

SECTION II HUMAN HISTORY OF THE COAST REDWOODS

In a document with the scope of *Redwood Ed*, it is impossible to go into depth regarding the history of a region the size of the coast redwood's range. *Redwood Ed* provides a brief summary of "stages" in the human history in the coast redwood region, particularly as it pertains to the redwood forests. For those who want to go into greater depth, many books have been written about specific local history. Some of them are listed in the Resources and Works Cited in the Appendices. Local parks, museums, libraries, schools and colleges, and book stores can provide a wealth of additional information.

Chapter 1

Native Americans and the Redwoods

The first people to inhabit the coast redwood region were the Native Americans who, according to their traditions, believe that they were placed in their homelands by the Creator and that they have lived there since "time immemorial." Most scientists agree that the people who are now called Native Americans are probably descendents of people who migrated to North America from Asia about 15,000-10,000 years ago, when the last ice age lowered sea level to a point several hundred feet below its present level. "Indians" probably came to California from elsewhere in North America about 10,000-8,000 years ago and to the northern redwood region from California's central valley. Evidence of human occupation from about 5,500 before present (B.P.) has been found in northwestern California (Moratto, 1973).

Archaeological evidence indicates that the entire coast of California was occupied by humans by about 5,000-4,000 B.P. By about 4,000 B.P., human populations in the redwood region had reached high levels. In the North Coast ranges, Native American populations were some of the densest in California. Before the Spaniards arrived, over 10,000 people lived in the coastal area between Point Sur and the San Francisco Bay.

Estimates of the number of Native Americans in California at the time of Columbus range from about 200,000 (Hewes, 1981) to as many as 700,000 (Wilson, 1998); by 1900, there were probably no more than 15,000 (Emanuels, 1993).

Teaching Idea



Have students find the average of 200,000 and 700,000. Then have them compare that number (450,000) to the populations of large cities in California and of the state. Discuss how more people are able to live in California now than 500 years ago. Be sure to discuss not only how agriculture and medicine have changed our lives, but also how people living in cities depend on food and water from elsewhere, i.e., the populations of cities exceed the carrying capacity of that area's land.

In the northern redwood region, some of the Native American peoples and cultures were very similar to the people of Alaska's southern coastal areas, living mainly along salmon streams and obtaining much of their food by fishing. Evidence of this derivation is found in their languages, culture, boat building techniques, and plank houses. Other groups apparently came to the north coast from the south and from the central valley.

In the southern redwood region, the Native Americans obtained more food by hunting and gathering than by fishing.

At least 15 different tribal groups inhabited the redwood region when the Europeans arrived in the 1700s. Native Americans in each area adapted to their local

environments, utilizing the natural resources, including the redwoods, in a variety of ways. Use local resources to learn about the lifestyles of specific groups. Because there were so many different groups, it is difficult to discuss all of them here. Some common practices of major groups are described below, especially as they pertain to the redwood forests.

The rugged geography of the redwood region, which tended to isolate groups from each other, was an important factor in the development of different languages and cultures. Plentiful resources, especially foods such as fish and acorns, also reduced the need to interact with other groups, further increasing isolation. As the relative isolation continued for many centuries, languages and cultures became increasingly distinct.

Teaching Idea



This cultural evolution is a similar process to biological evolution. Discussion of cultural evolution can provide a basis for discussion of biological diversification and evolution... change over time.

Evolution is emphasized in the seventh grade science curriculum. In high school life science, students learn about how geographic isolation affects speciation. (With regards to Native American groups, we're not talking about speciation, of course, but rather about development (evolution) of different cultures and language groups.)

Even as early as first grade, the history-social studies standards discuss such things as "some aspects of people, places, and things change over time while others stay the same." In third grade, students study "the ways in which physical geography, including climate, influenced how the local Indian nations adapted to their natural environment."

