica* in being usually much taller and more tree-like in habit and in having very much longer leaves, with a coarser and more prominently veined structure and less narrowly

elliptical. It is the cascara sagrada of commerce, but not that of the earlier Spanish settlers. One or two trees were pointed out to me in Round Valley, but it does not appear probable that the Indians have learned to distinguish between the two shrubs. It is more abundant farther north in Humboldt County.

Rhamnus ilicifolia Kellogg.

Bä-shöm' (Yokia).—A species of buckthorn, 6 to 15 feet high, which has long and very flexuous branches, small, evergreen holly-like leaves, which are yellowish or rusty beneath, and small semifleshy red berries about a third of an inch long. The fresh inner bark is orange-colored, aromatic, and, although not disagreeable to the taste, very slightly bitter. My Yuki informants told me that it was "good medicine," but were unable to tell me for what purpose it was used. The bush is very common in the hills about Round Valley and on the river bottoms south of Ukiah. The Wailaki name for the bush is *di-kö'-shö.*

VITACEAE. Grape Family.

Vitis californica Benth.

Shē-in' (Pomo). -The native wild grape of the region, which climbs over trees in canyons and in damp places to a height of 30 feet or more. The fruit is purple, about one-third of an inch in diameter, and is borne rather abundantly in large clusters, which ripen in late summer. The berry is full of seeds, and generally very sour; but my Yokia informant, who seemed to be especially well versed in Indian lore, told me that while those vines which grow on laurel and willow trees produce tart fruit, those that grow on the white or black oak produce sweet fruit. As the latter grow in drier and more open situations, the difference, if such exists, must be attributed to this cause. A very good jelly is made out of the fruit by a few of the better educated women. The smaller woody parts of the vine are extremely flexible and are considerably used by the Pomo tribes for the rims of their large cone-shaped carrying baskets. It is gathered at almost any time and soaked in water and hot ashes, after which the bark is removed and the wood split into a couple of strands, which, although very coarse, are used substantially as thread. The Yuki name for the wild grape is *möt-mö' mäm*, the Numlaki *kop.*

LOASACEAE. Loasa Family.

Mentzelia laevicaulis (Dougl.) Torr. & Gr.

Kā-tsak'-ū (Wailaki).—A fine perennial, 2 to 3 feet high, which has a dry hispid surface throughout, a whitish stem, light green leaves 2 to 6 inches long, with wavy saw-toothed margins, and most magnificent yellow flowers, 3 to 4 inches in diameter. The Indian children call the plant

"star flower," because it opens only at night; but it well deserves the more elegant and distinguishing name of "blazing star," which has been applied to it more generally. The plants grow singly or in patches on the dry rocky beds of streams throughout the county, blossoming late in summer. The Indian name signifies "sticky plant" and was applied because the leaves, which are densely covered with short barbed hairs, stick to the clothes of passers-by. A decoction of the leaves is used internally to relieve stomach ache and as a wash in some loathsome skin diseases. The Little Lake name is *ek*.

DATISCACEAE. Datisca Family.

Datisca glomerata (Presl) Benth. & Hook.

Hā chä-hä' kä-lā' (Pomo).—A smooth, stout, very leafy perennial, 5 to 7 feet high, which bears very considerable resemblance in the form and arrangement of the leaves to the nettle. It may at once be distinguished from the latter by the absence of stinging hairs. Specimens of this plant were collected near Ukiah, none having been observed at Round Valley. It grows rather sparingly along mountain streams, being more common southward. The name given above signifies "bitter-sick tree." The plant is herbaceous, except that it is slightly woody at the base, but its leaves and roots are most intensely bitter and give the saliva a greenish-yellow tinge. Both parts are used, even at the present time, to procure trout, being manipulated in exactly the same manner as soap root. It is said that water newts and frogs are not affected by the juice when applied in this way, but that trout are killed very quickly. My Yokia informant told me that their name for the plant is *wen*, and that it is a good "fish medicine."

ONAGRACEAE. Evening Primrose Family.

Boisduvalia densiflora (Lindl.) Wats.

Mū-sē'-päl (Pomo).—A widely branching, very leafy annual with numerous small rose-colored flowers in the axils of each leaf. The fruit is a cylindrical capsule about three-fourths of an inch long, which bears numerous tiny gray seeds. The plant is abundant in low, damp soils throughout the county. The seed has a rich nutty flavor, and is largely gathered for pinole and for bread.

Godetia albescens Lindl.

Lēl'-mil (Yuki).—A stout, erect, leafy annual, 1 to 2 feet high, which bears numerous purple flowers about an inch in diameter, in dense spikes on short, leafy branches at the top of the stem. It grows rather commonly in moist bottom land in Round Valley. The seed is borne in great abundance, and is used at the present time for pinole. A decoction of the leaves is said to be an excellent wash for sore eyes. The Pomo name is *bē-mō'*.

ARALIACEAE. Ginseng Family.

Aralia californica Wats.

Gos'-ē-zi sō (Pomo).—An aromatic, perennial herb, 8 to 10 feet high, with compound leaves bearing heart-shaped leaflets 4 to 8 inches long and numerous spherical clusters of small, white flowers. It grows in damp places in deep canyons throughout the county, but is not abundant anywhere. The Pomo name signifies "elk clover," but the best accepted common name is "California spikenard." The sweet aromatic roots were found in several Indian houses, both at Round Valley and at Ukiah, and the growing plant was afterwards pointed out to me at Ukiah by an Indian guide. A decoction of the dried root is highly valued as a medicine, especially for diseases of the lungs and stomach. It is used a great deal for consumption, for colds, and for fevers. The Yuki name given for the plant is *bu-kī'-muk*, the Concow *mâl-ē-mē'*.

APIACEAE. Celery Family.

Angelica sp.

But''-chō'-ä (Pomo and Yokia).—A very aromatic umbelliferous plant, about 2 feet high, with bipinnate leaves and broad, thin ovate leaflets an inch or so long, which are finely and conspicuously net-veined and often lobed near the base. The flat elliptical fruit is about half an inch long by one-third wide. It is abundant on rocky hillsides in the open chaparral at Round Valley. The root is woody and varies greatly in size from one-fourth of an inch up to 1 or 2 inches in diameter.

Angelica root, as it is most commonly called both by the Indians and whites, is a most valued remedy and talisman. It is found in nearly every household and is frequently carried about the person for good luck in gambling or hunting. Those roots found in places where the plant does not generally grow, especially cold places, are the more highly prized. The root, after thorough mastication, is sometimes rubbed on the legs to prevent rattlesnake bites, and it is also tied around the head and ears in bad cases of headache and nightmare. The juice mixed with saliva is used as a remedy for sore eyes. It is chewed and swallowed in cases of cold, colic, and especially fever. For cold and catarrh it is very frequently crushed up and smoked like tobacco. The fresh, young sprouts, being sweet and aromatic, are eaten raw with great relish. The seed, although produced in considerable abundance, does not appear to be used for any purpose whatever. The Yuki name of the plant is *chi-en'*.

Carum kelloggii Gray.

Shä-bō'-tä (Pomo and Yokia).—A smooth, slender, and mildly aromatic perennial about 5 feet high, which grows abundantly along creeks and in open meadows throughout the country, and is well known as "anise." The plant has very sparse foliage above, but the root leaves with their linear leaflets 2 to 4 inches in length are very prominent in May or June, when they are still tender. They have no resemblance to clover, but on account of their sweet taste and since they are greatly relished in the raw state, as clover is, the plant is frequently called "sweet clover," a name which is applied also to *Trifolium virescens*.

The most characteristic feature of anise is its fascicle of strong, slightly fleshy, and hard-fibrous roots, and the peculiar flat ellipsoidal tubers which it bears in varying abundance. Some plants bear only one or two tubers about half an inch long, while others in rich land are said to bear much larger ones in much greater abundance. Together with the semifleshy roots, they form a favorite source of food, being eaten raw, cooked like acorn bread, or used for pinole. The seeds also have a very agreeable aromatic taste and are largely used to flavor other kinds of pinole. The strong outer root fibers, which are rigid and quite hard like bamboo, are on this account made into compact cylindrical brushes an inch or so in diameter, which are used "for combs." It is apparent, therefore, that combing the hair, as well as the use of soap, is not an operation introduced entirely by the white man. The Yuki name of the plant, *möm-sin'*, has special reference to the tubers.

Cicuta spp.

Specimens of the poisonous water hemlocks were looked for in vain both at Round Valley and at Ukiah and no reliable information about them was obtained, but I was informed by an old settler that the plants do grow in Round Valley, and it is well known that some of the species are found in considerable abundance in the adjoining counties. It would be very interesting to learn whether the plant is used for any purpose or is ever mistaken for other plants with fatal results.

Daucus pusillus Michx.

Skut-in'-jet (Wailaki). A small erect annual ½ to 2 feet high, which has very finely dissected leaves and white flowers and looks very much like the ordinary cultivated carrot, but has no edible fleshy root. It grows in considerable abundance on dry hillsides, but is not used for any other purpose than that of a talisman in gambling. It is said that the Spaniards regard it as a valuable remedy for rattlesnake bite. The Yuki name is *hös''-ü'-sisht*.

Heracleum lanatum Michx.

Mun'-shök (Yuki).—The most robust umbelliferous plant of the region, which has compound leaves with leaflets 4 to 10 inches broad and flower clusters often 10 inches in diameter. It grows 3 to 8 feet high in damp ground among the brush, in valleys or on northern hillsides, and is well known as the "cow parsnip." The tender leaf and flower stalks are sweet and very agreeably aromatic and are, therefore, much sought after for green food in spring and early summer before the flowers have expanded. In eating these, however, the outer skin is rejected. Mr. George Grist who has had an extended experience with the Indians of Round Valley, and who in 1892 was the Government farmer for the reservation, informed me that he had seen the hollow basal portion of the plant used as a substitute for salt. It was dried in short cylinders and eaten either in the dry state with other food or placed in the frying pan and cooked into the substance to be eaten. A strong decoction of the roots is said to have been used by the earlier Spaniards as a lotion for rheumatism. The Yokia name for the plant is *tä-rä-tit'*, and the Concow is *chou'-mē-ō*.

Lomatium utriculatum (Nutt). Coult. & Rose.

Nī'-ē and *kin-göt-gō'-sä* (given as Yuki).—A slender, yellow-flowered plant a foot or so in height, which has very finely dissected leaves and grows in considerable profusion near the schoolhouse in Round Valley, both on the level land and on brushy hillsides. It is also called "clover" or "fir clover" by the Indians, who eat the young leaves raw in May or June when they are still crisp. The Pomo and Yokia name for the plant is *shä-bö'*.

Sanicula menziesii Hook. & Arn.

Sē-ū-didl'-ā (Wailaki).—A yellow-flowered plant 1 to 2½ feet high, which has bristly toothed, palmately lobed leaves and small globular fruit well armed with weak, barbed bristles. It grows in shady places everywhere throughout the district, being a rather disagreeable weed on account of the seed catching in the clothing. The Indian name refers to the fact that the seeds often catch in the hair when one lies down in the shade. The root is supposed to bring good luck in gambling if chewed and rubbed on the body. The seed has a taste very much like that of angelica, but is perhaps more bitter. No medicinal use of the plant was learned.

Sanicula tuberosa Torr.

Kā'-ā bŏ (Pomo). – A delicate plant 3 to 4 inches high, which has a spherical tuberous root, small, very finely divided leaves, and small, yellow clusters of flowers. It grows in the hills throughout the county. The bulb is only a half inch or so in diameter, but on account of its delicate flavor it is considered one of the very finest of the so-called Indian potatoes. It is generally eaten in the raw condition. The Wailaki name for the plant is *je-snä'-ti*.

ERICACEAE. Heath Family.

Arbutus menziesii Pursh.

Foin'-ke (Yuki).—The common madroña of the Pacific coast, a superb and stately evergreen tree, 80 to 100 feet in height. It grows very plentifully and adds greatly to the beauty and, as a native shade tree, to the comfort of the Indian villages and towns about Ukiah. It is less common and is apt to be bushy in Round Valley, although some splendid trees are to be found there. A striking character of this tree, which it has in common with the manzanitas, is that about the 1st of July each year a thin layer of the bark exfoliates from the tree in cinnamon-like quills, thus exposing a new surface, which changes in the course of a few weeks from green to a polished light-brown color. As the limbs are almost cylindrical and the new bark is continuous throughout, the tree is thus enabled to retain all of the beauty and symmetry of youth. One Yuki Indian informed me that this exfoliated bark was formerly used as a tea for the relief of stomach ache, but this usage could not be verified.

In February and March the madroña is thickly covered with white, globular, wax-like flowers, which furnish an abundance of wild honey, and late in the fall and until the middle of January the fruit is an abundant and favorite source of food for countless doves and wild pigeons, and for barnyard poultry, especially turkeys.

Concerning the edible qualities of the fruit there seems to be some difference of opinion. Several white people affirmed that it is not deleterious, and that their children are rather fond of it, as it has a sweet taste. The Wailakis, Little Lakes, and Calpellas eat it, but some of the Concows and Yukis claim that it is deleterious and causes vomiting if eaten in any considerable amount. So far as the author is aware, however, no specific case of poisoning has been traced to eating the fruit. None of it is kept by the Indians for winter use, because the berry soon decays when bruised, apparently containing a ferment which produces this result. Deer are very fond of the fruit.

The Little Lakes make an infusion of the leaves for the cure of colds. The wood is fine-grained, and would be very valuable for furniture if it did not check so badly. The Indians use it for lodge poles

MANZANITA ARCTOSTAPHYLOS MANZANITA.

and make saw handles, stirrups, and various little tools of it. It is valued commercially for the manufacture of charcoal for gunpowder. As a fuel it burns so rapidly and emits so much heat that it should be used along with some slow-burning wood. Cows will eat the leaves when green grass is scarce. Both the leaves and the scarlet berries are highly prized for decorative purposes. *Dis-tā'-tsi* and *kou-wät'-chu* were given to me as the names used by the Concows for the tree; the Little Lake name is *k7'-yū* and the Yokia *kab'-it*.

