

*A Guide to
Porter Creek Nature Trail:
Plant Identification and Lore*



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**Sierra Foothill Research and Extension Center
Browns Valley, California**

Prepared by Jerry Tecklin, Staff Research Associate, and Doug McCreary, Natural Resources Specialist, with the Integrated Hardwood Range Management Program, University of California, Berkeley.

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Introduction

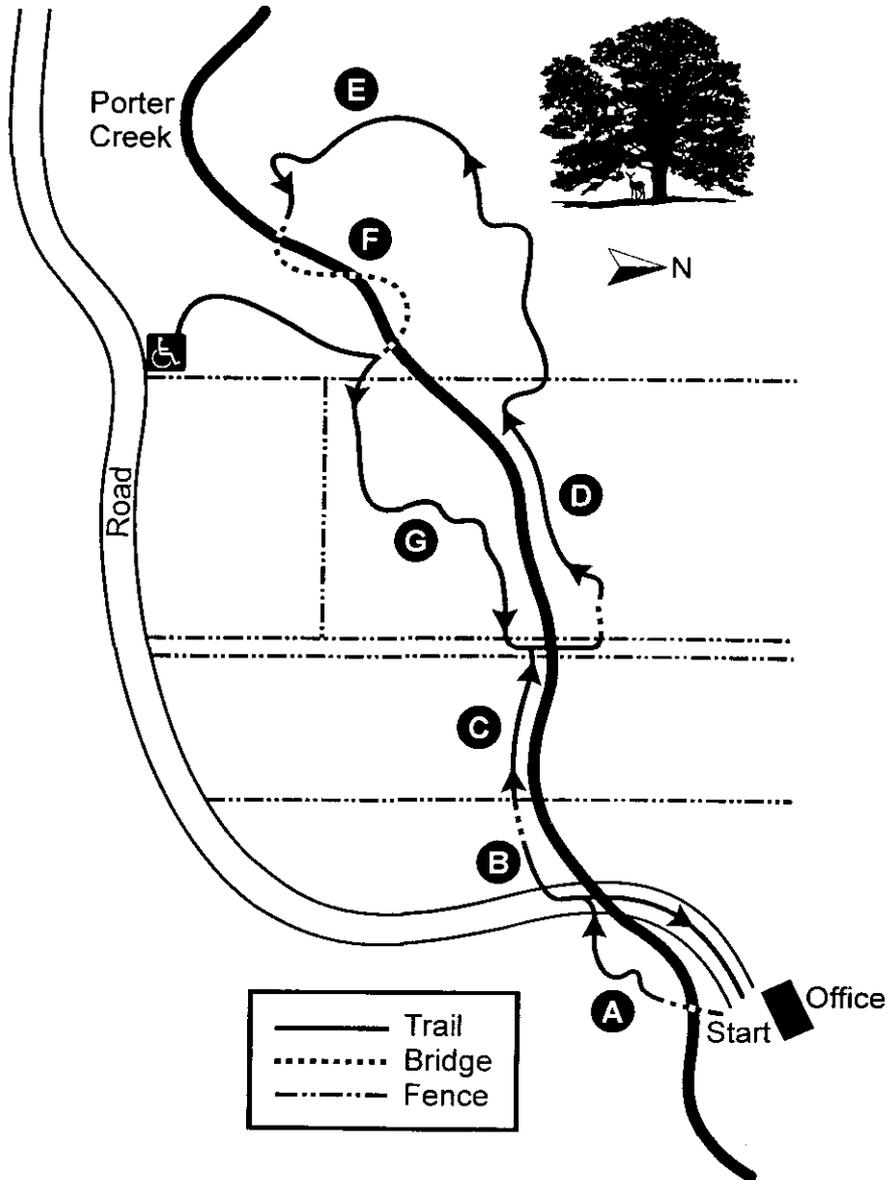
Welcome to the Porter Creek Nature Trail! Your hike will take you through three zones where you'll find different kinds of plants. You start out in a **Riparian Area**. "Riparian" just means along a stream. Here many plants have their roots in water or very damp soil, and usually grow tall and jungle-like since they have plenty of water, even during our dry summer months. You will then ascend to an **Upland Area** away from the creek where the soils are drier. To grow here plants send roots deeper down, or, as our dry summer approaches, they produce seeds quickly and turn brown and die. These areas are grassy, pasture-like, and trees and shrubs grow further apart. Finally, in the **Marsh Area** you'll find specialized plants that grow well when their roots are always wet. The marsh is a little basin that collects water, and the soil here contacts the water table and is always saturated. That's one reason we've built a steel bridge over it, so you can keep your feet dry and people in wheelchairs won't get stuck.

The Porter Creek area was home to the rich Native American culture of the Nisenan people. As you hike you can imagine how these people lived. We have included information on who these people were and how they used the plants that even today you find growing here. When we list the common name of a plant, we also give you its scientific name in *italic type*. Scientific names are useful if you want to find out more about these plants in reference books or other sources. In **bold type**, we include the name used by the Nisenan people, the first plant experts who lived here. For some plants, however, we don't know these names. Try these ancient names on your tongue.

How to Find a Plant. A large number of different kinds of plants grow along the trail. We identify and describe 38 of the more common and interesting ones. Each plant is located in one of the Areas, A-G, marked on the trail map, and indicated in the text and on the Plant Locator list opposite the map. This leads you to a likely place to find a specific plant. Often there will be a stake with an identification label near the place indicated. Of course, you won't always be able to find some plants because they are only conspicuous when in bloom or in fruit. And many of our plants are tuned to our climate cycle of wet winters and dry summers, completing their life cycles before the hot, dry months of June-October when they look brown and dead, or seem to have disappeared.

Take your time and enjoy your hike!

Map of Porter Creek Nature Trail



Porter Creek Nature Trail Plant Locater

Area A

periwinkle
fig
olive
miner's lettuce
Ithuriel's spear
wild oats
hedgehog dogtail
medusahead
annual rye
soft chess

Area B

blue oak
valley oak
verbena
rippgut brome
soap plant
mint
manroot

Area C

blue elderberry

Area D

pipevine
willow
white alder
Himalayan blackberry
eastern blackberry
Fremont cottonwood

Area E

interior live oak
foothill pine
yellow star-thistle

Area F

poison oak
cattail
bugle hedge nettle
rushes and sedges
California blackberry
mugwort
velvet grass
rabbit foot grass

Area G

eucalyptus
California grape
California buckeye

Who Was Here Before Us

For hundreds of years before the Gold Rush of the mid-1800s the Porter Creek region was the home of a people called the **Nisenan**. This was the southern division of a larger group called Maidu. The Nisenan, or Southern Maidu, lived in the foothills of the Sierras between the Yuba and American Rivers. Porter Creek is part of the drainage of the Yuba River. You are located in an area that was in the northern part of Nisenan territory. The people here were Hill Nisenan and had relatives who lived further into the valley, the Valley Nisenan. Their lives were more attuned to marshes and floodplains than the oak woodlands and grassland meadows of the Hill Nisenan. In the language spoken by the Maidu, Nisenan means "People of this Place."