Several of the resources listed in Appendix III and IV provide maps of Native American groups. (See Eargle, Emanuels, Heizer, Woodhead, and others.) By comparing a map of Indian group territories to a map that shows mountain ranges, students can see that groups in the northern region, where the mountains are very rugged, tended to inhabit a more restricted area than those in the southern areas, where the terrain made travel easier. This is very evident if one also looks at the large areas inhabited by groups in the central valley, where travel was relatively easy, or the southern deserts, where food and water resources were scarce and necessitated larger hunting/gathering areas.

Coastal groups utilized many resources from the sea, including many kinds of fish, seals, sea lions, shellfish, octopi, seaweeds, salt, and other resources, including the occasional whale. Not only did marine organisms provide food, but shells were utilized as tools, furs provided protection from cold weather, and many resources were used as trade goods. Resources such as fish, acorns, and deer were so plentiful that there was little need to "farm" such crops as corn or squash.

The major groups in the northern part of the redwood region were the Tolowa, the Wiyot, and the Yurok. The Tolowa lived in northern Del Norte County in the Smith River

area, while the Yurok inhabited an area from Wilson Creek in Del Norte County to Little River south of Trinidad Head in Humboldt County. They lived in over 70 villages ranging in size from one family to fifty people. The Wiyot lived along the coast from Little River south to the False Cape/Bear River Ridge just north of Bear River.

Tolowa and Yurok houses and other buildings such as sweathouses and assembly halls were made mostly of redwood planks. (See Figures 70 and 71.) While somewhat different in design, Tolowa and Yurok buildings had much in common. The planks were typically made from trees that had fallen in the forest and from driftwood. The trees were split into planks using wedges made from elk antlers that were pounded with stone mauls, and shaped with mussel shell adzes. The boards might be several inches thick and 1 to 4 feet wide. These rectangular buildings might be up to 50 feet on a side, but were generally smaller. To conserve heat, and to protect against animal or human intruders, access was through a round opening, barely large enough for a person to crawl through, cut into a plank. Redwood's resistance to decay helped these buildings last more than a hundred years.

While most of the redwood used by the Native Americans came from fallen trees, they apparently did occasionally use fire to cut trees down. Hot stones and fire were used to char and burn a "cut" in one side of the tree. The charred wood was scraped away and the process repeated. When one side was partly burned through, another "cut" was made higher up on the opposite side.

Fortunately for early users, much of the old-growth wood was knot-free, which made it easier to split. This facilitated the making of planks from the abundant old-growth trees and logs. (It also made it easy to make grape stakes, shingles and other "split products" in later times.)

Teaching Ideas



Many of the illustrations in Section II are provided two-to-a-page so that they are large enough to use as masters for overhead transparencies.



See the activity "Ideas for Using Historic Images" in Section IV.

Pictures from many sources in IV and V, including Barbour et al. (2001), can be used as a basis for student-built models of Native American plank houses and bark cone-shaped houses built by students.



Figure 69. Replica of a Yurok dugout canoe. (Photo from Clarke Museum collection.)



Figure 70. This replica of a Yurok redwood plank house can be seen at Patrick's Point State Park, north of Arcata. Note the small entrance opening, which helps conserve heat and makes the dwelling more secure. Since the house surrounds a pit, the walls needn't be very tall. (Photo by Michael Roa.)



Figure 71. Replica of a Yurok sweat house at Patrick's Point State Park. (Photo by Michael Roa.)



Figure 72. Model of a Yurok plank house on display at Patrick's Point State Park. (Photo by Michael Roa.)

Redwood was used in a variety of other ways, especially by the Yurok. They created furniture such as stools and boxes, paddles, dugout canoes, and fishing tools. Redwood bark and root fibers were used in basket-making. Redwood bark was even used to make women's skirts and men's mantles.

Canoes were especially important to the Yurok and the Tolowa. In many areas, the rivers provided an easier way to travel than hiking through dense forests and up and down steep terrain. (See Figure 69.)