Arctostaphylos manzanita Parry.

Kō-öch'-ē (Yuki).—The common manzanita (Pl. XXI) of California, a magnificent evergreen shrub, usually 8 to 15 feet high, with highly polished, mahogany-colored branches and berries.

This species of manzanita is an exceedingly common shrub throughout the region, generally occupying wide areas on dry, barren ridges, often to the entire exclusion of other vegetation, and in masses so thick that they are impenetrable to man.

The fruit is not much more than a third of an inch in diameter, but the quantity produced is very large. It was used very extensively by the Indians when the Spanish priests first settled the country, and from the latter it received the name "manzanita," which means "little apple," and was suggested by the shape of the fruit. This name has been universally adopted as the common as well as the botanical specific name of the shrub. The generic name is derived from two Greek words meaning "bear" and "grapes." Bears are exceedingly fond of the fruit, and it is in manzanita patches that they are hunted during the summer and autumn. The ripe fruit is dry, mealy, and very nutritious. Its time of ripening used to be memorialized by the Concows and other tribes by holding a special dance and "big eat." The green fruit is very tart and so indigestible that it is apt to cause colic, but when eaten in small quantity it is of great value in quenching thirst, an item of considerable importance, because the shrubs often grow on dry and barren hillsides. During July and August, when the berries are ripe, a number of squaws go out into the hills with their babies and their huge carrying baskets and beat off large quantities of the berries. These are caught in the baskets and carried home, where they are eaten raw or cooked, converted into cider, or stored away for the winter. During the gathering, which may last for a considerable time, the babies are protected from thirst by wrapping them up in the soft, flexible green leaves of the mountain iris.

The Yokia Indians recognized the fact that the bushes do not all yield equally well, and on this account certain large and prolific bushes, and even large areas, were owned by a family or a tribe, and only after the rightful owner's demand was satisfied could the fruit be picked by others. Tribute was often exacted for permission to gather food materials from such property.

An estimate made by Stephen Powers allows as great a yield of solid nourishment in selected acres of these bushes as in the best acre of wheat ever grown in California, proper allowance being made for the cost of cultivation. They are eaten whole in great quantity, but some tribes, especially the Numlakis, use them as a powder, like pinole, or cooked up in hot ashes and made into bread or mush. Death is said to occur from eating the fruit too freely. The bowels become stopped with great masses of seeds and pulp and death follows, with contraction of the pupils and general tetanic spasms, such as are observed with strychnine poisoning or in the symptoms of cerebro-spinal meningitis. Dr. J. W. Hudson, who has had a large practice with the Guidiville (Pomo) Indians near Ukiah and who furnished the above symptoms, states that he has observed at least five fatal cases, in all of which the same effect was noted. One similar fatal case has been reported by Dr. B. C. Bellamy, a former ageney physician at Round Valley.

The method of making manzanita cider as practiced by one of the more civilized Concow women is worthy of note, for from personal experience the beverage can be recommended as delicious. The ripe berries, carefully selected to exclude those that are worm-eaten, are scalded for a few minutes, or until the seeds are soft, when the whole is crushed with an ordinary potato masher. To a quart of this pulp an equal quantity of water is added. The mass is then poured immediately over some dry pine needles or straw contained in a shallow sieve basket, and the cider is allowed to drain into a water-tight basket placed beneath, or sometimes it is allowed to stand an hour or so and then strained. After cooling, the cider is ready for use without the addition of sugar. It is delightfully spicy and acid in taste. From some information obtained, it seems probable that some of the Indians not only ferment the cider to obtain vinegar, but also to obtain an alcoholic beverage. The Yuki name for the cider is *kö-öch'ök*. A better quality of cider is said to be made from the pulp alone. The berries are ground up in a "pounding basket" and the seed fragments separated by means of a flat circular basket about a foot in diameter. Some of the ground material is placed upon this, and it is then thrown repeatedly into the air, falling on the mat when it is in an inclined position. The fine flour will cling to the meshes, while the heavier seed parts will roll off on the ground.

The Calpella Indians make a tea of the leaves "to cure severe colds," but they are commonly regarded as "too strong" for internal use. In this connection it is interesting to note that the leaves of a closely related species (*A. glauca* Lindl.) have recently been largely manufactured into an extract for the cure of catarrh of the throat and stomach. The Little Lakes boil the leaves till the extract is yellowish red and then use it as a cleansing wash for the body and head—in the

latter case to stop some kinds of headache. The leaves are also used by them and by many white people of the county to check diarrhea. An analysis of the dry leaves made by W. H. Rees, of the University of California, shows that they contain about 8 per cent of tannin.

The old Concow women chew the leaves into a thick cud and place the mass on sores for the healing effect; the younger people grind the leaves up with water before applying. It is also used for sore backs on horses.

The crooked, beautifully polished limbs are much prized by white people for fancy woodwork, and a straight manzanita cane is a valuable rarity. The wood makes an exceedingly fine fuel, but it should be used with other more slowly burning wood, because the heat evolved is so great that the stove is very quickly warped and destroyed.

Two V-shaped branches about a yard in height are used, especially by the Yokias, as a convenient way for carrying a large amount of wood on the back. The forks are so selected that one prong on each is straight. After the wood is piled upon the forks the ends of the straight sticks are grasped with both hands and slung over the back. Dr. Hudson states that he has seen a Pomo Indian easily carry 210 pounds of wood on his back with this contrivance.

Bees gather large quantities of honey from the flowers from January to March, and children are fond of sucking or eating the globular waxy flowers.

The Yokian and Little Lake name for the bush is *kī-yī'*. *Bu-kī'* is added to designate the fruit, and *chō-pä'* for the leaf. *Pä-göt'* is the Numlaki name of the bush.

Arctostaphylos tomentosa (Pursh) Dougl.

Kö-öch'-ē (Yuki).—The same Yuki and the same Numlaki names are used for this species as for the preceding. The Little Lake name is *ki-yam'-pö-ē*, and the Wailaki is *te-nis''-tâ'*. This species is not so common as the preceding, but is found in considerable abundance on the west side of Round Valley. It may be distinguished by its somewhat smaller size, the hairiness and lighter grayish-green color of its leaves, and its smaller somewhat puberulent fruit. The uses differ in no way, except that the berry is a little more highly prized for cider. The fruit is smaller, but the edible portion is larger in proportion to the seed.

VACCINIACEAE. Huckleberry Family.

Vaccinium ovatum Pursh.

The Indian name for this shrub was not learned. It is the common evergreen huckleberry of the redwood belt in the coast regions, where it forms dense jungles 3 to 5 feet high on high and bleak ridges. It is a

handsome plant, and in this region, where it is daily bathed with fog, it yields large quantities of sweet black berries about the size of a pea. In July and August the Calpella and some of the other Indians travel 20 to 30 miles to gather large quantities of berries, which they consume immediately or make into pies.

PRIMULACEAE. Primrose Family.

Dodecatheon hendersoni Gray.

Hun''-möl'-ish (Yuki).—The common shooting star or mosquito bill. Its flat, succulent radical leaves, and its umbellate clusters of curiously shaped rose-purple flowers make the plant very conspicuous in early spring. The roots and leaves used to be roasted in the ashes and eaten by the Yukis. The flowers are used by women to ornament themselves at dances. The Yokian name of the plant is *kä-däch'-käch''-dō*.

OLEACEAE. Olive Family.

Fraxinus oregana Nutt.

Pök (Yuki).—The Oregon ash is rather common in the low, moist soil of Round Valley, and is valued by the Yukis chiefly for fuel and for making tobacco pipes. It will burn while still green. Straight pipes are made out of a section of limb about a foot long and a couple of inches thick by whittling it down to a small diameter except at the end, which is left intact. The bowl is dug out with a knife or burned out with a red-hot iron, and a red-hot wire is forced through the pith, which, being quite scanty, adapts the wood specially to this purpose. Ash pipes were observed both in the valley and around Ukiah. As the bowl is not at right angles with the stem, but in the same line, it is suitable for use only when the smoker is lying down, the position in which it is actually used. The ash leaf is a favorite food of a little black army worm which has white spots on its back. The worm is consumed in large quantities as food by several of the tribes in Round Valley. The fresh roots of the ash when mashed used to be particularly valued by the Yokias for the cure of wounds received in bear fights. The wood is valuable for canes and for making handles and small tools. The Yokian name is *gä-läm'*.

APOCYNACEAE. Dogbane Family.

Apocynum cannabinum L.

Mä (Yuki).—This is the common Indian hemp (fig. 75), so called from its use for fiber by the Indians, a light green, milky-juiced plant 2 to 4 feet high, with small elliptical leaves and rather inconspicuous green flowers. It grows quite commonly along ditches and in wet

soil, sometimes encroaching on gardens where it is difficult to eradicate. The inner bark collected in fall is soft, silky, and exceedingly strong. It was used not so very long ago as almost the sole source of fiber for ropes and nets, also to make garments, and as thread. Ropes and nets are still made from it by a few of the older Indian men. The Concow name is *pü*, the Little Lake *mü-shü'*, and the Yokia *si-lim' mü*.

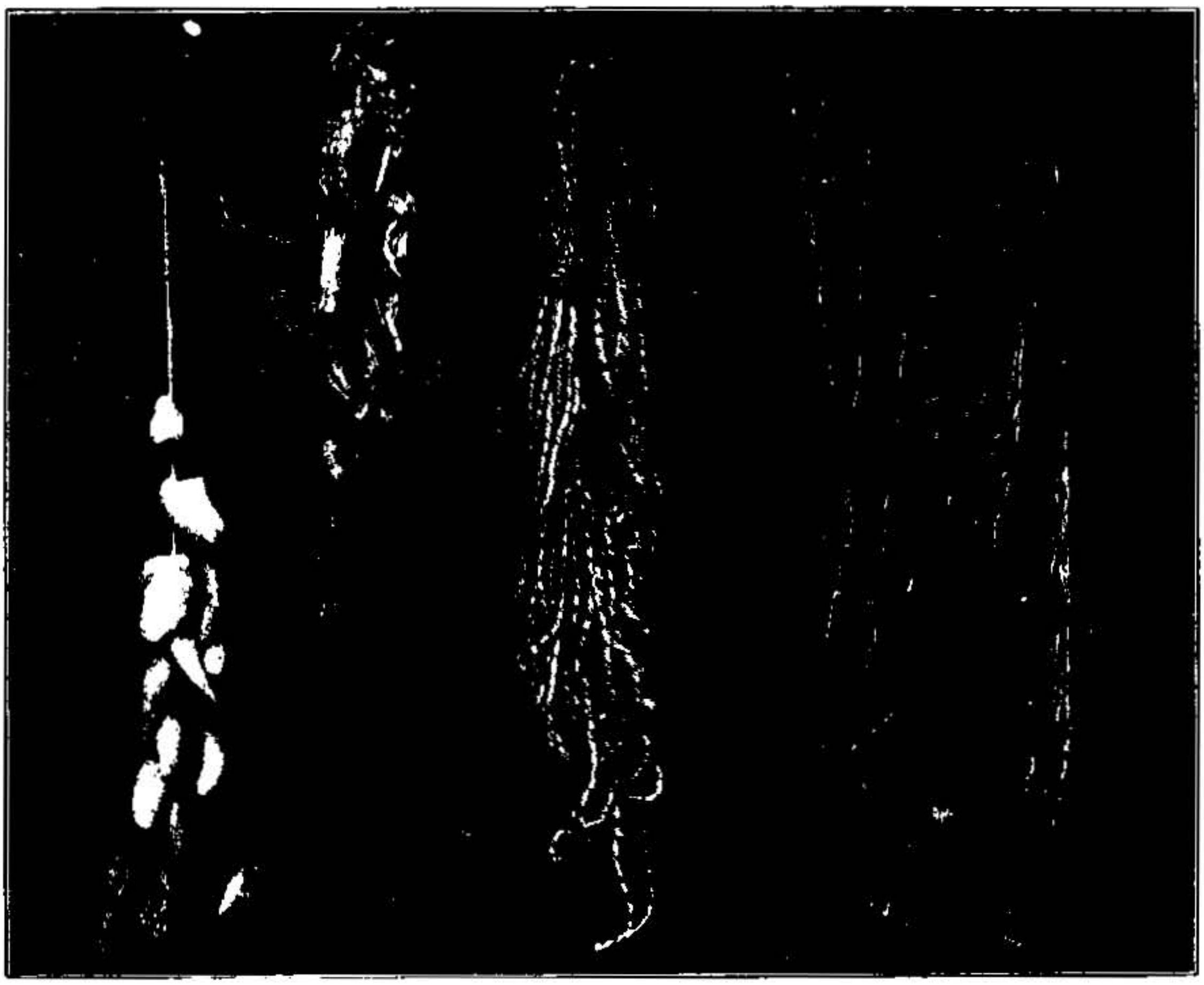


FIG. 75.—Indian hemp (*Apocynum cannabinum*).

ASCLEPIADACEAE. Milkweed Family.

Asclepias eriocarpa Benth.

Mü-chül' (white *mü*) and *chu-ul'* (Yuki). This common milkweed (fig. 76) is a leafy robust perennial weed 2 to 4 feet high, with conspicuous cream or purplish colored, sweet-scented flowers, a favorite source of nectar for bees. The broadly inflated pod contains a large number of feathery-tailed seeds which are widely distributed by the wind. It grows profusely along roadsides and in low, dry, or wet ground; sometimes, as in valleys, claiming large areas to the extent of from 60 to 90 per cent of the bulk of the vegetation. It is common throughout the interior part of Mendocino County. During the summer and autumn when the grass has been burned up by drought this milkweed is conspicuous, both for its size and for the abundance of its large, soft, flaccid, and hoary-pubescent leaves. These as well as the

stems are turgid with a sweet milky juice, in one instance as much as 18 drops having been forced out of a freshly cut stem in a few minutes. A protecting gummy or rubber-like membrane was then formed across the cut. This sticky juice is recognized as an excellent healing lotion for cuts and sores. It is valued to some extent as a means of killing warts, and was formerly used as a convenient lotion to make the pattern of tattoo marks on the skin, and to hold the soot while being pricked into the surface. The juice is irritating to tender-skinned individuals, and is generally recognized as poisonous to sheep, the juicy leaves being especially tempting when these animals are driven over dry valleys in very warm weather. One sheep man asserted that he lost 15 or 20 sheep while driving a flock a distance of about 70 miles. Another individual has been losing sheep near Ukiah from it for the past thirty years. Death is brought about within a half hour after eating. Its poisonous character is so well recognized that sheep men are careful to cut the weeds down before the sheep are driven over places where it is common.