Small Nisenan settlements of perhaps a few dwellings each were scattered along Porter Creek and adjacent creeks. A large village was located where today Collins Lake has been formed by damming Dry Creek, just a few miles to the north. Less than 200 years ago, salmon swam up the creeks from the Yuba in great numbers. Ducks and waterfowl abounded in the waterways and marshes. Oak woodland with grassy meadows covered the hills, and denser forest lined the creeks. The landscape was open and park-like, kept that way by frequent fires deliberately set by the Nisenan.

People fished, caught birds and small mammals in nets and snares, and hunted in groups for larger animals like deer. They gathered many plants for food, medicines, basketry, and other uses. A main staple of their diet was the fruit of the oak tree, the acorn.

Although descendants of the Nisenan still live scattered about in their ancestral territory, most died from diseases introduced in the 1830s or were brutally pushed off their land by gold seek-



ers and settlers in the 1840s and 50s. Information about their use of native plants, and other matters, was collected when their culture was already in decline, so what we know today about the Nisenan who lived so comfortably on this land is very incomplete.

The Nisenan had names for all the plants and animals in their territory. This plant guide will teach you some of these names, how these plants were used by Nisenan people, as well as their modern, scientific names.

Enduring signs of the Nisenan culture are the bedrock mortars found near their village sites. These were flat exposures of the bedrock, usually in a cool, pleasant location, where acorns were shelled and pounded into fine flour, and where seeds and other foodstuffs were pulverized or ground. So many different kinds of plants were prepared here for cooking or storage, that we might call these bedrock mortars Nisenan food processors. Holes have been worn in the rock from these activities, some of them several inches deep. Two bedrock mortar sites are found along the Porter Creek Nature Trail.

Oak Trees Along the Trail

Three kinds of oak trees are found along the Nature Trail. They are native to this and similar areas throughout our state and are not found growing naturally anywhere else in the world. Acorns from these trees were the most important food source for the Nisenan.

Valley Oak, *Quercus lobata*, **Lo'-wim chah** (Area B): Valley oak is the rarest of our oaks since it grows on the most fertile, well-watered sites and has been removed as land has been converted to agricultural uses. It is found here only along the immediate banks of Porter Creek. Tall, with furrowed, dark trunks and drooping



Valley Oak
(*Quercus lobata*)

branches, its leaves, 2-4 inches long, are deeply cut into rounded lobes, green above and slightly fuzzy, yellow-green below. Its acorns are chestnut-colored and very large, 1-2 inches long, with large, warty caps.

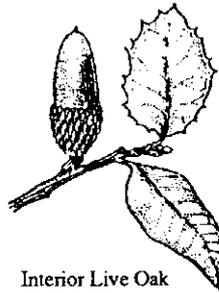


Blue Oak
(*Quercus douglasii*)

Blue Oak, *Quercus douglasii*, **Chak-kow-im chah** (Area B): You can tell blue oak by its white, flakey bark. The leaves have a blueish-green color on their upper surface, (hence the name blue oak) and paler green below. Leaves are variable, from slightly lobed or wavy to more deeply, pointy lobed,

1-3 inches long. Acorns are about 1 inch long, tapered to a slightly asymmetrical tip and brownish. Its caps are shallow with slightly warty scales. Blue oaks are the most common oak on the drier slopes surrounding the nature trail.

Interior Live Oak, *Quercus wislizenii*, **Bah-bahk'-um-chah** (Area E): Interior live oak has green leaves the year round, unlike our other oaks that drop their leaves as winter approaches. Leaf shape is variable from elliptical with smooth outlines, to scalloped and spiny like a holly leaf. They are glossy green on both upper and lower surfaces. The bark is smooth-looking and dark. Their acorns are distinctively long and thin, often with longitudinal lines, and a cap that looks shingled with overlapping scales. Look for this oak at drier locations.



Interior Live Oak
(*Quercus wislizenii*)

How The Nisenan Used Acorns

Acorns were a staple of the Nisenan diet, just as wheat and bread are in our diet today. Gathered in the fall, acorns were dried and stored for use throughout the year. Each acorn harvest, a single Nisenan family might collect as much as 500 pounds of acorns or more. Acorns could be stored in specially constructed granaries for several years.



Acorn preparation involved four processes: cracking and shelling, pounding the nutmeat to fine flour, leaching, and cooking.

Cracking and shelling: Done with just the right sized rock, each acorn was lightly tapped to crack the shell but not break the nutmeat into little pieces. Shells were removed by hand, and adhering inner skins loosened and removed in a winnowing basket by tossing lightly in a slight breeze.

At left, "Grinding Acorns," from 'Hutchings' California Scenes'



Pounding: Once again, just the right rock, or "pestle", was used to pound the acorn pieces to a fine flour. Acorns were pounded—not ground—in shallow depressions at the bedrock mortar, or sometimes in a portable stone mortar. Heavier pestles were used as the meal was pounded finer and finer. Deeper depressions in the mortar were used for harder acorns that tended to shatter and scatter. A brush made from the soaproot plant (p. 15) was used to whisk the meal and flour into a pile for pounding.

Leaching: A chemical compound called tannin makes acorns too bitter to eat. To remove it, the sifted acorn flour was placed on a bed of pine needles in a sandy depression usually at streamside. Water was slowly and carefully poured over the flour until the bitter taste was leached out and washed away. It might take a dozen buckets of water before the acorn flour was "sweet".

Cooking: Acorn soup or mush was cooked in a tightly woven basket that swelled to become water-tight when soaked in water. A mixture of acorn flour and water was placed in the basket, and then red hot stones added and swished around until the mixture boiled. An acorn pudding was also prepared, and sometimes acorn cakes were baked on hot rocks covered with green leaves.



Above, "Women Cooking Acorns," from 'Hutchings' California Scenes'

Other Trees Found Along the Trail

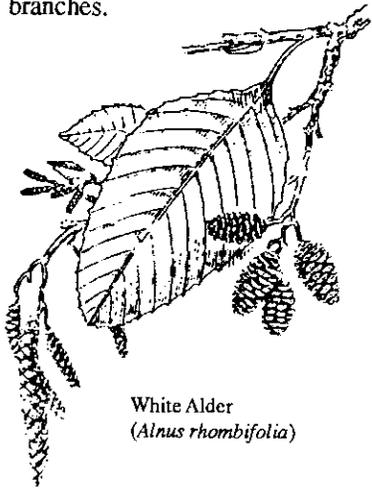
Willows, *Salix sp.*, **Che'-pum du** and **Koo'-ne** (Area D). The fact that willows have several Nisenan names indicates Nisenan recognized several species of willow. It was such a useful plant it must have received their close attention. The flexibility of its branches and shoots made it especially useful as a construction material, as the framework for dome-shaped tule houses, for example. Whole, shaped, or split willow rods were especially useful in weaving baskets. Roughly constructed burden baskets and fish traps, as well as the finest baskets, were woven on willow foundations.



Arroyo Willow
(*Salix lasiolepis*)

Throughout the ages the medicinal powers of willows have been recognized as a cure for nearly every ailment you can think of, including indigestion, worms, diarrhea, dysentery, cuts, bruises, and even to prevent tooth decay. Willow was widely used by Native Americans as a headache cure. Sure enough, it contains the ingredient "salicin" which, when ingested, breaks down into salicylic acid, the main constituent of aspirin, the modern world's most common cure for headache, pain, and minor inflammations.