Dugout canoe making was a complex process. After using fire to "cut" driftwood logs into sections about 18 feet long, the shaping process began. Pitch was spread on one side of the log and ignited. As the pitch burned, it charred the wood. The builders smothered the fire with damp green leaves or fresh redwood bark and then scraped out the charred wood. Repeating the process and scraping and shaping both the inside and outside produced a canoe that worked well on the rivers. Five or six months might be spent making a canoe, which could be used by the makers or traded to another group (Barbour *et al.*, 2001).

Even larger canoes were built for use in the oceans. Seagoing canoes might be thirty to forty feet long and five to ten feet wide. Such a canoe could easily hold over a ton of fish, seal meat, or other goods (Hearst, 2006).

The Yurok diet was based on salmon and acorns. Tanoak acorns were preferred, but black oak and canyon live oak were also used. Since oaks grow better in clearings than under a forest canopy, the Yurok and other native groups learned to start fires on a regular two-year cycle. The regular burning produced openings in the canopy, which resulted in a larger acorn crop, and it also provided fire breaks around villages, reduced the invasion of conifers into clearings, reduced the intensity of accidental fires, and provided habitat and food for a variety of desired plants and animals such as deer and elk. Burning to improve acorn crops was especially common in the inland forests, but was also practiced in the redwood forests.

Teaching Idea



Discuss what might have happened if the Native Americans hadn't set fires in the grasslands and prairies, i.e., if they hadn't managed the resources. (At first bushes and shrubs and then trees would be able to grow along the grassland/forest margin. Then the forest would encroach on the grassland, eventually replacing it with forest. This is an example of biological succession.

Fires are generally suppressed throughout the redwood region today. Ask students to discuss what is happening to the forest clearings as fires are prevented. When visiting a site such as Fort Ross, have the students look for evidence of forests moving into the grassland. Also ask students for ideas of ways other than fire to keep bushes and trees from invading the grassland.

*Be sure to discuss the problem of accumulation of fuel from decades of fire prevention. When fires burn an area every few years, there is little damage to the large trees because there is not enough fuel for a large, hot fire. If fuel accumulates for many years, fires tend to be much larger and more destructive. Sometimes **prescribed or controlled burning** is used as a tool to reduce the accumulation of hazardous fuel, but air quality concerns limit its use. Logging or thinning can also help reduce the fuel load. There are seldom simple solutions!*

Yurok villages were generally not located in the redwood forests, but rather in openings and prairies along the coast between Trinidad and Crescent City, and on the lower 45 miles of the Klamath River. The clearings were often maintained by fires. These clearings provided berries, bulbs, grains, nuts, and many other plants used not only for food, but for medicines, basket making, and for arrows and other tools. Bear-grass was highly desired for basket making. In some areas, the seeds of the grasses in the meadows and prairies provided a significant source of food. Indians sometimes saved seeds of desired plants and spread them in the ashes after a fire. Large redwood trees were seldom harmed by these regular fires, but the burning did influence the composition of the forest understory.

Teaching Idea



Discussion of burning by Native Americans should include discussion of the results of fire prevention around cities today. When brush and dead wood are allowed to accumulate, fires are much more intense than they are in areas that are regularly burned. Regular, cyclical burning by Native Americans reduced the intensity of the fires that they started or that occurred naturally. Fires occur every spring, summer, and fall, and they threaten human life and habitation, especially in southern California. Save clippings or articles about these fires and discuss the pros and cons of controlled or prescribed burning. Invite speakers from the U.S. Forest Service, the California Department of Forestry and Fire Protection, or local fire departments to discuss controlled burning and fire safety.

Clearings created and maintained by the Indians also provided habitat for animals such as deer, rabbit, and elk.

The rivers and streams of the northern redwood region yielded abundant harvests of salmon, steelhead and lamprey. These fish were harvested during spawning season and dried for a year-round source of food.