FIG. 76.—Milkweed (*Asclepias cryocarpa*), one sixth natural size.

The Yukis make no use of the plant and repudiate it as an undesirable and diabolical importation of the whites; but some other tribes, especially the Concows of the Sacramento Valley, formerly used it for the purposes given above, and also to a greater or less extent as a source of fiber for ropes and string. The use may have been learned from the early Spanish settlers by whom the plant was more widely distributed northward. The Concow name for the weed is *bō'-kō* and the Little Lake *gō-tō'-lü*.

Asclepias mexicana Cav.

Ch'lü-rē'-kot''-sī (Yokia).—A low, wiry milkweed, which is very common along roadsides in the vicinity of Ukiah. The narrow leaves are arranged about the stem in whorls or fascicles. The showy groups of purple flowers are very attractive to various insects.

In the southern portion of the State this plant is well known to be poisonous to cows and sheep, but about Ukia it has no such reputation. In fact, the Yokia Indians occasionally eat the young blossoms as they do clover. To my surprise, the taste was found to be really pleasant, being rather sweet and somewhat spicy. Eating the flowers is not, however, to be recommended, for the plant belongs to a dangerous

group of poisonous plants, and the natives probably eat the blossoms only now and then, and perhaps in very small quantity. No further use of the plant was noted.

POLEMONIACEAE. Phlox Family.

Collomia grandiflora Dougl.

Jou'-lish (Yuki).—The common orange-flowered gilia sometimes called *Gilia grandiflora*. No use was assigned to the plant, nor could the derivation of the word be determined.

Linanthus ciliatus (Benth.) Greene.

Nun-fat'-ē (Yuki).—The common ciliate gilia of California which has also been known as *Gilia ciliata*. It is a low, dry, grayish-green annual, 4 to 10 inches high, with capitate clusters of inconspicuous purple flowers nearly hidden by sharp-pointed bristly bracts. It grows thickly on low, dry, grassy hills, and is exceedingly common throughout Mendocino County, blossoming in the summer. The flowering head was formerly used in the summer by the Yukis as a substitute for coffee. In the winter it is of no value.

The plant is known to the Calpella Indians as *kä-cō-chē-pēl'*, and is used in the form of an infusion as a remedy for coughs and colds in children. Some old Indians keep a cold decoction on hand to drink instead of water in order to purify the blood. I was assured by a white man that it did not taste bad, and that white people also used it for the same medicinal purpose.

HYDROPHYLLACEAE. Waterleaf Family.

Eriodictyon californicum (Hook. & Arn.) Greene.

Til-at'-mil (Yuki).—The well-known yerba santa (holy herb) of California, a dark-green, resinous shrub, 5 to 7 feet high, synonomously called *E. glutinosum*. It grows profusely on dry, bushy hillsides throughout Mendocino County, and is known under the names mountain balm, wild balsam, gum leaves, tar weed, and, although incorrectly, "sumac." No plant is more highly valued as a medicine by all the tribes of Mendocino County. It is found in every household either in the dry state or in whisky extract. It was early adopted by the Spanish missionaries, and recently it has been admitted into the United States pharmacopœia, being of special value in chronic subacute inflammation of the bronchial tubes, and as a means of disguising the taste of quinine. It is conceded to be one of the best medicines recently admitted into regular officinal use. The Indians have various methods of using the plant, and apply it generally in their practice of medicine. The leaf is the only part used. As a cure for colds and for asthma it is considered a specific by the native whites and Indians. It was extensively and very successfully used in Round

Valley in the winter of 1897–98 as a cure for grippe, that disease having been especially prevalent at that time. It is generally valued as a blood purifier, a cure for rheumatism, consumption, and catarrh. As a wash it is used considerably in fevers and for catarrh and consumption. It is also smoked and chewed like tobacco. For the first two diseases the tea is taken freely as a drink for several days. Some drink it either alone or mixed with horehound in place of "store tea," but this is not at all general. Its employment as a substitute for tobacco is not uncommon. When rolled up into wads and dried in the shade the leaves are considered most valuable for chewing. The taste is peculiar, being rather disagreeably resinous and bitter at first. This taste soon disappears and gives place to a sweet and cooling sensation, which is especially noticeable when one ceases to chew for a minute or drinks a glass of water. As one Indian expressed it, "It makes one taste kind of sweety inside." The bitter taste of the extract is obviated by boiling the leaves with sugar.

Sā'-tek (the t explosive) (sticky brush) is the Little Lake name of the plant and *wä-sä-got'-ō* is the Concow name.

BORAGINACEAE. Borage Family.

Amsinckia lycopsoides Lehm.

A rough, hairy annual, with small, bright, orange-colored flowers, the buds of which are arranged in a spiral coil at the extremity of the flowering stem. The fresh, juicy shoots were formerly used for food. No specimens were obtained of the plant, but the species is probably as given.

Cynoglossum grande Dougl.

Shā'-al (Yuki).—The pretty blue-flowered plant which sends up its broad tongue-like leaves and flowering stalks early in February. It is generally known as hound's tongue and blue buttons, but the Indians call it either "coyote" or "dog ear." In the early spring it is a conspicuous plant in open hillside forests.

The grated roots are used by the Concows to draw out the inflammation from burns and scalds, and by the Potter Valley Indians to relieve stomach ache. The root is also asserted to be of value in venereal diseases. The Yukis claim that the cooked roots are good to eat.

Dē-wish'-ä-mä is the Potter Valley and also the Little Lake name for the plant.

Plagiobothrys campestris Greene.

Kochk (Yuki).—A pretty, white-flowered plant, which grows so profusely in Round Valley that whole acres of ground are made white with its delicately scented forget-me-not-like flowers. On account of its abundance and the similarity in the appearance of large masses to a light fall of snow, the Indian children call the plant snowdrops. The coloring matter at the base of the young leaves is used by women and

children to stain their cheeks crimson. The crisp, tender shoots and the flowers furnish a rather pleasant, sweet, and aromatic food, and the seeds are gathered in large quantities for pinole. After careful winnowing, the seeds are parched either in an ordinary frying pan or according to the old custom, which consists in tossing them about with hot oak-bark coals. When parched, the taste is much like that of popcorn. The flour, like that from all varieties of pinole seed, is generally mixed with that of barley or wheat, and is eaten in the dry condition, with the addition of a little salt. Alkanin, the dark-red, amorphous dye obtained from *Alkanna tinctoria*, which is cultivated in southern Europe, is, according to some experiments made by Professors Pammel and Norton,[1] nearly identical with the coloring matter of various species of Plagiobothrys and other plants of the Boraginaceae. The yield of color from the plant apparently varies with age. A specimen of *Plagiobothrys ursinus* in the United States National Herbarium, which was collected on June 24, 1894, in the Santa Barbara Mountains of California, had passed its intense purple dye through three thick sheets of specimen paper lying beneath it.

VERBENACEAE. Vervain Family.

Verbena hastata L.

No Indian name was obtained for this plant, which is generally known throughout the United States as blue vervain. It is a tall weed-like perennial with small rugose leaves and a long densely flowered spike of small blue flowers. It grows in the greatest profusion in the swampy bottom lands of Round Valley, and furnishes the Concow Indians, who alone seem to use the plant, with an abundance of small seeds which are used for pinole.

NEPETACEAE. Mint Family.

Marrubium vulgare L.

The common white horehound is well known as a weed along roadsides and in dry neglected fields. It is especially abundant at the old military headquarters in Round Valley, and is there commonly known as "soldier tea." It being an introduced plant, the Indians have but little knowledge of its value. White people use a decoction of the leaves to cure colds, and some of the more educated Indians use it for the same purpose and also to check diarrhea. No Indian names were given for the plant.

Micromeria chamissonis (Benth.) Greene.

Bul-lūk'-tō (Concow).—The pretty little aromatic herbaceous vine, synonymously called *M. douglasii*, which is so well known to Californians under the Spanish name of *yerba buena* (good herb). It is a

[1] Ninth Annual Report of the Missouri Botanical Garden, pp. 149 to 151.

thin, opposite-leaved plant with short, weak stems which rest prostrate upon the ground. The plant is much sought for in damp, half-shaded ravines throughout the district. The slender leafy vines are made into rolls and dried for use as a substitute for tea. Occasionally the tea is taken to relieve colic or "to purify the blood." *Mä-stit'* is the Yokia name for the plant.

Monardella sheltonii Torr.

Bi-ki'-ki (Concow).—A light green and very aromatic half-woody plant, 1 to 2 feet high, growing, commonly, in small clusters on dry, scantily wooded hillsides. It has opposite leaves and terminal circular clusters of small purple flowers. To some small extent it is known as horsemint and pennyroyal. The aromatic sweet-scented leaves are collected preferably when the plant is in seed, and is much used both in the dry as well as in the fresh state as a substitute for tea, especially by camping parties. The plants growing in Round Valley are considered less desirable than those growing in the Sacramento Valley, because they are more bitter. The tea is also valued in colic and as a blood purifier. The Yokian name for the plant is *pō-lā'-ā*.

Pogogyne parviflora Benth.

Kūlk, the l prolonged (Yuki).—A dainty blue-flowered and very aromatic plant, which grows from 5 to 8 inches high and in Round Valley very thickly covers whole acres of overflow land in summer. The seed is gathered in surprisingly large quantities and is highly valued by the Yukis and Numlakis as a sweet aromatic ingredient of wheat and barley pinole. The taste of the leaf when taken before the flowers appear is much like that of some of the finer species of mint, being sharp and devoid of bitter or otherwise disagreeable properties.

The Concows use the leaves as a substitute for tea, and, to some extent, as a counterirritant for pains in the stomach and bowels, the fresh leaves being placed in a bruised condition over the abdomen. Many of the Indians place the culled plants in or about their houses to drive away fleas.

Salvia columbariae Benth.

Ol-ī'-pŏ (Numlaki). A fine grayish green annual about a foot in height which bears a few deeply sculptured leaves of rather coarse texture, and one or two terminal clusters of blue flowers, which are often made more conspicuous by purplish leafy bracts. A remnant of 6 or 7 pounds of the minute gray seeds of this plant was found in the possession of a Numlaki squaw, who had gathered them in Tehema County, in the Sacramento Valley, the previous year and who had valued them highly for making soup, the seeds being very mucilaginous. The species was determined from seeds sent in to the Seed Laboratory of the Division of Botany, Department of Agriculture.

Scutellaria californica A. Gray.

Lēl'-mil (Yuki).—A low, simple-stemmed plant, with opposite, odorless leaves and large yellowish-white flowers, which grows in large patches on the dry banks of streams.

The leaves were known to a white man who was well versed in Indian lore, as being intensely bitter, and it was thought by him that the Indians use them as a substitute for quinine for chills and fever. This application was, however, disclaimed by all of the Indians consulted. The plant appears to be worthy of an investigation.

Trichostema lanceolatum Gray.

Lēl'-mil (Yuki).—The very peculiar little blue-flowered annual, which covers dry grassy hillsides with its ashy-gray verdure throughout the summer months, and exhales a strong pungent odor, somewhat like that of a mixture of vinegar and turpentine. On account of the peculiar shape of the flowers the plant is commonly called blue curls, but it is also known as "vinegar weed" and "tarweed," the latter name being applied to it on account of its sticky exudation, which is so troublesome when it gets on the clothing of persons passing through fields where it is abundant.

This plant is best known as a fish poison, its use for this purpose being especially well known to the Concow and Numlaki Indians, who formerly inhabited the Sacramento Valley. These tribes mash up the fresh plants with rocks and throw this product, without any additional ingredient, into pools or sluggish streams. The fish are quickly intoxicated and float to the surface, when they are easily caught by hand or scooped out of the water with shallow sieve baskets made of small wands of willow. More often, however, other ingredients, such as soap root or turkey mullein leaves, are added. These two plants are considered to be much more poisonous than the blue curls, but the latter is preferred to the fresh leaves and fruit of the buckeye, which are occasionally used for the same purpose.

The Concows also especially value an infusion of the leaves as a head wash for the cure of feverish headaches. In summer the extract is prepared by simply soaking the leaves in cold water; warm water is used in winter. Mixed with a decoction of the leaves of the turkey mullein, the extract of the leaves is valued to some extent as a wash in cases of typhoid fever. The Wailaki name for the plant is *dots-châng'-she-bog-i.*

SOLANACEAE. Potato Family.

Datura stramonium L.

Several specimens of the common Jimson weed were observed in the streets of Covelo, and it was seen more plentifully around Ukiah, but no Indian name could be obtained for the plant and no use was assigned

to it. The first plants grown in Round Valley were imported in 1884 by a white man who made a salve with the leaves which was used for curing the sores on horses caused by the friction of the harness. There appears to be little danger of the plant spreading so as to become an objectionable weed, because the climatic and other conditions are unfavorable.