One of willow's most useful properties is how easily its shoots will take root and grow a new tree. Bare or eroded streambanks can be re-vegetated and enhanced simply by sticking willow rod cuttings into the moist soil. Most of the plastic tubes you see along a barren section of Porter Creek were put up to protect 2-foot-long willow shoots harvested from nearby willows and pushed as deeply as possible into the stream bank. This was done in 1996. How tall have they grown already? Willow roots will stabilize the stream bank so other plants will have a place to grow, and less soil will wash into the stream to be carried away. Their shade will cool the stream, improving fish habitat, and all kinds of birds will forage and take cover in their branches.



White Alder
(*Alnus rhombifolia*)

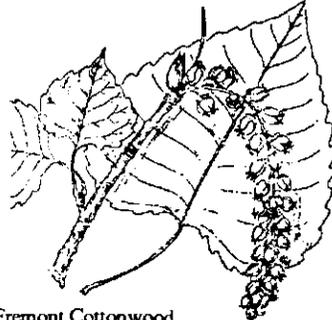
White Alder, *Alnus rhombifolia*, **Chitch-em chah** (Area D). Associated with willows along the creek, you will find this grey, smooth barked tree. In winter, even before leafing out, string-like male flowers hang down from the bare branches like Christmas tree ornaments. Later in the season you will notice little cones which bear the seeds.

Alders have the unusual ability to take nitrogen from the air and transform it into the kind of nitrogen that plants consume in order to grow. This is called "nitrogen fixation". It is done with the aid of specialized bacteria on the alder roots.

Thus, these trees fertilize the soil as they grow!

An orange dye can be made from the alder bark. Nisenan used it to color their clapper sticks, musical instruments that beat out the rhythm for chants and dances.

Fremont Cottonwood, *Populus fremontii*, **Wil-le'-le chah** (Area D). Often this is the tallest tree you'll find growing along streams in our area. Its bark is deeply furrowed and the leaves have characteristically scalloped edges and long stems that



Fremont Cottonwood
(*Populus fremontii*)

cause them to shake in the wind. In late summer, clouds of cottony, fuzzy seeds are released into the wind.

The Nisenan used cottonwood in their fire-making kits. Fires were started by friction heat of a rapidly twisted stick in gouged out depressions of a cottonwood anvil. The fuzzy seeds were used as tinder to catch the first sparks.

Foothill Pine, *Pinus sabiniana*, **To'-nim chahm** (Area E). Along with the oaks, this graceful pine defines our landscape. It is more round-topped and open-branched than most pines; you can see right through them. The foliage has a greyish cast, the needles long (as long as 15 inches), in bunches of three. Foothill pines grow interspersed among blue and interior live oaks, most abundant on steep, rocky slopes.



Foothill Pine
(*Pinus sabiniana*)

While a beautiful tree, it is not highly valued by people today. The wood is pitchy, twisted, and knotty, difficult to make good boards from. Trunks are often bowed and forked, rather than the straight stems favored by lumbermen. Some have called it a "weed tree" and sought to eliminate it in order to grow more grass for grazing. But it is native and distinctive to our place.

Nisenan, as well as early settlers, found it a very useful tree. The nuts of its gigantic cones—some almost 1 foot long and 6 inches in diameter, and weighing as much as 4 pounds—were laboriously collected. This was a sticky job. The pitchy, green cones were knocked from the tree and held over a fire until their scales opened, releasing the hard coated seeds. These were then cracked open to remove the tasty kernels within. But it was worth it, for the seeds are over 51% fat and 28% protein—power-packed food. High fat foods were rare in the Nisenan diet, and therefore prized. This is quite different from today's fat-crammed diet.

The pitch itself was a useful glue, and could be used to make torches for night travel. White settlers are also known to have used it as a kind of bandaid coating over sores and burns. Some even chewed the pitch when it thickened into a gum as a cure for rheumatism, or as a kind of chewing gum.

Foothill pine is also known as "Grey Pine", "Bull Pine", and, most common of all, "Digger Pine." This last name is nowadays avoided, since the term "Digger" was a derogatory term for California Indians. Some say this derived from the settlers' common observation of Native Americans industriously digging for roots and bulbs. Regardless, it was a term meant to belittle a whole people, no longer appropriate now that we understand the rich culture of the original inhabitants of this land.



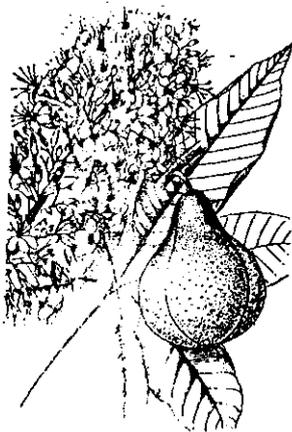
Blue Elderberry
Sambucus mexicana

Blue Elderberry, *Sambucus mexicana*, **Kah-kah'-kum du** (Area C). Elderberry often looks more like a shrub (The Nisenan "du" at the end of its name means "bush") than a tree, with its many stems and short stature. Its flat, white blossom cluster looks like a bouquet. Each flower becomes a blue berry that tastes fairly awful when raw, but tasty enough when dried or cooked to be made into jam and jelly. Pioneers very quickly discovered that the berries would also ferment into wine, which could be used for medicinal purposes.

The Nisenan had no fermented drinks originally, but prized the berries for food, dye, and as a cure for poison oak.

Elderberry stems are spongy inside and can be easily hollowed out and made into flutes, or split and tied at one end and used as clapper sticks for rhythmic accompaniment of chants and prayers. Elderberry was the Nisenan "Tree of Music".

California Buckeye, *Aesculus californica*, **Po'-lahm chah** (Area G). This bushy tree is first to leaf out in the spring. Its palm-shaped leaves seem to open up overnight. White spikes of flowers, looking like footlong bottle brushes, stick out from its round bushiness.



California Buckeye
Aesculus californica

By August its leaves have turned dry and brown, and can easily be picked out on the hill-sides where all other trees and shrubs are still green. Curious-looking, large, grey, pear-shaped fruits can be seen hanging from the bare branches.

In fall the fruit husks split, each releasing what looks like a giant chestnut. Buckeye nuts have a beautiful brownish sheen, with a lighter colored "eye" where the nut had been attached to the ovary of the flower. They are 2-3 inches in diameter. Any nut this size would attract attention as a food source.

Sure enough, it was used by the Nisenan. But like acorns, considerable preparation was first required. Unless properly prepared, the nut is poisonous.

First the nuts were baked in stone-lined, underground ovens for many hours, until they could be sliced like potatoes and were of that consistency. Then they were placed in baskets and the poison leached out in running water. The baked nuts were also mashed into a paste and leached like acorns in a shallow sand basin, with many changes of water poured over it. When leached it

could be eaten as is without further cooking.

The ground up raw nuts were also thrown into pools to poison fish. Apparently, however, this didn't affect the edibility of the fish.

The Nisenan used the buckeye for medicines too. Ground up and leached, the meal was packed into wounds. Perhaps it had antiseptic properties. As a dry powder it was used to cure athlete's foot. Straight stems of the buckeye were used for starting fire by friction.