The territory of the Northern Pomo extended from just north of Fort Bragg to near the mouth of the Navarro River, while the Central Pomo territory began there and extended south to the mouth of the Gualala River in southern Mendocino county. The territory of the Kashaya (another group of Pomo speakers) stretched from the mouth of the Gualala

River to Duncans Landing. Members of these groups sometimes built cone-shaped houses of bark by leaning large slabs of redwood bark against a central support pole. Layers of bark were laid on top of each other, shingle-like, until the only openings were a smoke hole at the top and a small "door." (See Figure 73.) They also used redwood planks to build structures similar to those of the Yurok and Tolowa, sometimes adding bark to the planks as additional weather proofing and insulation.

Like most other Native American groups of the redwood region, the Pomo generally didn't live in the redwood forest itself. Rather, they lived along the coasts, rivers, and mixed oak/grassland. The Pomo did enter the redwood forests in search of plants such as ferns, establishing seasonal camps that they might use for a few weeks each year. Like the Yurok, the Pomo hunted rabbits, deer, sea mammals and other animals. As with the Yurok, salmon and steelhead were an important part of the Pomo diet.

It was the Kashaya who were encountered by the Russians when they established the Fort Ross settlement in 1811-1812.



Figure 73. Redwood bark houses, or kotchas, were made by the Coastal Miwok. This replica is part of the Kule Loklo replica Coastal Miwok village at Point Reyes National Seashore. (Photo by Michael Roa.)

The Coast Miwok inhabited the area that is now Marin County, around Tomales Bay and Point Reyes, but also ranged north to Duncan's Point. Groups of Miwok speaking various dialects, lived in the central valley and the Sierra, including Yosemite.

From the Golden Gate south to the Sur River in Monterey County, the Ohlone (or Costanoans) were the predominant group, and they, like the northern groups, sometimes built winter shelters with slabs of redwood bark. In the milder areas such as Monterey County, the Costanoans slept in the open much of the year, using shelters of sticks and brush in the winter. Tule reeds were used for building shelters and making canoes.

Chapter 2

The Chinese, Spanish, Mexicans, Russians, and the Coast Redwoods

The first people other than Native Americans to see the coast redwoods may have been Chinese. One account has a Chinese merchant named Hee-li being blown out to sea and eventually arriving at a coast wooded with what were apparently redwoods in 217 B.C. (Collings, 1985). A Chinese explorer named Hui Shan wrote about tall trees with red wood that he had seen while sailing eastward along the Pacific rim in 458 A.D. (Adams, 1969?). Discovery of these writings has stirred controversy about our traditional ideas about the "discovery" of North America.

In 1579, Sir Francis Drake landed at Point Reyes, making the Coast Miwok among the first Native Americans in the redwood region to have contact with Europeans. Contact with Europeans in the southern part of the Miwok's territory increased with the coming of the missionaries in the 1700s.

The first recorded sighting of the coast redwoods by Europeans was written by Father Juan Crespi, who accompanied Gaspar de Portola on his explorations from San Diego to Monterey Bay in 1769. On October 10, Crespi wrote: "In this region, there is great abundance of these trees and because none of the expedition recognizes them, they are named red wood (*palo colorado*) from their color." (Barbour *et al.*, 2001).

To the Europeans who came to the coast redwood region in the 1700s and 1800s, the coast redwoods provided an important source of timber. As the Spanish buildings were constructed, pine and cypress were used for rafters and beams. Redwood was used for things such as doors and furniture. In 1775, Captain Juan Bautista de Ayala made a large dugout redwood canoe in the Carmel River area. This was one of the first three Spanish boats to enter San Francisco Bay. At his request, Father Junipero Serra was buried in a redwood coffin in 1784, and the coffin was still in good condition when it was disinterred at the Carmel mission 98 years later (Barbour *et al.*, 2001).

The first mission to use large amounts of redwood lumber was Mission Santa Clara. The redwoods were cut on the east side of the Santa Cruz mountains and dragged to the mission site, where they were used as posts or shaped into beams. Redwood was also used in the construction of other missions in the redwood region. Some missions, in Santa Cruz, San Rafael, and Sonoma, shipped redwood to other missions such as those at Santa Barbara, San Juan Bautista, and Soledad.