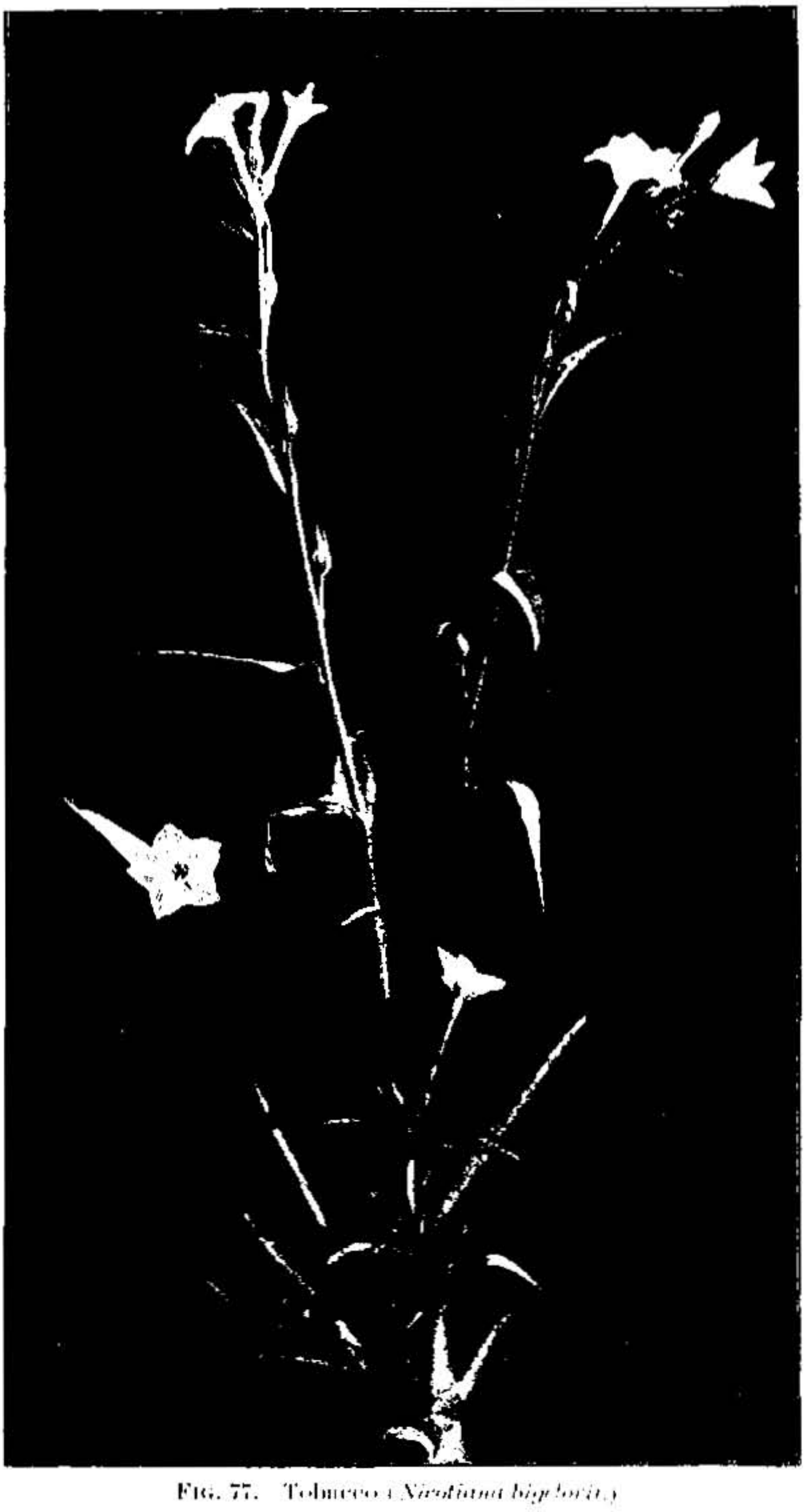


FIG. 77. Tobacco (*Nicotiana bigelovii*)

Nicotiana bigelovii Watson.

Sä-kä' (Yokia). A very viscid and ill-smelling species of tobacco (fig. 77) which is native to California and grows quite commonly along the dry beds of streams near Ukiah. The leaves, the larger of which

are from 4 to 6 inches long, are considerably prized for smoking and to some extent for chewing by all of the Indians of the county. The Round Valley Indians gather them in large quantity during the summer when they are engaged in hop picking near Ukiah and in the Sacramento Valley. The leaves are light green, and brittle when dry. The pipe used in smoking this tobacco is that described under *Fraxinus oregana*.[1]

Solanum nigrum L.

Mom'-uk (Numlaki).—The common black nightshade (fig. 78), which occurs somewhat plentifully as a garden weed throughout the district. The berries are used for food, but only when fully ripe. The green fruit is looked upon as poisonous, one case being cited by Mr. C. M. Brown, of Covelo, where in 1893 a white child was seriously but not fatally poisoned by eating the berries, some of which were supposed to have been unripe. The prominent symptoms were vomiting and spasms.

FIG. 78.—Black nightshade (*Solanum nigrum*), one-third natural size.

SCHROPHULARIACEAE. Figwort Family.

Mimulus guttatus DC.

Wä-chä' (the accented *a* being prolonged) (Wailaki).—A succulent, very showy yellow-flowered plant, which grows abundantly in water courses and especially on level land near springs. The plant is used to some extent as a substitute for lettuce, both by the Indians and the white settlers. On two separate occasions I was informed that a long time ago the ash from the leaves was used by the Round Valley Indians as one of the sources of salt. For notes on another plant, the leaves of which were used in the same way, see *Petasites palmata*.

Orthocarpus lithospermoides Benth.

Je-tsa'-chit (Wailaki).—A herbaceous yellow or pink flowered plant about a foot high, the upper flowering half of which is a simple, dense, cylindrical spike, like a painter's brush. The name "paint brush"

[1] Above, p. 378. Below, p. 395.

has been given to the plant on this account. The Indian children call it "coyote tail." It is a common plant on grassy hillsides and moist meadows, but is of no particular use to the natives. It is eaten, sparingly perhaps, by horses.

Pedicularis densiflora Benth.

Wä-i-mök' (Yuki).—A beautiful, low, herbaceous plant with finely dissected leaves and a densely clustered spike of red flowers. It may be found in open hillside forests in early spring. Children are fond of sucking the honey from the flowers. The Yuki name for the plant is the same as their name for the bird known as the yellowhammer, because the flowers are sought after by these birds for the nectar which they contain. The Wailaki name for the plant is *sel-sas'-chö*, and the Yokia, *stū-stū'-lä*.

Verbascum thapsus L.

The woolly mullein, so commonly introduced into the eastern United States, has become a garden weed in Mendocino County and other parts of California. As is usual in the case of introduced plants, the Indians have no name for it. It has no particular value to them other than to adulterate tobacco, a use which has been taught them by some of the poor white settlers.

PLANTAGINACEAE. Plantain Family.

Plantago lanceolata L.

The English plantain completely covers large areas of meadow land in Round Valley. The Indians have no common name for it and the only use assigned to the plant is that of fodder. It is eaten sparingly by cattle.

VIBURNACEAE. Honeysuckle Family.

Lonicera interrupta Benth.

Hī-wät' (Yuki).—The somewhat erect bushy species of honeysuckle which is found on brushy hillsides throughout the eastern part of the county. Children are fond of sucking the nectar from the long yellow flowers. The long flexible stems are used to a slight extent for the circular withes in baskets, and a concentrated tea is sometimes made from the leaves and used as a wash for sore eyes.

Sambucus glauca Nutt.

Kē-wē' mäm—kē-wē', elder; *mäm*, berry (Yuki).—The common pale elder of California. In the vicinity of Ukiah it frequently attains the dignity of a small tree, but in Round Valley it is seldom more than a shrub. It is very abundant, almost a weed, in level land, in grain fields, and along fences in both localities, having been spread,

apparently through the agency of birds that feed freely on the ripe berries. The berries formerly were eaten raw and dried for winter use, yet they were not consumed so extensively as they now are, because of their high acidity. Since the advent of the white man the more civilized Indians have learned to add sugar and make pies out of them; also to preserve them in cans, and even to make jelly of them. They are pronounced to be "awful nice to eat."

Nearly every household is provided with a quantity of dried elderberry blossoms which are used medicinally for several purposes. A decoction is used externally as a lotion for sprains and bruises, and in fevers; also as an antiseptic wash for the itch, and for open sores in domestic animals. It is used internally by the Little Lake Indians to stop bleeding from the lungs in consumption, and is particularly valued by the Potter Valley and Yokia Indians to allay stomach troubles. A decoction of the leaves is used to a less extent as an antiseptic wash. The inner bark is a strong emetic, but is seldom used.

The wood contains a large quantity of pith, which was formerly used as an easily combustible material for starting a fire by means of a knife and a piece of flint. The soft wood was also used to some extent as a twirling stick in the process of making fire by friction. After the pith is removed the wood is used in making syringes or "squirt guns," for whistles, occasionally for flutes, and very commonly as the material of an instrument used at dances for making a clapping sound. This consists simply of two half cylinders of the wood which are fastened together at one end. It is used by striking the free ends against the leg or in the palm of the hand. Other woods, especially the Chinese bamboo, are used for the same purpose.

In folklore, the bush figures with some of the Concow Indians as a cure for warts. These people do not treat the wart with the juice of the poison oak, according to the custom of some other tribes, but merely cut the wart and hold the hand or a finger for some time on the ground at the base of the bush. It is looked upon as a perfect cure.

The different parts of the elder are used so extensively that it was an easy matter to secure a considerable number of Indian names for it. Among the Wailakis the tree is known as *chin-sök'*, the Concows call it *nō-kōm-hē-in'-ē*, the Yokias *bä-tē'* (*kä-lā'*, tree), the Calpellas, Potter Valleys, and Little Lakes *kit-tā'* (*bu-kī'*, berry). The last-named tribe also call the berries *ga-lā' bu-kī'*.

Symphoricarpos racemosus Michx.

Bu-kwâl' (Yokia and Little Lake of Round Valley).—The slender, branched shrub commonly called snowberry, which grows in great abundance on level land throughout the county. The common name is given to the plant on account of the white waxy berries which

remain on the shrub throughout the greater part of the winter. The shrub is especially prized for its wood, which, while very light on account of the large quantity of pith which it contains, is yet very strong and durable. The slenderest twigs are bound together and used by the Yokias as a broom for sweeping; the medium-sized branches make first-rate arrows, and less than a century ago they were, according to Dr. Hudson, of Ukiah, used for pipestems. This was at a time when the use of stone pipe bowls was more universal than at present. The Pomo name of the plant is *sä-kä' hī*, the first two syllables of which constitute the particular name for the wild tobacco (*Nicotiana bigelovii*) of the region. *Hī* may be translated roughly as "the wood for." The English equivalent for the word may be taken simply as "tobacco wood." The branches which are a trifle larger are, on account of the appropriate diameter of the pith and the firmness of the wood, especially valued for making the revolving shafts of the drill commonly used by the Indians of this region for making their shell money. The Yuki name for the plant is *âl-lôn-gō'-bl*, the significance of which could not be determined.

CUCURBITACEAE. Cucumber Family.

Micrampelis marah (S. Wats.) Greene.

Zhâl-zhol'-ē (Yuki).—A long, trailing, or high-climbing vine, commonly called "big root," which is rather common along streams and on open northward slopes throughout the county. It is sometimes known among botanists as *Megarrhiza marah* S. Wats. As the common name indicates, the characteristic feature of the plant is its root, which is spherical and fleshy, often a foot or more in diameter. On account of its resemblance in size and shape to a man's head, it is not infrequently called "man root." The leaves are palmately lobed and are from 3 to 6 inches wide by a little over one-half as long. The long racemes of white bell-shaped flowers are for the most part sterile, but a few develop into fleshy, oblong-oval, and weak-spiny fruits 3 inches or more in length, and these contain several orbicular, nut-like seeds an inch or so in length by about a half-inch in thickness. In form they resemble the seed from which strychnine is derived. They are nearly as bitter, but in addition they are exceedingly acrid. The root is also very bitter and acrid. Both are poisonous when taken internally, and are, according to one informant, used by some Indians for the purpose of suicide. It is worth noting in this connection that Wilkes in his United States Exploring Expedition states[1] that a decoction of the root or seeds of a species (indeterminable) of the same genus called wild cucumber is used by Indian medicine men to poison aged people when they become sick and decrepit. The root was formerly used

[1] Vol. 4, p. 362. 1845.

in the way described under *Chlorogalum pomeridianum*[1] to poison fish which were used for food after being properly prepared. In the domestic practice of medicine both the seeds and the root are very highly valued as a specific against rheumatism and venereal diseases. In practice the fresh root is sometimes rubbed over the rheumatic joints or on the boils and swellings, but it is considered better to roast it in ashes, mash it up well with the hands, and then apply the pasty mass to the skin till it draws blisters. It is claimed that this method is comparatively painless and that it is very effective. The seeds are applied externally in the same manner and are also eaten after they have been roasted until they have become badly charred. For the cure of a certain complaint of the urinary organs, two seeds are eaten in the morning and two in the evening before meals. The Calpella name given for the plant is *mä be-hā' yem;* the Yokia, *he'-tē.*

Mr. J. G. Cooper in the Pacific Railroad Reports[2] states that the root of a certain species (unnamed) of Micrampelis is said to have strong cathartic properties, and that that of a California species has been used to make a well-known brand of "bitters."

CICHORIACEAE. Chicory Family.

Scorzonella maxima Bioletti.

No Indian name was given for this plant, and it has no common name. It is a perennial, 2 to 4 feet high, with a fleshy and very milky-juiced root; has broad, lanceolate root and stem leaves 8 to 12 inches long, with entire margins, and bears several solitary, long-stemmed heads of large, nodding yellow flowers. The plant is very common in wet bottom land in Round Valley. The root is rather bitter, but was formerly used to a small extent for food. The milky juice is converted into a gummy substance after a few hours exposure to the sun, and in this state it is occasionally used by school children as a substitute for chewing gum. The bitter taste which is first experienced is said to be transient.

CARDUACEAE. Thistle Family.

Achillea millefolium L.

Nun-ält'-mil (Yuki).—The common weed known everywhere as yarrow. A tea is made of the leaves and flowers, which is considerably prized in the treatment of consumption, for stomach ache and headache, and as a lotion for sore eyes. An alcoholic extract is applied externally for sprains and bruises.

---

[1] Page 320.

[2] Vol. 12, pt. 2, p. 61. 1860.

Achyrachaena mollis Scheuer.