Such a useful plant, yet both the nectar and pollen of its flowers are poisonous to honey bees which are attracted to them. Honey bees are not native to North America. They were introduced here by the very first settlers. (Indians called them the "White Man's Fly".) So honey bees and buckeye flowers have not had time to evolve in mutually beneficial directions. These foreign newcomer insects just had to take their chances in this new land.

Figs and Olives, *Ficus carica* and *Olea europaea* (Area A).

Fig and olive trees are not native to America, but they are found growing along Porter Creek and many other locations on the Sierra Foothill Research and Extension Center. They are a sign of early settlement by Europeans, commonly introduced by white settlers because they are drought tolerant plants and grew well in our climate with little care or watering. They have been cultivated for several thousand years in the Mediterranean region of Europe and the Middle East, which has a climate similar to ours.

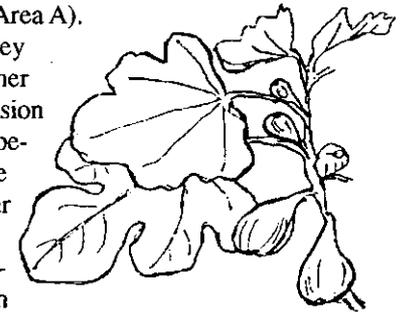


Fig
Ficus Carica

Figs and olives first came to California with the Missions established by Spanish Catholic priests in southern California in the 1700s. That's why the two commonest varieties grown here are called "Mission Figs" and "Mission Olives". Figs and olives grew on the five old ranches purchased in the 1960s to establish this Research and Extension Center. Those that you see are either the original planted trees or their offspring.

Fig stems root easily. Broken-off pieces of stems or branches are spread by the rushing stream to other locations where they take root in moist soil and grow into a new tree. Many birds also nibble the fruits and spread the seeds in their droppings. Sometimes we find them growing in odd places.

At the turn of the century olives were planted on many ranches throughout the foothills of Yuba and Butte counties. Ranchers meant to produce olive oil commercially, but were unable to compete with less expensive oil from Spain and Italy. Many olive

groves were abandoned. Today, however, California olive oil is making a comeback, since olive oil has been found to be especially healthful compared to other kinds of edible oils. The old, "organic" olive orchards are being restored and brought back into production to answer this new demand by a health conscious population.



Olive
Olea europaea

Gum Tree, *Eucalyptus sp.* (Area G). You are probably more familiar with this tree's scientific name than its common name of gum tree. The fresh, almost medicinal smell of eucalyptus trees, and their rustling, grey-green or frosty-blue foliage, are strongly identified with California. It is not, however, native to our state. Although it has been widely planted around homes, parks, and roads, especially in the Bay Area, it's actually an import from Australia.

In the early 1900s people in the wood industry hoped eucalyptus would be the dream tree for California. Their plan was to exploit its outstanding main characteristic—extremely rapid growth. Australian eucalypts were planted widely, by people hoping to quickly produce wood for lumber, railroad ties, and timber supports for California's mines. But the dream died a quick death, when it turned out the wood was not suitable for these uses. So, we are left with many huge, old trees and their progeny, which have invaded areas near where they were introduced.

In 1984 a large plot of different kinds of eucalyptus was planted here to see how they would grow and how much firewood they'd produce under intensive management. A remnant of this test plot is along the nature trail. In six years we had a small "forest" ready for harvest. Many were over 50 feet tall and 4 1/2 inches in diameter. We got 20-50 cords of firewood per acre, depending on the kind of eucalyptus. (A cord is a stack of firewood 4 feet high by 4 feet wide by 8 feet long.) The native oaks of our area, which are also cut for firewood, can hardly compete with such productivity. They usually grow about 10 cords per acre, and take far longer than six years to reach harvest size. However, unlike the oaks which are adapted to the rare freezes we can get, below freezing temperatures can kill the eucalyptus stem. In 1991, it was 17 degrees here, and the tops of many of the eucalyptus were killed. They soon sprouted new stems from buds at ground level. The eucalyptus trees you see here sprouted from the stumps of trees harvested for firewood in 1990.

Eucalyptus makes an excellent firewood. Other products we get from eucalyptus are extracts for oils and cough medicines. Florists use the attractive, roundish young leaves for flower arrangements.

Other Plants of the Nature Trail

Poison Oak, *Toxicodendron diversilobum*, Che'-tok-um-du (Area F). This plant is no relation to oaks whatsoever. Some people probably just thought it looked a little like an oak sprout. But you had best memorize how it does look with this little verse: "Leaves of three, let it be." Poison oak makes most people break out in an itch after they've rubbed the leaves or stems. Not much poison oak grows along this nature trail, but there's lots in the area.



Poison Oak
Toxicodendron diversilobum

The itchiness and blister eruptions on our skins is provoked by an oil-like, irritating substance borne on the leaves, stems, and roots that causes our body's immune system to respond in a protective manner. It takes 15-20 minutes for the oil to start the body's response, although it can be hours or days before you notice it, so if you happen to have soap and water along you can wash off the oil and prevent this immune response. Not everyone breaks out in a rash, or to the same extent. You can also get a good case from touching shoes or clothing that have rubbed oils from the plant. While unpleasant, poison oak rashes soon disappear with no lasting effects.

The plant itself is attractive and diverse in occurrence. The three shiney leaves may be found on a vine winding around a tree to a height of 50 feet, or on clumps of erect shrubs, or ground-hugging sprouts. Early in spring it produces whitish flowers, that have nectar sought after by bees and other insects. The fertilized flowers mature to white berries eaten by many species of birds. Neither flowers nor berries have the irritating oil.

Did the Nisenan itch from poison oak? We don't know. But there are many uses reported for this plant. Supposedly, acorn cakes were baked in its leaves! A black dye was made from the sap and used to color basket designs. These and other uses must have required lots of handling of the plant, so maybe a long time ago Indian people were more immune to its effects than they, and we, are today.

One of the more curious reported uses of poison oak juice was as a cure for warts and for an itchy fungal skin infection called "ringworm". People often experimented with plants as possible cures if the plants could produce symptoms similar to the ailment they wished to cure.

Enjoy this plant at a distance.

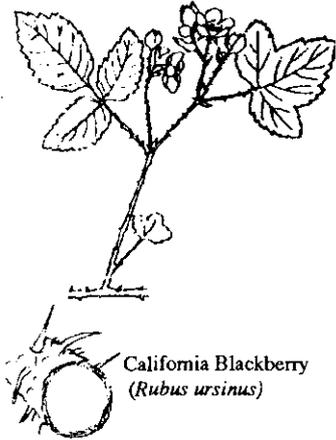
There are three different kinds of blackberries along Porter Creek, two introduced species and one native. The introduced ones are Himalayan blackberry (*Rubus discolor*) and the eastern blackberry (*Rubus pensilvanicus*) (Area D). It's easy to tell these two from our native California blackberry (*Rubus ursinus*) (Area F) using these rules:

- If the underside of the leaf is white, it's Himalayan.
- If the underside of the leaf is green, and the stem is five-sided, with large thorns, it's eastern blackberry.
- If the leaf is divided in three parts and its underside is green, and the stem is round, with many small thorns, it's Californian.

The berries of each of the different kinds has a slightly different flavor, and all are delicious. Himalayan blackberry is most common along the nature trail; its berries ripen latest, and are the biggest.