Teaching Idea



Many fourth grade students do "mission projects" in which they build models of missions. Sometimes students visit the actual missions. If/when students do visit the missions, have them look for evidence of the use of redwood, and ask them to report back to the class about what they find. When students build mission projects, they can also build models of the Native American villages that were often near the missions.

In sum, though, redwood was not a major commodity or much used resource during the Spanish reign in Alta California, and the Spanish did not have a major impact on the redwood forests.

When Mexico won independence from Spain in 1821, pastureland was the major concern. Redwood continued to be used in relatively small quantities, but the Mexicans were more interested in tallow and hides than in timber.



Figure 74. Tanoak bark was used in the tanning of hides to make leather. (Photo courtesy of Humboldt State University Humboldt Room collection.)

The redwood forest itself was not conducive to growing crops, and the size and numbers of the trees discouraged attempts to clear them for settling. Also, the tendency of the redwoods to stump sprout meant that the settlers had to keep cutting the trees if they wanted to keep the land open for grazing or growing crops. As was the case with the Native Americans, most early European or Mexican settlement occurred along the coast and along rivers, which provided transportation, and in open areas in the forest where the light made it not only more comfortable, but also made it possible to grow some crops.

During the early 1800s some non-Mexicans were living in the redwood forests near Santa Cruz, and some of them were operating commercial redwood logging and milling companies by the 1830s. The trees were felled and cut into boards by hand and then hauled to San Francisco or Monterey Bay to be sold.

Between 1812 and 1841, the Russians on the north coast used redwood from the nearby forests to build Fort Ross. The local Native Americans were the Kashaya, who spoke a form of the Pomo language. With Aleut and Kashaya workers, the Russians felled trees up to 20 feet in diameter and made lumber with which they built the chapel, stockade, two blockhouses and several houses.

The Russian traders, unlike the missionaries to the south, didn't try to convert the Native Americans to Christianity. Rather, they saw the Indians as trading partners and workers, and they tried to establish a business-like relationship (Lightfoot, 2005).

The Russians were mainly interested in the pelts of sea mammals, especially the sea otter, whose pelts were especially valued by Asian rulers. The Russians even brought skilled native Alaskan hunters with them to Fort Ross. They also conscripted local Indians to hunt for the Russian companies. So effective were these otter hunters that the sea otter was rapidly hunted to near extinction in California. The swiftness of the decline was remarkably rapid; by the early 1820s, the sea otter population had declined significantly (Lightfoot, 2005).

The Russians were also interested in establishing agricultural sites, largely to provide food for their hunting colonies in the North Pacific. The Russians grew some of their food, but also produced grain, beef, and manufactured goods to trade with the Franciscan padres to the south. The Spanish, and later the Mexican government, didn't officially recognize the right of the Russians to move into the California territory, but the Spanish governors often negotiated deals that enabled trade, frequently receiving sizeable gifts and payment of taxes and duties (Lightfoot, 2005).

Some of the redwood used in the building of the missions, houses, and forts 200 to 300 years ago can be seen when one visits the missions, parks, and other places where the structures remain. The chapel at Fort Ross was rebuilt after the 1906 San Andreas earthquake, largely with wood from the original Russian buildings.