Ch'ō'-mel (Yuki).—A small annual 4 to 14 inches high, which is densely covered throughout with fine soft hair and has large cylindrical clusters of inconspicuous flowers which gradually develop by the expansion of the feathery pappus into very conspicuous and pretty globular seed clusters. The plant grows in great profusion in low ground throughout the county. The seed is only a quarter of an inch or so in length, is very hard and sharp, like an awl, and is moreover very abundantly supplied with a chaffy pappus, yet in May and June it is gathered in large quantities even at the present time for pinole. The pappus is either rubbed off between the palms of the hands or knocked off by tossing the seeds about with rocks and afterwards winnowing in a shallow basket, or by combining this process with that of roasting by tossing the seeds about with glowing coals. It is then generally mixed with buttercup seeds, which ripen at about the same time, and the whole is ground into a fine meal for pinole. The Yokia name for the plant is *yē-hō'*, and the Pomo, *chē-bä'*.

Anthemis cotula L.

Pō'-muk (Yuki). —The common dog fennel or mayweed, an ill-smelling annual, about a foot in height, with finely dissected leaves and numerous white flowers. The Numlaki Indians call the plant *yē-mā-dos'-il-slū*, which means "trail weed." It was evidently introduced into Round Valley at an early date, for it is now a troublesome garden weed. The Yuki name given above has reference to the acrid effect of the herbage upon the eye, for the juice is exceedingly irritating to the skin. After playing with the dog fennel, children very frequently suffer from the poison for several hours. On this account the plant is known to some of the Indians by the name of fireweed or fire grass.

Notwithstanding this acrid quality, the juice is occasionally used as an eye wash, but it is too harsh to be recommended for such a purpose. The fresh plants are sometimes placed in bath water, which is then used as a wash both for severe colds and for rheumatism. White residents make an ointment by frying the older blossoms with lard, and this is used for sore throat and to some extent for rheumatism.

Artemisia heterophylla Nutt.

Komp'-lū''-li (Pomo).—A slender aromatic plant, generally known as wormwood. It grows 3 to 5 feet high, and has soft lance-shaped leaves, which are woolly beneath and of irregular outline, and it bears loose terminal panicles of inconspicuous flowers. The taste of the leaf is exceedingly bitter, but the odor is most agreeably aromatic. It is very common in rich land throughout the entire district, being especially common in valleys. No native plant is more highly esteemed for its medicinal value. A decoction of the leaves is con-

sidered by both Indians and whites as a specific for colic and for colds. Its efficiency in the cure of bronchitis is recognized by one of its common names, bronchitis plant. A decoction is used internally by the Indians for stomach ache, headache, diarrhea, and some kinds of fever. Externally it is used as a head wash to relieve headache and as a wash for sore eyes. The juice is reputed by one individual to be a specific against the effect of poison oak (*Rhus diversiloba*). Bruised leaves are frequently placed in the nostril to relieve the effects of a cold, and are tied in bundles around the body to cure rheumatism, and after childbirth to promote the circulation of blood. In the sweat-bath cure for rheumatism the leaves are considered invaluable. The method of treatment consists essentially in binding the dampened leaves in large bundles to the limb and then subjecting it to heat. The heat is sometimes applied by piling heated dirt upon the bandage or by wrapping the limb or even the whole body in a blanket and lying down in a hole which has previously been heated by a small fire. It requires many hours to obtain the desired relief.

The Yokia name for the plant is *kä'-blū*.

Baccharis consanguinea Greene.

No Indian name was obtained for this plant, which is sometimes known as groundsel tree. It is a compact, glutinous evergreen shrub 8 to 12 feet high, with thick, alternate, ovate, stemless leaves with coarsely toothed margins, and terminal clusters of small cylindrical white flowers. The staminate and pistillate flowers grow on separate shrubs, and the latter are very showy in autumn. It grows in various habitats and is common throughout the region. The wood being light, pithy, and very straight, was formerly used for arrows.

Blepharipappus platyglossus (Fisch. & Mey.) Greene.

Hö'-pē (Yuki).—A very showy wide-branching annual about a foot in height, which is more or less hairy and glandular, and has numerous bright-yellow flowers tipped with white. It covers meadows in great profusion, and is known under cultivation as "tidy tips" and yellow daisy. The seeds furnish one of the very highly esteemed kinds of pinole. The Yokia name for the plant is *chē-dä'*.

Coleosanthus californicus (A. Gray) Kuntze.

No Indian name was given for the plant, and it has no common name which is in general use. It is a perennial, 2 or 3 feet high, woody at base, and somewhat scurfy and glandular throughout. The alternate leaves are ovate or heart-shaped and coarse-toothed, those on the main stem being a couple of inches long, while those on the side branches of the terminal or subterminal flower clusters are only a half inch in length. The green, cylindrical flowers are arranged in nearly sessile spikes at or near the top of the plant. It grows commonly on dry gravelly river

bottoms throughout the region, being more abundant southward. The leaves are used by the Sanel Indians south of Ukiah as a substitute for tea.

Grindelia sp.

Shē-nā'-tik (Pomo).—A perennial species of rosinweed 2 to 3 feet high which has alternate lance-shaped, half woody leaves with entire margins, and 3 or 4 terminal resinous heads of yellow flowers about an inch in diameter. The leaves have a rather agreeable taste, very much like that of ordinary store tea, but perhaps a little more bitter. The plant was found only in one locality, on the southern rim of Round Valley. A decoction of the whole plant is valued as a blood purifier, to open the bowels, and to cure cold and colic, especially in children. The leaves are chewed in the fresh state, and are also used as a substitute for tea.

Helenium puberulum DC.

Kä-pä' shō'-pä (Pomo). -A dark-green herbaceous perennial 2 to 4 feet high. The broad, lanceolate, sessile leaves at the base of the plant are 4 to 6 inches long, while the upper measure only 1 to 2 inches. Both are sessile, and their margins are continuous with the stem for several inches. The reddish brown flower clusters are a half inch in diameter, and are borne singly in smooth spherical clusters at the ends of the long, slender branches near the top of the plant. It is of rather frequent occurrence along shady streams throughout the county. Specimens were shown only to the Indians near Ukiah.

The flower heads are extremely acrid and bitter, the taste being compared by one Indian to that of "Wizard Oil." He remarked at the same time that they were hot as red pepper, and stronger than whisky. As a medicine for a certain venereal complaint it is claimed to be almost a specific. The heads and also the leaves are either eaten raw or taken as a decoction. Three plants are boiled in a gallon of water, and three tablespoonfuls of this extract are taken before each meal for two or three days or until a cure is effected. The Yokia name of the plant *kot-kā-yā'-chdō* means "beaver flower," and was probably applied on account of the fancied resemblance of the winged stems to a beaver's tail.

Hemizonia luzulaefolia DC.

Mä-kō' (Pomo).—The commonest and most prolific representative of the various plants, which, on account of their disagreeable exudation, are known as "tarweeds." It is a wide-branching, herbaceous plant, 8 to 20 inches high, with linear, floccose-woolly and viscid, glandular leaves and showy white flowers. It often covers wide areas of dry open ground, and may be found in bloom at any time from April until November. The plant bears a great abundance of ovate, obscurely triangular seeds, about $\frac{1}{8}$ of an inch in length, which consti-

tute one of the most important sources of pinole. The seed is slightly bitter, but has a delightfully spicy odor when roasted. It is gathered in the fall, and a small supply is frequently saved over winter and spring. The Yokia name for the plant is *gä-lä'*.

Madia densifolia Greene.

Dos-sil' (Pomo).—An erect, soft-hairy, but only slightly glandular species of tarweed, 2 to 4 feet high, the leaves of which are alternate and linear, on the basal portion of the stem set thickly together, but at the top small and scattering. The heads of flowers, which open in the evening, measure an inch or more in diameter and are yellow with a red center. The plant is very common in open valleys throughout the county. The seed, which is yielded in great abundance, is slightly flattened, curved, and club-shaped, being about ¼ of an inch long, and is prettily marked with microscopic longitudinal striae. It is even more agreeably aromatic than the seed of the preceding species.

Madia dissitiflora Torr. & Gr.

Un'-gā-mil (Yuki).—One of the most typical tarweeds, 2 to 3 feet high, leafy and very viscid throughout, and bearing numerous small scattering heads of inconspicuous flowers. The tarry exudation of the easily detachable flower bracts does much damage to clothing and to sheep's wool. The rich oily seeds are used to a considerable extent for pinole. The Pomo names for the plant are *dä-shā'* and *shä-mut'*.

From the seed of a closely related but more common species, *M. sativa*, an oil has been manufactured in small quantity which was used at one time for cooking purposes.

Matricaria discoidea DC.

Mä'-nä (Yokia).—A plant which looks much like dog fennel, but is easily distinguished therefrom by the sweet odor of its herbage, and the absence of white rays in the flower heads. It is very common throughout the county. A decoction of the leaves and flowers is used by the Yokia Indians to check diarrhea.

Petasites palmata Gray.

Mul'-cöm (Yuki).—A robust perennial 2 to 4 feet high with stout creeping rootstocks from which the long-stemmed, orbicular, and palmately lobed leaves ascend directly. These are deeply 5 to 11 cleft, are incisely toothed on the margin, and often measure 7 to 10 inches in diameter. The flower stalks appear much earlier than the leaves and bear racemose clusters of dull white, sweet-scented flowers. The plant is very common along rivers and large streams in damp woodlands throughout the mountainous part of the country, and may be known as the palmate-leaf sweet coltsfoot. So far as history is concerned, this plant might very appropriately be called the Yuki salt

plant. Hedged in from the sea by enemies, this tribe, together with the Wailakis, formerly used the ashes of various plants, but more especially of this one, for the salt which they contain, and being essentially a herbivorous people, salt was as prime a necessity for them as it is for cows and other herbivorous animals. I was told that frequent battles were fought for the possession of a certain salt supply on Stony Creek in Colusa County. To obtain the ash the stem and leaves were first rolled up into balls while still green, and after being carefully dried they were placed on top of a very small fire on a rock and burned. It was a very acceptable ingredient for their pinole, but no kind of salt is or ever was used in their acorn bread or soup. The Indians about Ukiah have never used this plant for such a purpose because the sea has always been more accessible to them, but its use for salt is also known to some of the Little Lake people, who call it *be-dä''-shä-tel'*. The young stems and leaves are used for food by the Concow, who call the plant *tä-tä-tē'* or *mâl-ē-mē'*. The root, which they call *pē'-wē*, is valued medicinally in the first stages of consumption and for grippe; when dry, and coarsely grated like nutmeg, it is applied to boils and running sores to dry them up. The Wailaki name for the plant is *tel-dink'-ō*.

Wyethia longicaulis Gray.

Bish'-nön (Yuki).—The most common short-stemmed sunflower of the mountainous part of the county, a perennial plant 2 feet in height, with a profuse tuft of broad lanceolate leaves 12 to 18 inches long, and a half dozen or more sparingly leafy flower stalks which bear one or several heads of flowers 2 to 4 inches in diameter. All parts of the plant, especially the root, are pervaded with a balsamic oil, which is warmly aromatic in flavor and taste. The plant often completely covers whole acres of valley land in Round Valley, and is common everywhere in grassy openings in forests. The lower part of the fresh young leaves and the stem, taken before flowering time, is eaten for food in the field and occasionally at home, and the seed is very much used, along with parched wheat, for pinole.

The large resinous woody root is most highly esteemed as medicine, being used chiefly in the form of a decoction as an emetic. In some stomach complaints it is taken repeatedly, with copious amounts of hot water, until finally a thick yellowish fluid is vomited. The patient then goes to bed to recuperate. As a cure for rheumatism the roots are baked in hot ashes and applied in the form of a poultice; and when dried, powdered, and again moistened they are used as a poultice for running sores and burns. The decoction is also used as a wash to relieve headache and to allay inflammation in sore eyes.

The Wailaki name for the plant is *chä-lä'*, the Little Lake *chi-läm'*, and the Yokia *de-wish'-ä-lum''*.

CLASSIFIED LIST OF ECONOMIC PLANTS.

I. Food:
1. Foods proper—
a. Farinaceous—
Seeds—
Achyrachaena mollis.
Amaranthus retroflexus.
Avena fatua.
Blepharipappus platyglossus.
Boisduvalia densiflora.
Bromus marginatus.
Bursa bursa-pastoris.
Calandrinia elegans.
Carum kelloggii.
Ceanothus integerrima.
Elymus triticoides.
Godetia albescens.
Hemizonia luzulaefolia.
Hordeum murinum.
Hordeum vulgare.
Lolium temulentum.
Lupinus luteolus.
Madia densifolia.
Madia dissitiflora.
Madia sativa.
Nymphaea polysepala.
Plagiobothrys campestris.
Pogogyne parviflora.
Polygonum aviculare.
Ranunculus eisenii.
Rumex crispus.
Salvia columbariae.
Thysanocarpus elegans.
Trifolium bifidum decipiens.
Trifolium dichotomum.
Verbena hastata.
Wyethia longicaulis.
Nuts—
Aesculus californica.
Castanopsis chrysophylla.
Corylus californica.
Pinus lambertiana.
Pinus sabiniana.
Quercus californica.
Quercus chrysolepis.
Quercus densiflora.
Quercus douglasii.
Quercus dumosa revoluta.
Quercus garryana.
Quercus lobata.
Tumion californicum.
Umbellularia californica.

I. Food—Continued.
1. Foods proper—Continued.
a. Farinaceous—Continued.
Starchy roots—
Cynoglossum grande.
Pteridium aquilinum.
Scorzonella maxima.
Typha latifolia.
Tubers—
Carum kelloggii.
Sagittaria latifolia.
Sanicula tuberosa.
Bulbs—
Allium bolanderi.
Allium unifolium.
Calochortus maweanus.
Calochortus pulchellus.
Calochortus venustus.
Dichelostemma capitatum.
Dodecatheon hendersoni.
Hesperoscordum lacteum.
Hookera coronaria.
Quamasia leichtlinii.
Triteleia laxa.
Triteleia peduncularis.
b. Saccharine—
Sweet flowers—
Arctostaphylos manzanita.
Arctostaphylos tomentosa.
Asclepias mexicana.
Lonicera interrupta.
Pedicularis densiflora.
Exudates—
Pinus lambertiana.
c. Herbaceous—
Pot herbs—
Brassica campestris.
Chenopodium album.
Chlorogalum pomeridianum.
Claytonia perfoliata.
Dodecatheon hendersoni.
Lathyrus watsoni.
Lupinus carnosulus.
Lupinus luteolus.
Rumex crispus.
Vicia americana.
Raw herbs—
Amsinckia lycopsoides.
Angelica sp.
Carum kelloggii.