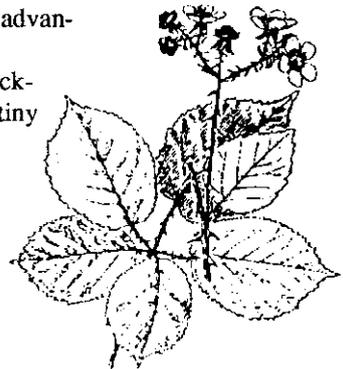


Eastern Blackberry (*Rubus pensilvanicus*)



California Blackberry (*Rubus ursinus*)

The blackberries tell us a story common to native plants. Often the new invader plants tend to take over. They may be able to reproduce more vigorously in a wider range of habitats than the native plant, or their traditional enemies and diseases may be absent in their new homeland, giving them an advantage over the native plants. California blackberries occupy but a tiny corner of the marsh, while the non-native kinds are much more abundant and spread aggressively.



Himalayan Blackberry (*Rubus discolor*)

The Nisenan called blackberries **Wah'-sem-du'**. They were just as fond of them as we are, collecting them in special baskets hung around the neck so both hands were free to pick. Berries could be dried, pulverized, and formed into cakes, or made into a refreshing drink.

Miner's Lettuce, *Claytonia perfoliata* (Area A). This plant is also known as "Indian Lettuce", which testifies to its widespread use among both whites and Indians. We don't know its Nisenan name. It was eaten raw as a salad green and cooked as a potherb. You will find this little plant in great abundance in shady places during early spring. The white to pinkish flower seems to pierce through a circular leaf surround-

ing the flower stalk. The stems are a bit stringy but the leaves succulent, as good as lettuce and about as tasteless, though refreshing.

To the miners of the Gold Rush this was a most important food source. Far from home, in a strange country, their diet was poor, mainly meat, especially deficient in vitamins. In the mining camps there were many who suffered from scurvy, a mysterious disease then, caused by lack of vitamins. They felt miserable as their hair and teeth fell out. Miner's lettuce alleviated this condition, since it is rich in Vitamin C.

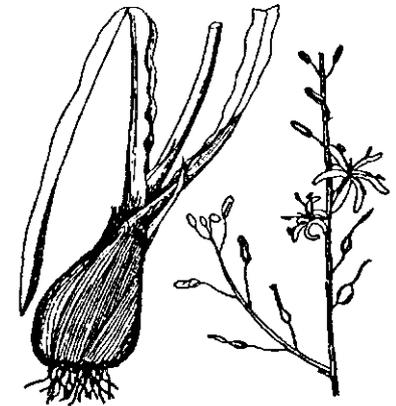


Miner's Lettuce (*Claytonia perfoliata*)

The Nisenan, too, appreciated the healthful properties of this plant. Although their diet was far healthier than that of the first miners, early spring was a time of sparse food availability. In this period between the bounty of fall and the new sprouts and bulbs of spring, they were able to gather "Indian Lettuce" to round out their diet.

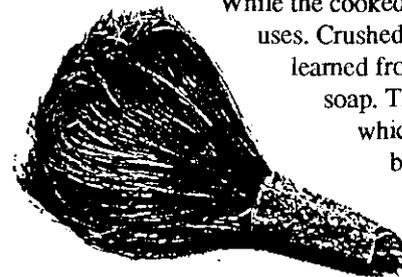
Our native Miner's/Indian lettuce has been introduced to Europe, where it is grown and sold as "Winter Purslane", much appreciated by gourmets.

Soap Plant, *Chlorogalum pomeridianum*, **Hawm'** (Area B). This plant is also found growing away from the creek. Its wavy edged, lily-looking leaves and tall, candleabra-like flower stalks are easy to spot. Deer love to munch them down. The flowers are small and whitish, opening toward evening to be pollinated by night-flying moths and other insects. Once fertilized, the flowers turn into green little globes on the naked flower stalk.



Soap Plant (*Chlorogalum pomeridianum*)

While the cooked bulb was a nutritious food, it had many other uses. Crushed in water it forms a soapy suds. Early settlers learned from the Indians how to make use of this natural soap. The bulb is covered with coarse brown fibers, which were removed and made by the Nisenan into beautifully curved brushes for cleaning bedrock mortars and whisking acorn flour. A handle



Nisenan soap plant brush

for the brush was made by boiling the bulb to pulpy consistency and spreading it to harden over the fiber ends. This substance was also used as an all-purpose glue.

The bulbs were mashed raw and used to catch fish. Large amounts of crushed bulbs were thrown into pools at times of low flow, and the fish would become stupefied and float to the top. Picture the water afloat with bobbing fish, with the wading men netting and throwing them on to the bank, where laughing women and children clubbed and prepared them for a bountiful feast.

There were even more uses for soap plant! Both the young shoots and leaves were eaten, and the leaves were wrapped around acorn for baking. Crushed bulbs were rubbed on the body for cramps and rheumatism. Roasted, they were made into poultices for sores. Some groups, though not the Nisenan, even used the green juice from the leaves as a pigment, pricking the skin to make tatoos.

All of the above is cited at length just to show how useful some plants can be. Except for Native American people rediscovering their old traditions, hardly anyone uses soap plant today, and few even can identify it.



California Manroot (*Marah fabaceus*)

California Manroot, *Marah fabaceus* (Area B). You may see this vine creeping along the ground or climbing in the vegetation along the creek. It looks like the familiar cucumber of our gardens. In fact, it has the nickname "Indian cucumber." But it isn't edible.

Its fruit is green and spiny, but those spines are actually soft to the touch. Inside are several large, brown seeds, which are poisonous. When they're ripe, they explode out of the

fruit. Look out if you're here when it happens!

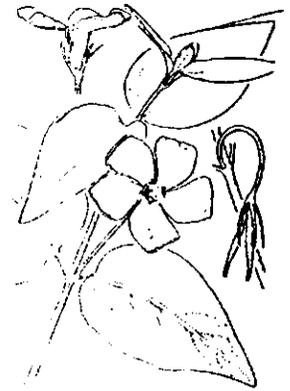
Nisenan fishermen crushed the seeds and threw them in streams to poison and catch fish. This doesn't sound very sporting but there were a lot more fish to go around in those days. Other plants, buckeye and soap plant, were used in a similar manner. The juice of the seed pods seems to have been used as a hair conditioner.

"Manroot" is a strange name, but describes well a part of the plant you never see. Its root is of huge dimension, as big as a man (or woman). The vine above ground fades and dies soon after fruiting. Stored nutrients in the root provide energy for the vine to start a new cycle of growth in early spring the following year.

Periwinkle, *Vinca major* (Area A). You will notice this sprawling ground cover vine at several locations along the trail. It will catch your attention especially when it's in

flower and dotted with blue funnel-shaped blossoms, 1-2 inches across. It may look familiar.

This perennial is an extremely popular ornamental plant for home landscaping. It's pretty, makes a dense green carpet, and has those cheerful blue flowers. It is also very hardy, spreading by sending out stems that root at their tips to form new growth.



Periwinkle
(*Vinca major*)

Periwinkle is not native to this place, but was introduced from Europe. It has made itself at home in damp locations. It tells us that a homestead of the early settlers was located somewhere nearby.