Teaching Idea



When visiting historical sites, look for opportunities to point out the spacing of the rings in the logs or wood. Trees that grow slowly produce closely spaced rings. Most of the redwood used in the historical buildings was from "old-growth" forests, which were very shady, resulting in closely spaced rings. (Old-growth trees growing in an opening, however, may have produced widely spaced rings. Trees may also grow slowly for a while, then more rapidly if the forest **canopy** opens, then slow down again when the canopy closes up again.) Most redwood harvested today is from young growth* forests, which are generally more open, resulting in more rapid growth and more widely-spaced rings.*

*** For a discussion of "old-growth" and "young growth", see Section I, Chapter 2 See the activities "Fence Post Studies," and "Slow Growth or Fast Growth?" in Section IV.**

Chapter 3

The Redwoods in the Early American Era

Since the redwood timber industry has been such an important part of the history of the redwood region for the last 150 years, I have included a lot about the history of the timber industry in *Redwood Ed*. One point should be made at the start of this section. The term "logging" refers to the act of cutting and removing timber from the forest. Modern forest resource management involves more than just cutting of trees and hauling of logs to the mill. Modern companies not only log timber, but they must take into consideration and attempt to mitigate the effects of their operations on fish and other wildlife, plan for regeneration of trees, carry out research, hire professional biologists, hydrologists, geologists, archaeologists, and lawyers, and work with many public and private agencies, among other things. They are not only cutters and millers of trees, but growers of trees and managers of the forests.

Among the first Americans to see the north coast redwoods were those in Jedediah Smith's party in 1828. Because of slow progress while following the Trinity River, they tried to reach the coast through the dense forest. The terrain was so rough and densely forested that it took the party nearly 10 days to traverse about 20 miles. Horses and mules died from exhaustion, and the party had to eat their last dog. These trappers had little love for the redwoods (Bearss, 1969).

By the early 1840s, an American merchant named Thomas O. Larkin, who was the U.S. Consul in Monterey, was shipping boards, shingles, and other redwood products from Monterey Bay to Santa Barbara and Los Angeles. He even shipped redwood to Hawaii and Tahiti, where the rot- and termite-resistant wood was especially valued. Larkin shipped over a million board feet of redwood lumber to the east coast of the United States in 1846 (Barbour *et al.*, 2001). The redwood lumber industry had been born. Even in the 1840s, most settlement occurred not in the forests themselves but rather along rivers and the coast. A few small towns such as Guerneville and Boulder Creek grew in open areas near waterways, but the land was too cheap to warrant the effort to clear large forest areas for settlement.

Many early loggers came to California from the woods of Maine or Michigan. With the discovery of gold in 1848, many loggers headed for the gold fields, including some along the Trinity River and, later, on the Smith and Klamath Rivers in the redwood region. Overland access to the Trinity gold fields was made extremely difficult by the vast quantity of fallen redwood trees, which were so resistant to decay and fire that they lay for decades where they fell. In 1849, Josiah Gregg led a party seeking a route from the Trinity gold fields to Humboldt Bay. In the dense redwood forests, the party had to literally cut their way through the fallen trees, which lay on top of each other, sometimes using slabs of redwoods to build ramps to enable their pack animals to get over the huge trees...the first overpasses? Travel was reduced to less than two miles per day, resulting in great hardship on both the men and the animals. Travel by boat was much easier, so miners generally came to Humboldt Bay by sea, prompting the development

of the towns of Eureka and Arcata. Eureka and Arcata were, as one would expect, built primarily with wood from the nearby redwood forests (Wood, date?)

Teaching Idea



An excellent collection of primary sources, mostly by writers who revered the redwoods, is Giants in the Earth: The California Redwoods, edited by Peter Johnstone. It includes pieces by over three dozen writers and poets, ranging from Walt Whitman and John Muir to Arthur Conan Doyle, Tom Wolfe, and Julia Butterfly Hill. Topics include natural history, Native American legends, exploration, logging (including one called "Women in the Early Logging Camps"), preservation efforts and others. The writing styles are greatly varied, and it is interesting for students to compare the various authors' phraseology and vocabulary to the other authors and to contemporary writing.

Not finding much gold, many loggers-turned-gold miners returned to the redwood region to harvest the "red gold" found in the forests. As California's gold rush-fueled population exploded, the demand for lumber also increased. Seeing the profits to be made by filling the increased demand, some entrepreneurs started lumber companies.