I. Food—Continued.
1. Foods proper—Continued.
c. Herbaceous—Continued.
Raw herbs—Continued.
Claytonia perfoliata.
Eriogonum latifolium.
Heracleum lanatum.
Lomatium utriculatum.
Mimulus guttatus.
Petasites palmata.
Plagiobothrys campestris.
Trifolium spp.
Wyethia longicaulis.
d. Fleshy fruits—
Berries—
Amelanchier alnifolia.
Fragaria californica.
Ribes californicum.
Ribes divaricatum.
Rubus leucodermis.
Rubus parviflorus velutinus.
Rubus vitifolius.
Sambucus glauca.
Solanum nigrum.
Vaccinium ovatum.
Vitis californica.
Taxus brevifolia.
Other fruits—
Arbutus menziesii.
Cerasus demissa.
Crataegus rivularis.
Heteromeles arbutifolia.
Prunus subcordata.
Umbellularia californica.
e. Dry fruits—
Arctostaphylos manzanita.
Arctostaphylos tomentosa.
Juniperus californica.
Rosa californica.
f. Condiments—
Carum kelloggii.
Heracleum lanatum.
Libocedrus decurrens.
Lomatium utriculatum.
Mimulus guttatus.
Petasites palmata.
Pogogyne parviflora.
Porphyra laciniata.
Roripa nasturtium.
Tumion californicum.
Umbellularia californica.

I. Food—Continued.
1. Foods proper—Continued.
g. Miscellaneous—
Lichens and seaweeds—
Alectoria fremontii.
Porphyra laciniata.
Fungi—
Agaricus campestris.
Boletus sp.
Polyporus sp.
Gum—
Pinus ponderosa.
Pinus sabiniana.
Scorzonella maxima.
2. Drinks—
a. Simple aqueous drinks—
Coleosanthus californicus.
Eriodictyon californicum.
Grindelia sp.
Hordeum vulgare.
Linanthus ciliatus.
Micromeria chamissonis.
Monardella sheltonii.
Pogogyne parviflora.
Pseudotsuga mucronata.
Quercus sp.
Umbellularia californica.
b. Acid drinks—
Arctostaphylos manzanita.
Arctostaphylos tomentosa.
c. Fermented drinks—
Arctostaphylos manzanita.
Arctostaphylos tomentosa.
3. Forage and fodder—
Aesculus californica.
Agrostis asperifolia.
Carex vicaria.
Elymus triticoides.
Equisetum variegatum.
Hookera coronaria.
Hordeum gussoneanum.
Juncus effusus.
Lathyrus watsoni.
Lupinus luteolus.
Medicago denticulata.
Medicago hupulina.
Orthocarpus lithospermoides.
Plantago lanceolata.
Pteridium aquilinum
Quamasia leichtlinii.
Quercus californica and other evergreen species.
Sitanion elymoides.

I. Food—Continued.
3. Forage and fodder—Continued.
Robinia pseudacacia.
Trifolium spp.
Vicia americana.
II. Clothing:
1. Protection and use—
a. Hats—
Adiantum pedatum.
Carex sp.
b. Dresses—
Acer macrophyllum.
Apocynum cannabinum.
Iris douglasiana.
Salix lasiolepis.
c. Thread—
Psoralea macrostachya.
2. Ornament—
a. Personal ornament—
Adiantum emarginatum.
Dodecatheon hendersoni.
Gymnogramma triangularis.
b. Dyes—
Alnus rhombifolia.
Plagiobothrys campestris.
c. Tattooing—
Asclepias eriocarpa.
Chlorogalum pomeridianum.
Pinus sabiniana.
Poaceae.
Rhus diversiloba.
Tumion californicum.
III. House and furnishings:
1. House building—
a. House frames—
Arbutus menziesii.
Pinus ponderosa.
Pseudotsuga mucronata.
Sequoia sempervirens.
b. House coverings—
Pinus ponderosa.
Pseudotsuga mucronata.
Salix lasiolepis.
Sequoia sempervirens.
2. House furniture—
a. Beds—
Stuffing material—
Alsia abietina.
Chlorogalum pomeridianum.
Evernia vulpina.
Typha latifolia.
Usnea lacunosa.

III. House and furnishings—Continued.
2. House furniture—Continued.
b. Domestic utensils—
Food utensils (baskets, etc.)—
Acer macrophyllum.
Adiantum pedatum.
Butneria occidentalis.
Carex spp.
Ceanothus integerrimus.
Cercis occidentalis.
Cercocarpus betuloides.
Chlorogalum pomeridianum.
Corylus californica.
Gymnogramma triangularis.
Juncus effusus.
Libocedrus decurrens.
Lonicera interrupta.
Pseudotsuga mucronata.
Pteridium aquilinum.
Rhus diversiloba.
Rhus trilobata.
Salix argyrophylla.
Scirpus sp.
Smilax californica.
Tumion californicum.
Vitis californica.
Water holders—
Carex spp.
Cercis occidentalis.
Washing—
Chlorogalum pomeridianum.
Child-rearing utensils—
Alsia abietina.
Corylus californica.
Iris douglasiana.
Juncus effusus.
Philadelphus gordonianus.
Miscellaneous—
Carum kelloggii.
Pteridium aquilinum.
Symphoricarpos racemosus.
IV. Heating, cooking, and lighting:
1. Matches, fire sticks—
Sambucus glauca.
2. Tinder—
Soft wood—
Aesculus californica.
Alnus rhombifolia.

IV. Heating, cooking, etc.—Continued.
2. Tinder—Continued.
Leaves—
Poaceae.
Quercus.
Pith—
Sambucus glauca.
3. Fuel—
Wood—
Arbutus menziesii.
Arctostaphylos manzanita.
Crataegus rivularis.
Fraxinus oregana.
Pinus ponderosa.
Pinus sabiniana.
Populus fremontii.
Pseudotsuga mucronata.
Quercus.
Bark—
Quercus.
4. Fire receptacles—
Pseudotsuga mucronata.
V. Manufacture:
1. General tools—
Arbutus menziesii.
Fraxinus oregana.
Quercus
2. Special tools—
Equisetum variegatum.
Juncus effusus.
Sambucus glauca.
Symphoricarpos racemosus.
VI. Field industries:
1. Hunting—
a. Killing—
Arrows—
Alnus rhombifolia.
Amelanchier alnifolia.
Baccharis consanguinea.
Butneria occidentalis.
Philadelphus gordonianus.
Salix argyrophylla.
Symphoricarpos racemosus.
Bows—
Libocedrus decurrens.
Philadelphus gordonianus.
Taxus brevifolius.
Miscellaneous—
Angelica sp.
VI. Field industries—Continued.
1. Hunting—Continued.
a. Killing—Continued.
Miscellaneous—Continued.
Chlorogalum pomeridianum.
Cercocarpus betuloides.
Pinus sabiniana.
Psoralea macrostachya.
b. Trapping—
Acer macrophyllum.
Apocynum cannabinum.
Asclepias eriocarpa.
Iris douglasiana.
Psoralea macrostachya.
2. Fishing—
Apparatus—
Alnus rhombifolia.
Apocynum cannabinum.
Asclepias eriocarpa.
Ceanothus cuneatus.
Corylus californica.
Iris douglasiana.
Juncus effusus.
Pseudotsuga mucronata.
Psoralea macrostachya.
Salix argyrophylla.
Poisons—
Aesculus californica.
Chlorogalum pomeridianum.
Croton setigerus.
Datisca glomerata.
Micrampelis marah.
Trichostema lanceolatum.
3. Harvesting—
Cercis occidentalis.
Cercocarpus betuloides.
Juncus effusus.
Pinus sabiniana.
Pteridium aquilinum.
Salix argyrophylla.
Vitis californica.
VII. Travel and transportation:
1. Boats, Sequoia sempervirens.
2. Packing utensils—
a. Pack baskets—
Cercis occidentalis.
Pteridium aquilinum.
Vitis californica.
b. Fastening cords—
Apocynum cannabinum.
Asclepias eriocarpa.
Iris douglasiana.

VII. Travel and transportation—Cont'd.
2. Packing utensils—Continued.
b. Fastening cords—Continued.
Juncus effusus.
Psoralea macrostachya.
Vicia americana.
c. Miscellaneous—
Arctostaphylos manzanita.
Salix lasiolepis.
VIII. Language communication:
Ink, Quercus lobata.
IX. War:
1. Killing—
a. Bows—
Libocedrus decurrens.
Philadelphus gordonianus.
Taxus brevifolia.
b. Arrows—
Shafts—
Alnus rhombifolia.
Amelanchier alnifolia.
Baccharis consanguinea.
Butneria occidentalis.
Philadelphus gordonianus.
Salix argyrophylla.
Symphoricarpos racemosus.
Tips—
Cercocarpus betuloides.
Quercus.
Fastening feathers—
Chlorogalum pomeridianum.
Pinus sabiniana.
c. Clubs and spears—
Cercocarpus betuloides.
2. War dress—
Pinus sabiniana.
X. Amusement:
1. Outdoor games, Pinus sabiniana.
2. Indoor games—
a. Gambling—
Delphinium nudicaule.
Poaceae.
b. Talisman in gambling—
Angelica sp.
Daucus pusillus.
Sanicula menziesii.
Vicia americana.
XI. Ceremonial and religion:
1. Music—
Pinus sabiniana.
XI. Ceremonial and religion—Cont'd.
1. Music—Continued.
Salix.
Sambucus glauca.
2. Dancing—
Arctostaphylos manzanita.
Arctostaphylos tomentosa.
Dodecatheon hendersoni.
Medicago denticulata.
Quercus.
Salix lasiolepis.
Trifolium.
XII. Medicinal plants:
1. Muscles—
Artemisia heterophylla.
Chlorogalum pomeridianum.
Eriodictyon californicum.
Heracleum lanatum.
Micrampelis marah.
Pinus sabiniana.
Polypodium californicum.
Pseudotsuga mucronata.
Umbellularia californica.
Wyethia longicaulis.
Zygadenus venenosus.
2. Nerves—
Achillea millefolium.
Angelica sp.
Arctostaphylos manzanita.
Artemisia heterophylla.
Cerasus demissa.
Eriogonum latifolium.
Limodorum giganteum.
Thalictrum polycarpum.
Trichostema lanceolatum.
Umbellularia californica.
Wyethia longicaulis.
3. Brain—
Delphinium nudicaule.
Limodorum giganteum.
Nicotiana bigelovii.
Rhamnus californica.
Trillium sessile giganteum.
4. Organs of special sense—
Achillea millefolium.
Angelica sp.
Anthemis cotula.
Artemisia heterophylla.
Equisetum variegatum?
Eriogonum latifolium.
Godetia albescens.
Lonicera interrupta.
Phoradendron flavescens.
Polypodium californicum.

XII. Medicinal plants—Continued.
4. Organs of special sense—Continued.
Quercus lobata.
Wyethia longicaulis.
5. Respiration—
Achillea millefolium.
Alnus rhombifolia.
Angelica sp.
Anthemis cotula.
Aralia californica.
Arbutus menziesii.
Arctostaphylos manzanita.
Artemisia heterophylla.
Berberis repens.
Clematis ligusticifolia.
Eriodictyon californicum.
Grindelia sp.
Linanthus ciliatus.
Marrubium vulgare.
Petasites palmata.
Pinus sabiniana.
Rhamnus californica.
Sambucus glauca.
Tellima affinis.
6. Circulation—
Alnus rhombifolia.
Artemisia heterophylla.
Berberis repens.
Daucus pusillus.
Eriodictyon californicum.
7. Surface of body—
Achillea millefolium.
Alnus rhombifolia.
Anthemis cotula.
Arctostaphylos manzanita.
Artemisia heterophylla.
Asclepias eriocarpa.
Chlorogalum pomeridianum.
Croton setigerus.
Cynoglossum grande.
Datura stramonium.
Erythronium giganteum.
Evernia vulpina.
Fraxinus oregana.
Humulus lupulus.
Lathyrus watsoni.
Lycoperdon sp.
Mentzelia laevicaulis.
Micrampelis marah.
Petasites palmata.
Pinus ponderosa.
Pinus sabiniana.
Pogogyne parviflora.
Polypodium californicum.

XII. Medicinal plants—Continued.
7. Surface of body—Continued.
Populus fremontii.
Rhus diversiloba.
Rhus trilobata.
Sambucus glauca.
Trillium sessile giganteum.
Umbellularia californicum.
Wyethia longicaulis.
Zygadenus venenosus.
8. Digestive system—
Achillea millefolium.
Aesculus californica.
Alnus rhombifolia.
Angelica sp.
Aralia californica.
Arbutus menziesii.
Arctostaphylos manzanita.
Artemisia heterophylla.
Asarum caudatum.
Berberis repens.
Cerasus demissa.
Chenopodium album.
Chlorogalum pomeridianum.
Eriodictyon californicum.
Eriogonum latifolium.
Grindelia sp.
Heteromeles arbutifolia.
Libocedrus decurrens.
Marrubium vulgare.
Matricaria discoides.
Mentzelia laevicaulis.
Micromeria chamissonis.
Monardella sheltonii.
Pinus lambertiana.
Pogogyne parviflora.
Polygonum aviculare.
Quercus lobata.
Razoumofskya occidentalis.
Rhamnus californica.
Rhamnus purshiana.
Rubus vitifolius.
Salix lasiolepis.
Sambucus glauca.
Tellima affinis.
Thysanocarpus elegans.
Umbellularia californica.
9. Tissue change—
Angelica sp.
Aralia californica.
Artemisia heterophylla.
Cerasus demissa.
Cercis occidentalis.
Croton setigerus.