Verbena
(*Verbena bonariensis*)

Verbena, *Verbena bonariensis* (Area B). Like many of the other exotic plants along the nature trail, Verbena is widespread and thriving. This native of South America has a stout, woody stem and stands 3-6 feet tall. Blue flower spike-clusters at the branch tips, often nodding, make it an attractive invader. It thrives especially in irrigated pastures, but ranchers don't like it since it takes up space where other, better forage plants would grow.

Looked at up close, you will notice the square stem. This characteristic often is an indicator of the mint family, but not in this case. Verbena (Vervain family, for you botanists) is related to the low lying, usually red to pink blossomed, ground-cover plant purchased in nurseries for landscape planting in difficult spots around homes. That, too, is an import. Curiously, Verbena is also related to the mangroves, growing in thickets in tropical brackish marshes and to the teak tree of the tropics.

Wild Mint. Several wild mints grow along the trail in streamside damp areas and in the marsh. Members of this family (Lamiaceae, formerly Labiateae) have square stems, bell-shaped flowers or flowers with petals fused to form a lower or upper "lip". The flowers are arranged in groups or whorls with leaves below. They smell minty or are variously aromatic.

The mint, *Mentha sp.* (Area B) smells very much like the mint of mint jelly or toothpaste; the one in the marsh, *Stachys ajugoides*, (Area F) is more lemmony. It's called Bugle Hedge Nettle and, cu-



Bugle Hedge Nettle (*Stachys ajugoides*)

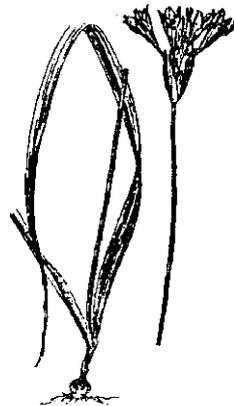


Hedge Nettle
(*Stachys stricta*)

riously enough, is neither a hedge nor a nettle. Elsewhere, throughout the marsh, another "Hedge Nettle" (*Stachys stricta*) grows tall and looks coarse. It has hairs on stems and leaves, with little glandular droplets you can see with a hand lens. Its smell is an overwhelming minty overdose.

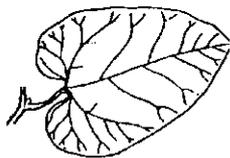
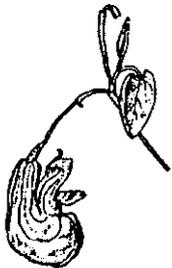
Mints have been widely used for medicinal teas by Native Americans and many others. There is something universally appealing about the smell; the refreshing, pleasant sweet taste of the leaves steeped in hot or cold water have been a healthy tasting drink for centuries of human history.

Ithuriel's Spear, *Triteleia laxa*, Way (Area A). This prolific blue wildflower is one of a group of native plants often referred to as "Brodiaeas", or sometimes "Blue dicks". They form bulb-like structures below ground called corms. These are the storehouse of nutrients for next year's growth. Their nick-name "Indian potatoes" is a clue to their use. Nisenan harvested them in abundance—one author reported over 100 to the square foot—in late spring, using a four foot long, fire-hardened, pointed digging stick. They could be eaten raw, baked, dried and stored, or pounded and mixed with other plant foods and made into cakes. They were an important and reliable part of the Nisenan diet.



Ithuriel's Spear
(*Triteleia laxa*)

These beautiful blue flowers are at their height in April-May, although different kinds bloom on into the summer. The flowers of the Ithuriel's Spear are attached by thin stems to one point at the top of the main stem, and look like a basket of flowers. They are a sign of spring in the annual grasslands and we hate to see them fade away into the dry summer.



Pipevine (*Aristolochia californica*)

When native peoples dug up these plants, they consciously left the tiny "bulblets" adhering to the larger bulb. Thus, the stirring up of the ground around these remaining sources of future plants was a kind of cultivation that stimulated future prolific growth of the brodiaea beds.

Pipevine, *Aristolochia californica* (Area D). This native vine has distinctive heart-shaped leaves and a most peculiar flower. It is "U" shaped, like a tiny pipe, and greenish-purple. A peculiar odor attracts a species of fly, which enters the flower to transfer pollen from the male to the female flower parts, thus fer-

tilizing the flower.

During the spring you may see beautiful black and metallic green-blue butterflies hovering about or on the foliage. These are Pipevine Swallowtails (*Battus philenor*) mating and laying eggs on the plant. Caterpillars hatching from these eggs will feed on the leaves of the pipevine until ready to form cocoons. The caterpillar larvae feed only on this plant. You may find pipevines completely covered with the feeding black and orange caterpillars. Chemical substances derived from the pipevine plant make both the larvae and adult butterflies distasteful to birds, thus protecting them from their main predators. It is not unusual for flowering plants and insects to have evolved together in such intricate ways. In this case, it's not clear what benefit the plant derives from this insect relationship.

Mugwort, *Artemisia douglasiana*, Mo-mo-um or Mun-mum (Area F). If you smell the leaves of this plant, you'll immediately guess it had medicinal uses. It smells like sagebrush, and is closely related to that shrub of the high plains. It also has the same grey-green look, almost silvery, but it is soft and herb-like, growing 2-3 feet tall. Some people call it "wormwood", probably because it was once used to cure worms.

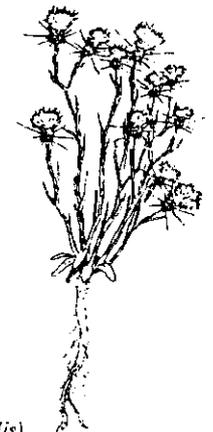


Mugwort
(*Artemisia douglasiana*)

It was widely used by both Indian and non-Indian peoples, its leaves brewed as a tea for numerous ailments such as bronchitis, intestinal problems of all sorts, colds, and as a general tonic. It was also wrapped on wounds, and its juice was said to counteract poison oak. Its medicinal virtues would take many pages to list.

The Nisenan had both ordinary and sacred uses for the plant. Mugwort leaves were layered onto acorns stored for long periods in granaries, the aromatic odor repelling insects. Ceremonially, it was waved to calm bear and rattlesnake. It was a symbol of peace, like we use the olive branch.

Yellow Star-Thistle, *Centaurea solstitialis* (Area E). This is one of California's most noxious weeds, probably arriving here in the mid-1800's as a contaminant in alfalfa seed. It has since spread to many millions of acres. Each plant has numerous bright yellow flowers, circled at maturity by a formidable crown of thorns. Most animals will not eat it at this stage.



Yellow Star-Thistle (*Centaurea solstitialis*)

What makes it so undesirable is its ability to out-compete other plants, crowding them out and then taking over to become a dense stand, which is very difficult to eradicate. Such dense stands may even be nearly impossible for humans to walk through. Horse-lovers hate yellow star, since, eaten in quantity, it can be toxic to horses.