Even as the gold fields played out, demand for redwood continued to increase. Ex-miners provided a labor force that turned to harvesting, milling, and shipping redwood throughout California and around the world. There was a high demand and ample labor, and new technologies enabled the logging companies to access and harvest previously unloggable timber. The costs of transporting both logs and milled lumber inhibited the logging industry, but developing technologies would make logging very profitable.

In the mid-1800s, when California joined the Union, the U.S. government wanted new territories to be settled as quickly as possible. The vast redwood forests were public domain. Laws had been or were soon to be passed to encourage settlement, including the Pre-emption Law of 1841 and the Homestead Act of 1862, which allowed settlers to claim 160 acres of land. Often, the settlers cleared the land of trees as fast as they could to allow the sun in for light and heat, and to enable food crops to grow. (Many of those efforts were in vain, however, because of the redwood's ability to sprout new trees from stumps and roots.) Provisions of the 1862 Homestead Act and the Timber and Stone act of 1878 allowed settlers to sell their land to timber companies, and some companies soon acquired large tracts of land. Sometimes timber companies got sailors to file 160-acre land claims, which the sailors then sold to the timber companies for \$50 (Hewes, 1981).

In the late 1800s, companies owned by investors on the East Coast began to buy up small holdings and companies to acquire huge tracts of redwood forest land. Most of the redwood forests were soon owned by private individuals and timber companies.

Redwood became a major building material throughout California. Continued development of logging and milling technologies made it easier and more profitable to

produce redwood products ranging from siding and framing timber, to decks and water towers, to shingles and grape stakes. The rapidly developing railroad industry not only enabled lumber to be shipped throughout California, but also resulted in a huge demand for redwood for use as railroad ties.

Since the gold rush brought in a population explosion in the San Francisco Bay area, the logging of the coast redwoods first became a major industry in the central region from Sonoma County to Monterey County. The first sawmills were built around the San Francisco Bay. The town of Redwood City developed as a shipping center for redwood in the 1850s, and Woodside and other towns in San Mateo County were founded by the logging industry.

A few small groves of redwoods were found in the hills on the east side of San Francisco Bay. While few in number, many of the trees were magnificent. Some were more than 30 feet in diameter at the base. It is not surprising that the groves were decimated with the building boom that accompanied the gold rush. The approximately five square miles of redwood groves in the East Bay region were among the first to be logged. Much of the wood from the East Bay was used in the construction of buildings in Oakland and Sacramento. By 1860, all of the ancient redwoods in the East Bay had been cut (Barbour *et al.*, 2001).

By the late 1800s, the redwoods near San Francisco Bay were rapidly disappearing before the loggers' axes, especially the trees that were easily accessible to the growing communities along the bay. At the same time that the trees were disappearing, people began to seek recreation in the redwood groves near Santa Cruz. By the 1890s, people started to awaken to the rapid disappearance of the huge trees and a redwood conservation movement began to develop. Alarmed at the loss of the trees, John Muir would state that: "As timber, the redwood is too good to live."

In the later part of the 19th century, the northern redwood region of Humboldt and Del Norte Counties developed into a major source of redwood lumber. Large companies bought up huge tracts of timber, and large-scale operations included logging camps, sawmills, railroads, and even lumber schooners that sailed from Humboldt Bay with boards destined for San Francisco, Los Angeles, and beyond. In 1882, there were about 340 sawmills in California. By 1884, there were at least 400 sawmills operating in the north coast counties alone. In 1853, about 100 ships sailed from Humboldt Bay; in 1876, 1100 ships left Humboldt Bay loaded with redwood and wood products (Barbour *et al.*, 2001). The trees near Humboldt Bay were soon cut. (They eventually re-grew so that the town of Arcata now has its own managed young-growth municipal forest, and many such redwood stands can be found near Humboldt Bay.)