XII. Medicinal plants—Continued.
9. Tissue change—Continued.
Grindelia sp.
Linanthus ciliatus.
Micromeria chamissonis.
Monardella sheltonii.
Salix lasiolepis.
Scutellaria californica.
10. Excretion—
Alnus rhombifolia.
Chlorogalum pomeridianum.
Micrampelis marah.
Pteridium aquilinum.
Rhamnus californica.
Salix lasiolepis.
11. Generative system:
Alnus rhombifolia.
Claviceps purpurea.
Cynoglossum grande.
Eriogonum latifolium.
Helenium puberulum.
Phoradendron flavescens.
Pseudotsuga mucronata.
12. Incantation—
Angelica sp.
Equisetum variegatum.
Erythronium giganteum.
Lycoperdon sp.
Sambucus glauca.
13. Use unknown—
Gymnogramma triangularis.
Rhamnus ilicifolia.
Therofon elatum.

XIII. Poisonous plants:
1. Fish poisons—
Aesculus californica.
Chlorogalum pomeridianum.
Croton setigerus.
Datisca glomerata.
Micrampelis marah.
Trichostema lanceolatum.
2. Stock poisons—
Asclepias eriocarpa.
Asclepias mexicana.
Delphinium hesperium.
Hordeum gussoneanum. } Stock killers.
Hordeum murinum. } Stock killers.
Phoradendron flavescens. } Stock killers.
Sitanion elymoides.

XIII. Poisonous plants—Continued.
2. Stock poisons—Continued.
Pteridium aquilinum.
Quercus.
3. Human poisons—
a. Skin (external)—
Anthemis cotula.
Asclepias eriocarpa.
Crataegus rivularis.
Rhus diversiloba.
Trichostema lanceolatum.
Umbellularia californica.
b. Internal—
Aesculus californica.
Agaricus campestris.
Allium unifolium.
Amanita muscaria.
Arctostaphylos manzanita.
Arctostaphylos tomentosa.
Boletus sp.
Lolium temulentum.
Micrampelis marah.
Phoradendron flavescens.
Quercus chrysolepis.
Solanum nigrum.
Taxus brevifolia.
Thalictrum polycarpum.
Trifolium ciliolatum.
Trillium sessile giganteum.
Zygadenus venenosus.
4. Insect repellents—
Pogogyne parviflora.
Umbellularia californica.

XIV. Art:
1. Painting, Evernia vulpina.
2. Dyeing—
Alnus rhombifolia.
Quercus spp.
Rhus diversiloba Gray.
3. Tattooing—
Asclepias eriocarpa.
Chlorogalum pomeridianum.
Pinus sabiniana.
Poaceae.
Rhus diversiloba.
Tumion californicum.
4. Adhesives—
Chlorogalum pomeridianum.
Pinus ponderosa.
5. Miscellaneous, Carex spp.

GLOSSARY OF INDIAN NAMES IN SCIENTIFIC EQUIVALENTS.

Âl-bō′-tē (Y.[1]), Eriogonum latifolium.
Âl-lòn-gō′-bl (Y.), Symphoricarpos racemosus.
Äl-tē″-hēz′-mil (Y.), Ribes divaricatum.
Äl-tē″-hēz′-mil (Y.), Crataegus rivularis.
Äm (P.), Chlorogalum pomeridianum.
Änt-pot′ (Y.), Hookera coronaria.
Änt-pot′ (Y.), Triteleia laxa.
Bä-chō′ (P.), Scirpus laeustris occidentalis.
Bä-he′ (P.), Umbellularia californica. (Nut.)
Bä-hem′ (P.), Umbellularia californica. (Tree.)
Bä-hō′ (P.), Trifolium virescens.
Bä-käm′ (P.), Ceanothus cuneatus.
Bal-lō′ kī (P.), Oat Valley.
Bäm kä-lä′ (P.), Salix argyrophylla.
Bä-ō″-zhe-lä′-dit (W.), Thysanocarpus elegans.
Bä-shä′ (Yo.), Aesculus californica.
Bä-shōm′ (Yo.), Rhamnus ilicifolia.
Bä-tē′ (Yo.), Sambucus glauca. (Berry.)
Bä-tē′ kä-lä′ (Yo.), Sambucus glauca. (Tree.)
Bât (Y.), Trifolium virescens.
Bä-töm′ (Yo.), Calochortus venustus.
Bät′-sōm (P.), Quercus dumosa revoluta.
Bät′-sōm dä′-nō (P.), San Hedrin Mountain.
Bē-bi′ (LL.), Pteridium aquilinum.
Bē-cha′-te-chū (W.), Trillium sessile giganteum.
Be-dä″-shä-tel′ (LL.), Petasites palmata.
Be-he′ (P.), Salix lasiolepis.
Bē-mō′ (P.), Godetia albescens.
Bē-shä′ bō (Yo.), Calochortus pulchellus. ("Deer potato.")
Bē-tä′ sō (P.), Trifolium wormskjoldii.
Bi-ki′-ki (Co.), Monardella sheltonii.
Bis (C.), Pteridium aquilinum.
Bish′-nön (Y.), Wyethia longicaulis.
Bi-tē′ (P.), Quamasia leichtlinii.
Bō. (Bulb.)
Bō-bō′-ē (Yo.), Rhus trilobata.
Bok (N.), Umbellularia californica.
Bō′-kō (Co.), Asclepias eriocarpa.
Bō lä (Y.), Dichelostemma capitatum.
Bō lä (Y.), Triteleia laxa.
Bō tē (LL.), Fritillaria mutica.
Bu-kī′ (Yo.), (LL.) (Berry.)
Bu-ki′ muk (Y.), Aralia californica.
Bu-kwâl′ (Y.), (LL.), Symphoricarpos racemosus.
Bul-luk′-tō (Co.), Micromeria chamissonis.
But″-chō′-ä (Yo.), (P.), Angelica sp.
But″-zä′-zä (P.), Heteromeles arbutifolia
Chä′-ä (Y.), Cercis occidentalis.
Ch'a″-ak′ (Y.), Asclepias eriocarpa.
Chä-bä′ (LL.), Corylus californica.
Chä-bä′ (P Y.), (LL.), (Yo.), Juncus effusus.
Chä-lä′ (W.), Wyethia longicaulis.
Chäl-choi′ (Y.), Microrampelis marah.
Chä-ōm′ (LL.), Pinus ponderosa.
Chä-wâ′-kot″-sâ (Yo.), Asclepias mexicana.
Chē-bä′ (P.), Achyrachaena mollis.
Chē-dä′ (Yo.), Blepharipappus platyglossus.
Chē-wish′ (Y.), Iris douglasiana.
Chi-en′ (Y.), Angelica sp.
Chi-läm′ (LL.), Wyethia longicaulis.
Chin-dum″-gä′-chit (W.), Thalictrum polycarpum.
Chin-sök′ (W.), Sambucus glauca.
Ch'kī (W.), Corylus californica.
Choi′-ē pots (Y.), Trifolium ciliolatum.
Ch'o′-mel (Y.), Achyrachaena mollis.
Chou′-mē-ō (Co.), Heracleum lanatum.
Chū-ös′ (Y.), Quamasia leichtlinii.
Chwâk (Yo.), -stick.
Da-cal′ bō (LL.), Hookera coronaria.
Dä-shä′ (P.), Madia dissitiflora.
Del′-shit (W.), Pinus sabiniana.
Dē-sä′ kä-lä′ (P.), Aesculus californica.
Dē-wish′-ä-lum (Yo.), Wyethia longicaulis.
De-wish′-ä-mä (PY.), (LL.), Cynoglossum grande.
Di-kō′-shō (W.), Rhamnus ilicifolia.
Dis-tä′-tsi (Co.), Arbutus menziesii.
Dop (Co.), Cercis occidentalis.
Dos (N.), Pteridium aquilinum.
Do-slū-tit′-is-dō (Yo.), Eschscholtzia douglasii.

[1] See key at end of list.

Dos-sil′ (P.), Madia densifolia.
Dots-chăng′-she-bog-i (W.), Trichostema lanceolatum.
Dū-shē′ kä-lā′ (LL.), Quercus californica.
Ek (LL.), Mentzelia laevicaulis.
Ē-wē′ büch-ō′-ä (Yo.), Thalictrum polycarpum.
Ē-wē′ shi-shä′ (LL.), Thalictrum polycarpum.
Fä-hut′ (Y.), Quercus lobata. (Galls.)
Fär′-sökt (N.), Aesculus californica.
Foin′-kä (Y.), Arbutus menziesii.
Gä-lä′ (Yo.), Hemizonia luzulaefolia.
Gä-läm′ (Yo.), Fraxinus oregana.
Ga-lū′ bu-kī′ (LL.), Sambucus glauca. (Berries.)
Gä-sēl′ (Yo.), Sequoia sempervirens.
Gä-shä′ (LL.), (C.), Quercus chrysolepis. (Acorn.)
Gä-shēt′-i (P.), Alnus rhombifolia.
Gol-lē′ (Y.), Ribes californica.
Gol-lē′ (Y.), Rubus vitifolius.
Gōm′-he″-ni (Co.), Corylus californica.
Gŏn′-chä (W.), Triteleia laxa.
Gos (W.), Libocedrus decurrens.
Gos′-chū (W.), Chlorogalum pomeridianum.
Gos′-ē-zi sō (P.), Aralia californica.
Gō-shin′ (Y.), Claytonia perfoliata.
Gos′-i (Co.), Prunus subcordata.
Gō-tō′-lä (LL.), Asclepias eriocarpa.
Hä′-hä (Co.), Quercus densiflora. (Acorn.)
Hân′-li (Y.), Philadelphus gordonianus.
Hē′-lē (Co.), Ceanothus integerrimus.
He′-tē (Yo.), Micrampelis marah.
Hī (P.), "The wood for."
Hī chä-hä′ kä-lā′ (P.), Datisca glomerata.
Hī-gat′ (Y.), Agaricus campestris.
Hit (W.), Ceanothus cuneatus.
Hī-wät′ (Y.), Lonicera interrupta.
Hō (P.), fire.
Hō bō (Yo.), Hesperoscordum lacteum.
Hō-dim′ (Yo.), Limodorum giganteum.
Hoi-ŏnt′ (Y.), Quamasia leichtlinii.
Hoi′-tā (Co.), Psoralea macrostachya.
Hōl′-gā-shēn (Y.), Thalictrum polycarpum.
Hon′-shŏl (Co.), Quercus californicus. (Acorn.)
Hŏ′-pē (Y.), Blepharipappus platyglossus.
Hō-sä′ kä-lā′ (Yo.), Cerasus demissa.
Hō-sä′ kä-lā′ (Yo.), Rhamnus californica.
Hŏs″-ä′-sisht (Y.), Daucus pusillus.
Hŏ′-tä (Co.), Libocedrus decurrens.
Hŏ-yŏ-con′-el (Y.), Eschscholtzia douglasii.
Hun″-möl′-ish, ( ), Dodecatheon hendersoni.
Ink-ō′-um (Y.), Platystemon californicus.
Jä-gilt′ (N.), Trifolium obtusiflorum.
Jä-jin′-jū (W.), Fritillaria mutica.
Jē′-jē (Y.), Quercus chrysolepis. (Acorn.)
Jesh (Y), Quercus chrysolepis. (Acorn.)
Je-snä′-ti (W.), Sanicula tuberosa.
Je-tsä′-chit (W.), Orthocarpus lithospermoides.
Jin-net′ (N.), Calandrinia elegans.
Jou′-lish (Y.), Collomia grandiflora.
Jou′-lish fal (Y.), Polypodium californicum.
Jou′-lish fal (Y.), Lathyrus watsoni.
Jū′ (W.), Pinus sabiniana. (Gum.)
Jus-ki-at′ (W.), Alnus rhombifolia.
Kä′-ä bŏ (P.), Sanicula tuberosa.
Kä-lä′-tä (LL.), Quercus douglasii. (Acorn.)
Kab′-it (Yo.), Arbutus menziesii.
Kä′-blū (Yo.), Artemisia heterophylla.
Kä bŏ (LL.), Sagittaria latifolia.
Kä-däch′-käch″-dŏ (Y.), Dodecatheon hendersoni.
Kä′-ē (Y.), Agaricus sp.
Kä′-hē (Yo.), Tumion californicum.
Kä-höm′ (P.), Carex barbarae.
Kä-kō-chē-pēl′ (C.), Linanthus ciliatus.
Kä-kūl′ (Yo.), Quercus douglasii. (Acorn.)
Kä′-kus (W.), Philadelphus gordonianus.
Kä-lä′ (Yo.), Tree.
Kä-lä′ ä kä-lä′ (Yo.), Cercis occidentalis.
Kä-lä′ bŏ (P.), Calochortus pulchellus.
Kä-lä′ chä′-ä (C.), Polyporus sp.
Kä-lä′ kŏ′-chē (LL.), Alsia abietina.
Kä-läl′-nō (Yo.), Salix argyrophylla.
Kä-lä′ shä (Yo.), Pseudotsuga mucronata.
Kä-lä′ sō (P.), Trifolium ciliolatum.
Käl′-ē (Y.), Rosa californica.
Kal′-kä tzä′ (Yo.), Lathyrus watsoni.
Kä′-op (Y.), Bromus marginatus.
Kä-pä′ shŏ′-pä (P.), Helenium puberulum.
Kä sō (P.), Trifolium wormskjoldii.
Kä sō lŏk (P.), Trifolium obtusiflorum.