Yellow star's widespread occurrence provides a lesson in what it takes to be a successful plant invader. Most important is its enormous reproductive capacity. These plants normally produce 700 to 10,000 seeds per plant, and some as many as 170,000 seeds per plant! It completes its life cycle in one year like any other annual plant, but it isn't quick about its business and sticks around a long time, using up space and nutrients. This persistence is aided by a strongly developed tap root, which reaches deep into the soil for moisture. This, in turn, allows it to exist in drier places and on poor sites. Good underground development also lets it regrow and reflower if it is grazed or mowed. If all these were not advantage enough, yellow star's invasion of California is far from its old insect enemies and diseases in Mediterranean Europe. Many strategies and much research is going into yellow star-thistle control. We are trying herbicides (plant killing chemicals), fire, mowing, and grazing in its early life stages, and even importing some of its old insect enemies to eat the seeds before they are released. So far, yellow star is still the winner.

Who likes yellow star? Bees and beekeepers. The many flowers in a dense stand of acres upon acres of solid yellow star produce nectar sought after by the bees who make it into honey.

California Wild Grape, *Vitis californica*, **Pim-im Hin** (Area G). This vine can be found draped and sprawling over other vegetation in the riparian area. Its leaves are familiar, shallow-lobed and heart-shaped, like the closely related cultivated grape of our vineyards. The purple fruit, too, occurs in familiar clusters, but is smaller in size.

The edible fruit was prized by the Nisenan, but they made no alcoholic drink from the juice. Alcohol was unknown to the Nisenan before settlers arrived on the scene. The newcomers used the plant for making wine before imported European grape varieties replaced the native species for this purpose late in the 19th century.

The Nisenan also used the flexible vine itself. Grape vines were wrapped around willow poles stuck in the ground to form the frame for acorn storage bins or granaries. The vines were useful in binding together the pole framework of temporary houses, and were strung across creeks as hanging bridges.



California Wild Grape
(*Vitis californica*)

Wild grapes were once so widespread in our area that the earliest Spanish explorers made note of this profusion by naming the river system they explored the "Uva" (Spanish for "grape"). Later this was anglicized to become the "Yuba" River.

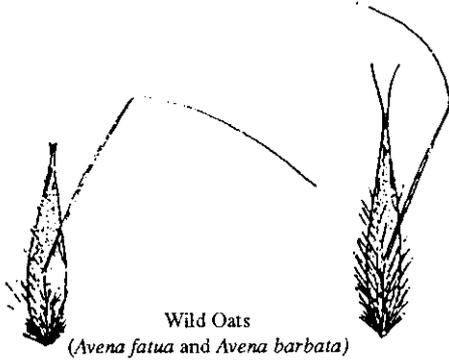
Grasses

Nearly all of the grasses you will encounter on the nature trail have been introduced since European settlement first began in California about 225 years ago. These are grasses that complete their life cycles in one year, and are therefore called "annual grasses". They sprout and grow at the start of the winter rainy period, then mature, flower, and form seeds, turning brown and dead as the summer dry period begins. From the seeds, a new cycle of grass growth begins again the following year. The best time to identify the different kinds of grasses is when they are green and ripe with seed during the spring.

Before settlement, most of our grasses in California were probably "perennial bunch grasses". Perennials have life cycles lasting many years. Instead of the carpet of annual grasses you now see, imagine what it might have looked like to see clumps, or bunches, of tall grasses, green or nearly green most of the year, with other kinds of plants and flowers growing between them. These kinds of grasses reproduced by sending out "runners" of different kinds, rather than large amounts of seed. As annual grasses came into our area in imported animal feeds and by chance over time, their great seed production gave them a strong advantage over the native grasses. Also, many newcomer annuals were better adapted to grazing by the cattle and sheep which accompanied settlement. Now the native grasses exist marginally in our landscape, while exotic annuals dominate.

The native people of our area utilized grass seeds extensively, harvesting them by cutting with wooden knives, then collecting the seeds by shaking the sheaves over a basket. Another method was to gather them by holding the seed heads over a tightly woven basket and beating them with a paddle-like tool. The seeds (called Tsis) were hulled by beating, the chaff separated by tossing in the wind in a basket tray. Pulverized at the bedrock mortar, they were then made into mush said to taste like peanut butter. None of the grasses below have Nisenan names because they arrived with white settlement. There are reports of Nisenan gathering introduced wild oats, however.

On the next pages are a few of the grasses you will encounter on the nature trail. There are many others in our area. Experts tell them apart by characteristics of their stems, leaves, and flowers. Yes, grasses have flowers! But they are small, hard to notice, and occur in groups as a flower head at the top of the grass stem. Some grasses flower earlier than others, so you will not always be able to detect all of the different kinds.



Wild Oats
(*Avena fatua* and *Avena barbata*)

Wild Oats, *Avena fatua* and *Avena barbata*, (Area A). Look for these tall-stemmed grasses anytime after May. They're usually 2-3 feet tall and waving in the wind above the other grasses. Even after the seeds have fallen out, you will notice the erect stems and remaining flower parts, silvery empty scales hanging down on curved, thin branches of the skeletal stem. If you find it in

flower, examine an individual flower closely. You'll notice it has a hairy bottom and a long bristle called an "awn". To be a real expert, check out the tip of the closed flower. You can tell the two species of wild oats apart by whether the bristles at the tip are long or short. Wild oats are good cattle feed. We get our oatmeal from another species, *Avena sativa*, the cultivated species.



Hedgehog Dogtail
(*Cynosurus echinatus*)

Hedgehog Dogtail, *Cynosurus echinatus* (Area A) In late spring you'll begin to find this easy-to-identify species, and by mid-summer you will see it everywhere. Its bristly head (like a hedgehog) looks more developed on one side than the other. Because it flowers later than many other grasses which are grazed, it has less competition and tends to occur in dense stands. It has little value for forage.

Medusahead, *Taeniatherum caput-medusae* (Area A). When most other grasses are matured and brown, this grass is still green on the surrounding hillsides. Extensive clumps wave in the wind and have a green, velvety texture. But only from a distance. This is one of our most noxious grasses. In Greek legend, Medusa had a head of snakes, and you'd turn to stone just looking at her. This grass has seeds with long, tangled awns, that give the seed head a similar appearance. Each seed and its awn are armed with tiny hooks, rough and itchy to the



Wild Oats
(*Avena fatua*)



Velvet Grass
(*Holcus lanatus*)

touch. Ripe seeds break from the head and will penetrate your clothes. They are hard to remove because the hooks face the wrong way. This is a good mechanism of seed dispersal, since humans and other animals can carry the seeds long distances.

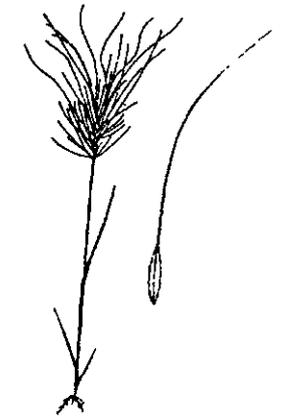
Medusahead crowds out other grasses and can take over vast areas. Its stems have an abundance of silica, which is the same substance that sand is composed of. It doesn't decompose very rapidly, and thus accumulates a thick mat called "thatch", which is difficult for the seeds of other plants to penetrate. Animals don't like to eat Medusahead because it's prickly and hard to digest. So it has become a widespread pest. We have tried to slow it down by periodic burning.