Figure 75. Logged forest near Trinidad (north of Arcata), 1919. It appears that slash and underbrush have been cleared by burning. Note the building to the left of center. This same photograph appears in *The Redwood Forester*, Volume II, Number One, published circa 1933. It is accompanied by a photograph of the same area taken fourteen years later (1933?) showing how "natural second growth made farming almost impossible." (*The Redwood Forester*, 1933?) (Photo courtesy of the California Redwood Association.)

Logging of the redwoods in Mendocino County began in the 1850s, and several towns such as Fort Bragg, Mendocino, and Albion developed around the industry. Since that portion of the coast has no sizeable harbors, the logs were shipped to the San Francisco Bay area on small lumber schooners. Intricate systems of cables and chutes were used to transfer the wood from the shore to the ships. (Figure 76.)

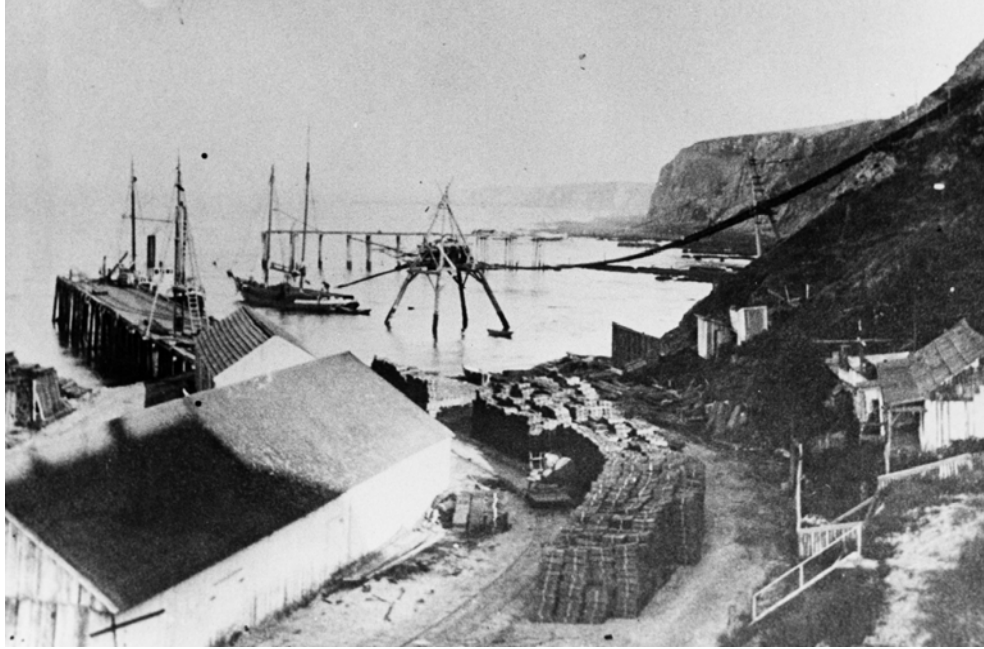


Figure 76. Schooner taking on lumber in a "doghole" port...probably in Mendocino County. The coves were called "dogholes" because "a dog couldn't turn around in one." (Photo courtesy of Humboldt State University Escola collection.)



Figure 77. Schooners lined up to take on lumber, probably in Arcata. (Photo courtesy of the Clarke Museum.)

When the redwood logging industry developed in the 1850s, north coast Native Americans often used boards that were discarded by sawmills and boards that washed ashore from shipwrecked lumber schooners.

Some very large trees were cut in Sonoma County, especially along the Russian River. One near Guerneville was measured at 367 feet tall and 45 feet in circumference (between 13 and 14 feet in diameter) at its base. It was cut for lumber about 1875 (Schubert, 2005). Another was 23 feet in diameter and the man who cut it down spent two years converting it into 600,000 shingles (Andrews, 1985).

Teaching Idea



Provide students with a series of tree diameters and have them calculate circumferences and areas of circles. Then give circumferences and teach how to calculate diameters from them.

See the activities "Making a Forester's Diameter Tape" and "Redwood Pi" in Section IV.