Kā-tsak′-ū (W.), Mentzelia laevicaulis.
Kä-wā′ (LL.), Pinus sabiniana. (Pitchy exudation.)
Kē-bē′ (P.), Tumion californicum.
Kē-chil′ wā-ē-mök′ (Y.), Croton setigerus.
Kē′-gus (W.), Zygadenus venenosus.
Ket′-en (W.), Quamasia leichtlinii.
Ket′-en chou (W.), Quamasia leichtlinii (Valley where it grows.)
Kē-wē′ (Y.), Sambucus glauca.
Kē-wē′ mäm (Y.), Sambucus glauca.
Ki-kä′-hī-um (LL.), Trillium sessile giganteum.
Kin‴-göt-gō′-sä (Y.), Lomatium utriculatum.
Kin-göt-gō′-sä (Y.), Tellima affinis.
Kit-tā′ (C.) (P.V.) (LL.), Sambucus glauca.
Kit-tā′ bu-kī′ (C.) (PV.) (LL.), Sambucus glauca. (Berries.)
Kī′-yā (LL.), Arbutus menziesii.
Kī-yäm′ (Y.), Quercus lobata.
Kī-yäm′-pö-ē, Arctostaphylos tomentosa.
Kī-yī′ (Yo.), Heteromeles arbutifolia.
Kī-yī′ (Yo.) (LL.), Arctostaphylos manzanita.
Kī-yī′ bu-kī′ (Yo.) (LL.), Arctostaphylos manzanita. (Fruit.)
Kī-yī′ chō-pä′ (Yo.) (LL.), Arctostaphylos manzanita. (Leaves.)
Klū-pö (N.), Salvia columbariae.
Kō′-bē (P.), Tumion californicum.
Kō-bī′-yē (P.) Allium. (Cultivated onion.)
Kō-bī′-yē (P.), Allium unifolium.
Kochk (Y.), Plagiobothrys campestris.
Koi-ē′ kä-lā′ (LL.), Lupinus carnosulus.
Koi-ē′ kas′-il (Y.), Hordeum murinum.
Koi-ē′ kas′-il (Y.), Sitanion elymoides.
Komp′-lū‴-li (P.), Artemisia heterophylla.
Kō-ō′ chā′-ā (C.), Boletus sp.
Kö-öch′-ē (Y.), Arctostaphylos manzanita.
Kö-öch′-ē (Y.), Arctostaphylos tomentosa.
Kö-öch′ ök (Y.), Arctostaphylos manzanita. (Cider.)
Kop (Y.), Bromus marginatus.
Kop (N.), Vitis californica.
Kos-chet′-tsi (W.), Cercocarpus betuloides.
Kot-kā-yā′-chlō (Yo.), Helenium puberulum.
Kots′-tā (W.), Rhus diversiloba.
Kou-wät′-chu (Co.), Arbutus menziesii.
Kulk (Y.), Pogogyne parviflora.
Kus (W.), Alnus rhombifolia.
Lam′-chē, bulb similar to Quamasia leichtlinii.
Lat (Y.), Triteleia pedunculatis.
Lēl′-mil (Y.), Trichostema lanceolatum.
Lēl′-mil (Y.), Godetia albescens.
Lēl′-mil (Y.), Scutellaria californica.
Lō-ē′ (Co.), Quercus lobata. (Acorn.)
Lol′ um (Y.), Juncus effusus.
Löm (P.), Ribes californicum.
Löm′ kä-lā′ (LL.), Crataegus rivularis.
Löm kä-lā′ hī (LL.), Crataegus rivularis. (Wood.)
Mä (Y.), Apocynum cannabinum.
Mä be-hā′ yem (C.), Micrampelis marah.
Mä-chäl′ (Y.), Asclepias eriocarpa.
Mä-kō′ (P.), Hemizonia luzulaefolia.
Mâl-chū′-lēz (Y.), Delphinium hesperium.
Mâl-chū′-lēz (Y.), Lupinus carnosulus.
Mā-lē′ (Y.), Quercus garryana.
Mâl-ē-mē′ (Co.), Aralia californica.
Mâl-ē-mē′ (Co.), Petasites palmata.
Mä-lō′ mä-lō′, rude garment or cowty.
Mäm (Y.), berry.
Mä′-nä (Yo.), Matricaria discoidea.
Mä-ôr-dä-git′ (Yo.), Pteridium aquilinum.
Mās (Y.), Zygadenus venenosus.
Mä-shä′ (LL.), Apocynum cannabinum.
Mä-stit′ (Yo.), Micromeria chamissonis.
Mât (Y.), Lolium temulentum.
Mä-tas′ sō (P.), Trifolium cyathiferum.
Mat′-ka (Yo.), Psoralea macrostachya.
Ma-tū′ (P.), doctor.
Ma-tū′-yä‴-hō (P.), Rhus diversiloba.
Mē-ēn‴-chip‴-ā-soi′ (Y.), Lycoperdon.
Mē′-lē (Y.), Quercus douglasii. (Acorn.)
Milk (Y.), Quercus douglasii. (Acorn.)
Mil-kö′-chē (Y.), Heteromeles arbutifolia.
Mū-lā′ (LL.), Cercis occidentalis.
Mom (Y.), Quercus californica.
Mön-sin′ (Y.), Carum kelloggii.
Mon′-uk (N.), Solanum nigrum.
Möt-mō′ mäm (Y.), Vitis californica. (Fruit.)
Mul′-ööm (Y.), Petasites palmata.
Mūl′-sik (Y.), Trifolium cyathiferum.
Mun′-shök (Y.), Heracleum lanatum.

Mū-sē′-päl (P.), Boisduvalia densiflora.
Nä-kä (Yo.), Pinus sabiniana.
Nä-kä′ (Yo.), Pseudotsuga mucronata.
Nä-tit′-nēs (W.), Pinus lambertiana.
Nī′-ē (Y.), Lomatium utriculatum.
Nin-kōs′-jē (W.), Cerasus demissa.
Nok (Y.), a large mussel shell.
Nō-kōm-hē-in′-ē (Co.), Sambucus glauca.
Nōsh (Y.), Chlorogalum pomeridianum.
Nū (Y.), Pseudotsuga mucronata.
Nū fal (Y.), Pseudotsuga mucronata. (Leaves.)
Num (Y.), Quercus californica.
Nun-ält′-mil (Y.), Achillea millefolium.
Nun-fat′-ē (Y.), Linanthus ciliatus.
Ōl-gät′-i (Y.), Evernia vulpina.
Ōl-lō′-bich (Y.), Thysanocarpus elegans.
Ōl mäm (Y.), Corylus californica.
On-pöt′ (Y.), (LL.), (Co.), Carex sp. (Roots.)
Ō′-pē-ōl (Y.), Rumex crispus.
Pä (Co.), Rhamnus californica.
Pä-göt (N.), Arctostaphylos manzanita.
Pä-hut′ (Y.), Pinus lambertiana.
Pâl′-but (Y.), Platystemon californicus.
Pal-gön′-shē (Y.), Acer macrophyllum.
Pä′-önsh (Y.), Quercus lobata. (Bread from.)
Pä-shō′-lä (Yo.), Trifolium dichotomum.
Pät′-mil (Y.), Populus fremontii and P. trichocarpa.
Pē-ni-mē′ (Y.), Trifolium variegatum.
Pē″-ni-pēn-sik′ (Y.), Trifolium wormskjoldii.
Pē′-wē (Co.), Petasites palmata. (Root.)
Pō (Co.), Apocynum cannabinum.
Pō (Co.), Rhamnus californica.
Pod″-jez-pâl-mök′ (Y.), Vicia americana.
Pök (Y.), Fraxinus oregana.
Pō-lä′-ä (Y.), Monardella sheltonii.
Pōl′-cum (Y.), Umbellularia californica. (Nuts.)
Pōl′-cum höt′-mil (Y.), Umbellularia californica. (Bread made from nuts.)
Pōl′-cum ōl′ (Y.), Umbellularia californica.
Pōl′-cum ōl (Y.), Pinus sabiniana.
Pol-put′ näm (Y.), Fragaria californica.
Pō-mä′ näm (Y.), Cerasus demissa.
Pō′-muk (Y.), Anthemis cotula.
Pots (Y.), Clover.
Sä-cöm′ (Y.), Trifolium wormskjoldii.
Sä-cöm′ (Y.), Trifolium obtusiflorum.
Sä-kä′ (Y.), Nicotiana bigelovii.
Sä-kä′ hī (P.), Symphoricarpos racemosus.
Sä pots (Y.), Trifolium bifidum decipiens.
Sä′-tek (LL.), Eriodictyon californicum.
Sē-äm′ (P.), Salix lasiolepis. (Inner bark of.)
Sē′-hil (Y.), Elymus triticoides.
Sel-säs′-chö (W.), Pedicularis densiflora.
Sē-pä′ (LL.), Quercus lobata. (Acorn.)
Sē-ū-didl′-ä (W.), Sanicula menziesii.
Shä hö (P.), (Yo.), Lomatium utriculatum.
Shä-hō′-tä (P.), (Yo.), Carum kelloggii.
Shâ-lē′-kō-em (Y.), Razoumofskya occidentalis.
Shä-mut′ (P.), Madia dissitiflora.
Shân-kē′ (Y.), Libocedrus decurrens.
Shân-tum′ (Y.), Equisetum variegatum.
Shast-kēt′-ä (W.), Rhamnus californica.
Shä-tä′-ē (LL.), Bromus marginatus.
Shä′-um (P.), Croton setigerus.
Shä-wä-kä′ (LL.), Vicia americana.
Shēp-(Y.), Allium bolanderi.
Shēp (Y.), Allium unifolium.
Shē-in′ (P.), Vitis californica.
Shē-nâ′-tik (P.), Girindelia sp.
Shkä (Yo.), Salix lasiolepis.
Shlä (N.), Chlorogalum pomeridianum.
Shmū (Yo.), Ear.
Shmu-chwâk′ kä-lä′ (Yo.), Adiantum emarginatum.
Shō′-kish (Y.), Quercus densiflora. (Acorn.)
Shön′-a-hī (LL.), Philadelphus gordonianus.
Shō-pä′ (Yo.), Leaf.
Shū′-âl (Y.), Cynoglossum grande.
Shūk′ōl (Y.), Pinus lambertiana.
Shū′-mē (LL.), Equisetum variegatum.
Shu-töt′ (W.), Pinus lambertiana. (Sugar.)
Sic (Y.), Trifolium virescens.
Sī kä-lä′ (P.), Butneria occidentalis.
Si-lim′ (P.), Iris douglasiana.
Si-lim′ mä (Yo.), Apocynum cannabinum.
Sī-mē′-yä (Yo.), Avena fatua.
Sī-mē-yä hō (Yo.), Avena fatua. (Flour.)
Sī′-tō (W.), Juncus effusus.
Skin′-chön (W.), Quercus lobata. (Acorn.)
Skut-in′-jet (W.), Daucus pusillus.

Sō (P.), Clover (or, more generally, any plant whose leaves are satin green).
Sō-ē′-bä (Co.), Umbellularia californica.
Sō-mä′ (C.), Delphinium nudicaule.
Sō-mä′ yem (C.), Delphinium nudicaule. (Root.)
Spō kä-lā′ (Yo.), Juniperus californica.
Stū-stū′-lä (Yo.), Pedicularis densiflora.
Sū-lä-lä′ (Co.), Pteridium aquilinum.
Sympt′-ōl (Y.), Aesculus californica.
Tal'k (Co.), Cercis occidentalis.
Tä-loch′-dō (Yo.), Ranunculus eisenii. (Seed.)
Tä-nē′ (Co.), Pinus sabiniana.
Tä-rä-tit′ (Yo.), Ribes californicum.
Tä-rä-tit′ (Yo.), Heracleum lanatum.
Tä′-sha-lē (LL.), Eschscholtzia douglasii.
Tä-tä-tē′ (Co.), Petasites palmata.
Tâ-tet′-el (W.), Carex sp.
Tē (Y.), Carex vicaria.
Tē-lä′ (P.), (LL.), Ranunculus eisenii. (Seed.)
Tē-lä′ (P.), (LL.), The tick.
Tē-lā′bō (LL.), Triteleia laxa.
Tel-dink′-ō (W.), Petasites palmata.
Te-nis″-tâ (W.), Arctostaphylos tomentosa.
Tē-täm′ kä-lā′ mäm (Y.), Rubus leucodermis.
Til-at′-mil (Y.), Eriodictyon californicum.
Ti-ti-mē′ (LL.), Rubus vitifolius. (Vine.)
Ti-ti-mē′ yem (LL.), Rubus vitifolius. (Root.)
Tol (W.), Quercus californicus. (Acorn.)
Tō-nē′ (LL.), Porphyra laciniata.
Tom′-tē bō (P.), Calochortus maweanus.
Tsī mä-är′-shē (LL.), Phoradendron flavescens.
Tsin (P.), Zygadenus venenosus.
Tso″-tä-tä-sit′-chō (W.), Eschscholtzia douglasii.
Tsū-ish′ (P.), Carex sp.
Tum′-ti (Y.), Rhamnus californica.
Um′-pē (Y.), Rhamnus californica.
Um′-sē (Y.), Alnus rhombifolia.
Un′-gâ-mil (Y.), Madia dissitiflora.
Wä-chä′ (W.), Mimulus guttatus.
Wä-chök′ (Y.), Quamasia leichtlinii.
Wä-i-mök′ (Y.), Pedicularis densiflora.
Wân-kō-mil′-ē (Co.), Rubus vitifolius. (Vine.)
Wä′-sā (Co.), Rubus parviflorus velutinus.
Wä-sä-got′-ō (Co.), Eriodictyon californicum.
Wē (Y.), Ranunculus eisenii.
Wen (Yo.), Datisca glomerata.
Yä (P.), South.
Yē-hō′ (Yo.), Achyrachaena mollis.
Yē-mä-dos′-il-slū (N.), Anthemis cotula.
Yōl′-kō (Co.), Taxus brevifolia.
Yūk (Y.), Ceanothus cuneatus.
Yūk-kuml′ (Y), Ceanothus cuneatus. (Flowers.)
Zhâl-zhoi′-ē (Y.), Trillium sessile giganteum.
Zhâl-zhoi′-ō (Y.), Mierampelis marah.
Zhe-lä′-tsä″-chit (W.), Iris douglasiana.

KEY.

C=Calpellas.
Co=Concow.
LL=Little Lake.
N=Numlaki.
P=Pomo.
PV=Potter Valley.
W=Wailaki.
Yo=Yokia.
Y=Yuki.