Velvet Grass, *Holcus lanatus* (Area F). The broad leaves of this grass are velvety to the touch. Look for it where the soil is constantly damp. It flowers early, and its plume-like flower head stands about 2 feet tall, looking pinkish colored before turning whitish as it matures. Unlike most of the other introduced grasses, this is a perennial rather than an annual, and forms dense clumps.

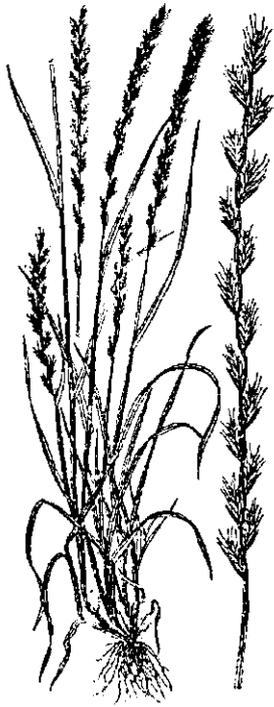
Rabbit-Foot Grass, *Polypogon monspeliensis* (Area F). The fuzzy head of this grass, which looks like a green rabbits foot, will be found in similar wet places as velvet grass. You will be tempted to pet its silkiness. In fall the brown heads looks cottony and ragged on the stem.



Rabbit-Foot Grass
(*Polypogon monspeliensis*)



Medusahead
(*Taeniatherum caput-medusae*)



Annual Rye
(*Lolium multiflorum*)

Annual Rye, *Lolium multiflorum* (Area A). This grass is also known as Italian rye, a clue to its origin in the Mediterranean area, home of many of our introduced grasses. It is good feed for livestock and is one of the main grasses planted on our pastured hills, although it is scanty along the nature trail. It is also useful for erosion control, quickly taking root and protecting soils scraped bare on construction sites and road cuts, or where vegetation has been burned by wildfires on steep hillsides.

Soft Chess, *Bromus hordeaceus=mollis* (Area A), and Ripgut Brome, *Bromus diandrus* (Area B). These two closely related grasses are a study in contrasts. Soft chess is like its name suggests, and both leaves and flowers are soft and fuzzy to the touch. It is very nutritious for grazing animals, and one of our most desirable range feeds. Ripgut, as its name also suggests, has a more sinister reputation. While palatable in its early stages, its long awns and sharp seeds can injure or irritate the mouths, eyes, or ears of grazers—and stick in the socks of hikers. Both species are found where we've disturbed the soil, a typical strategy of successful invaders.



Soft Chess
(*Bromus hordeaceus=mollis*)

Interesting Marsh Plants

Broadleaved Cattail, *Typha latifolia*, Pok'-pok (Area F). Our main marsh plant can be found standing in water. It hardly resembles a cat's tail, and the mature flower head looks more like a brown cigar. Pollen bearing male flowers are borne on a stalk above the extremely numerous, tightly packed female flowers which form the "cigar" (The technical term would be "inflorescence"). Sometimes there's a small space between male and female sections. The cigar turns brown after pollen has fertilized the female flowers, and the inconspicuous, spent male flowers soon fall off, so there's nothing but a bare spike above the cigar. The seed-bearing cigar breaks apart in the stormy winds of winter, spreading the fluffy seeds far and wide. Cattails readily invade any habitat with standing water.

All parts of the cattail are useful. The Nisenan—as do many people today who gather wild foods for fun—ate the young shoots, like we eat asparagus. The creeping stem beneath the water, rich in stored starch, was dried and made into a flour. When the female flower head is still green it can be roasted and eaten like corn-on-the-cob. The male flower head of a single plant can be shaken into a bag, yielding about 2 tablespoons of very nutritious and tasty pollen. It can be added to bread mixes.

Leaves and stems make excellent material for weaving mats. Such mats may have been a component of Nisenan house construction in our area where the usual siding material, cedar bark, is lacking. Like their neighbors a short distance away in the valley, they may have woven the cattails onto an oak or willow framework to make round, basket-like dwellings.

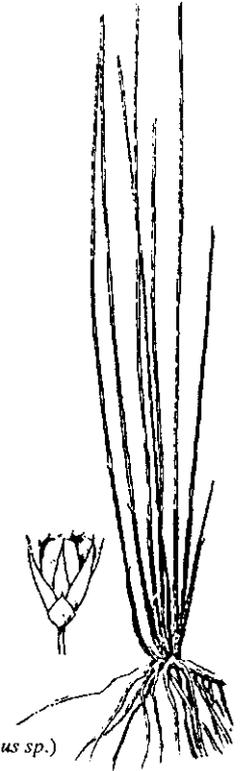
If you wondered how the Nisenan made fire, the answer is by rapidly twirling a stick between the palms of their hands, with downward pressure, in a specially cupped, wooden anvil. The fuzzy seeds of the cattail, as well as those of cottonwood, were used as the fire-starting material. They first glowed from the heat of the friction, and then when gently blown upon, became a glowing match for additional tinder.

Rushes (*Juncus sp.*) and Sedges (*Carex sp.*) (Area F). These grass-like plants indicate water. Their roots, and root-like underground stem-runners called rhizomes, can grow in water or soggy soil because they receive oxygen by way of their hollow and spongy leaves. An old rhyme helps tell them apart: "Sedges have edges and rushes are round". It works, but not all of the time.

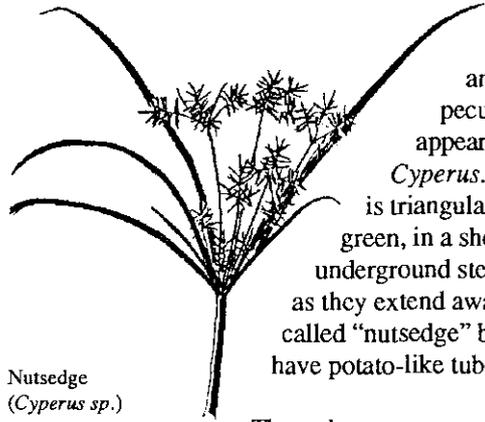
The *Juncus* rush you see from the elevated walkway in the marsh is almost 3 feet tall, very pointy, and its brownish flowers look like miniature, dried flowers when looked at through a hand lens. The *Carex* sedge



Broadleaved Cattail
(*Typha latifolia*)



Rushes (*Juncus sp.*)



Nutsedge
(*Cyperus sp.*)

near it grows in a much less pin-cushion clump. Its flowers are also brown and appear unfamiliar because they have peculiar un-flower-like structures, scaley in appearance. There's another sedge here, *Cyperus*. It is easy to distinguish because its stem is triangular (edges!) and its flower flat, scaley and green, in a showy head. New plants grow from the underground stems (called "rhizomes") of these plants as they extend away from the mother plant. *Cyperus* is called "nutsedge" because in some species the rhizomes have potato-like tubers attached, which are edible.

The sedge group provided, and still provides, one of the main plants used in California Indian basketry. The rhizomes are dug up, especially those long and straight. They are split and dried and used in the finest baskets. Indian people today, including our contemporary Nisenan basket weavers, pay special attention to these sedge growing places, keeping their favorite sedge beds thinned and productive by careful harvesting.

All together, the rushes, sedges, and cattails of the marsh provide the dense cover many of our more secretive birds and mammals require.

Notes