

Man and the Redwoods, 1700 to 1965

by Dr. James P. Gilligan, 1965

This is one of a series of five lectures on the California Redwoods presented by Letters & Science Extension in cooperation with the School of Forestry, University of California. Dr. James P. Gilligan is introduced by Dr. Nathan W. Cohen, head, Letters & Science Extension.

Introduction

Good evening, ladies and gentlemen, and welcome to the third in a series on the California Redwoods. Our speaker this evening is Dr. James P. Gilligan, extension forester and research associate in forestry. Before coming to California, Dr. Gilligan was professor of forestry at Oklahoma State University. He has served as chairman of the Forest Wildlife Division and Recreation Division of the Society of American Foresters and was a consultant to the President's Outdoor Recreation Resources Review Commission. He has written widely in the areas of forestry, forest management, wilderness, and outdoor recreation. Dr. Gilligan's topic this evening is MAN AND THE REDWOODS from 1700-1965. It is my great pleasure to introduce Dr. Gilligan.

Preface

I want to disqualify myself right at the start as a historian. I'm not a historian, I am a forester, as I think I've been properly identified. First of all I want to emphasize that this discussion is on the coast redwood (*Sequoia sempervirens*) because this has been the area I have been concentrating on more recently. I would like to review this material in somewhat of a chronological treatment with the understanding that I will be touching primarily the highlights. Of course this is all we can hope to

cover in the evening. I'll divide it into five different sections:

- The period of discovery and early settlement prior to the California gold-rush
- A century of development and utilization with emphasis in this period on the redwood lumber industry and its development and activities
- The changes in the Redwood Region after World War II;
- The public parks and forest reservations
- An attempt to contrast the original virgin forest with the present forest.

Indians

We should really begin our discussion of the coast redwoods with the Indians. They had a very imperceptible effect on the coast redwoods, but there were about a dozen various Indian tribes that were located fairly close to the coastline all the way from the Oregon line clear on down through the redwoods into the Monterey County area. These Indians were somewhat isolated in their various tribal groups. They did not, apparently, from the historical literature, spend much time really wandering through the major forest itself, but clung to the peripheral edges. They were largely dependent, of course, for their livelihood on products from the ocean and the rivers. They made limited use of redwood. They made some crude shelters from debris that they found, sweat-baths, and canoes; in several recorded instances they have been known to have burnt down large redwood trees to obtain acorns that were buried in the upper parts of the trees by woodpeckers. And of course they used the wood for heating and cooking very lightly. In the main, they probably used the fallen trees that were lying about them and they did know apparently how to split the redwood. Incidentally, the Indians even in this region did some limited burning, not primarily in the redwood forest, but at its edges, at the grassy and brush edges, and the oak grass for-

est, for the purpose of driving out rodents and insects that they used to feed on.

Spanish

The Spanish entrance into the Redwood Region was really a result of expansionist policies that were developed by various European nations in the 16th and 17th centuries. The Spanish first came to California in 1769 into San Diego and then proceeded north to the Monterey Bay region where the following years they developed Presidio Fort at Monterey and a mission in Carmel. Then following this very rapidly, within about six years, they moved to San Francisco where they developed a mission; another mission at Santa Clara; and about 20 years later a mission northeast of San Jose. Just before their departure from California, they developed a mission at San Rafael, north of the Golden Gate, and still later a mission at Sonoma. I mention these missions simply because the Spaniards were never really located in their developments, in their missions) in their presidios immediately in the redwood area - they were nearby.

And they did make some very limited use of the redwoods. Actually, Juan Baptista de Anza, the Spanish explorer who started out from Monterey to explore the San Francisco Peninsula area, and then extended this to a total survey of the Bay region, was the first one to report the area known as the East Bay redwoods. I think it's of particular interest that the Spanish navigator did use two of the tallest trees of the south-end of this particular group as a navigational point for coming to the Golden Gate. It was a very important point, apparently, and it was on the early maps for many, many years, and undoubtedly the Spanish navigators and other ship navigators were the first to protest the cutting of redwoods.

As I indicated, the Spanish made limited use of the redwoods. They were primarily oriented to development of missions, missionary work among the Indians, development of crop lands to sustain them, and of course extensive cattle raising. Fundamentally, I think we could refer

to the Spanish in our context here in reference to the forest as an adobe culture simply because though they used the redwoods for rafters and beams and door frames and window frames, etc., this was not a very extensive use. You have to understand that the Spanish had very poor tools, really, for handling any sizable tree. They had a simple ax and a four-foot-long whipsaw. They did use the whipsaw occasionally to slice boards from trunks of trees. But they could only cut about 100-200 lineal feet per day.

I think it's important to know that the Spaniards probably had a special regard for trees, and this is in turn probably due to their recognizing the value of trees for shipbuilding from their earlier history and what could happen when a vast forest resource that existed in some parts of Spain was depleted. I think it gave them a very high regard for the value and soil protection that trees gave and for wood products. Fundamentally, it is my view that the Spaniards were largely aesthetic and protectionist in their views of the forest - of all forests, not only the redwood forests but other forests that they were living in. In 17749 not long after they arrived in the southern part of the Redwood Region, the Spanish administrators have recorded instances where they severely criticized Indian burning of grass land because this burning off got away in the late summer and moved into certain forested areas and set some of the forest on fire. And actually, about 1779, they instituted their first regulations to try to prevent the Indian burning and other types of haphazard burning that occurred.

Russians

Now the Russians' arrival in California is of particular interest because the Russians were really the first to make what we might call more extensive use of the redwood as a material. And we could probably identify them in contrast, as a wood culture. Undoubtedly, they were used to using wood, knew how to use its work it, and had somewhat better tools. Their

expansion moved from the Bering Straits area eastward and down through Alaska where they settled fur-trapping colonies on Kodiak and Sitka Islands, and they sent an exploratory survey down the California coast around 1805 as far as San Francisco.

They decided that the sea otter and the fur seals were sufficiently abundant in certain areas that it would be worthwhile to establish a settlement in the area just north of the Russian River which is now called Fort Ross. And they made very effective use, as we can still see. Samples of their work up at Fort Ross are their stockades, churches, homes and other buildings. They even built two very small ships. They were used for navigating in the sea, but these were not very successful because redwood is not a very good material for ship exteriors. They also, incidentally, shipped some lumber to the Sandwich Islands, which we now know as the Hawaiian Islands and they made some shipments back of lumber of probably very limited amounts back up to Sitka and Kodiak Islands. In the history of the Russians at Fort Ross, they record trees that they felled up to 20 feet in diameter. The Russians, however; left about 1841, when they sold their properties to John Sutter and not much was done after that.

Incidentally, this is the one place in California where you can see some of the earliest of cutting in Sonoma County because the spot where they did some of their logging is still locatable and by going to Fort Ross I think, they can tell you where this is and you can see some of the oldest young-growth, 31 more commonly referred to second-growth red; J woods in California. Some of it is even being cut again, and would be referred to as third-growth. But these trees have now grown to fairly large size in the 150 years or so since they left.

Mexican

The Mexican regime was also not too significant as far as utilization of redwoods. The Mexicans took over from the Spaniards in 1822. They did have a little different point of

view apparently towards the forest. They - had a diminished regard for the forest. There was a relaxation of the older Spanish authority and regulations on cutting and burning - some of the Indian fires and settler fires were allowed to spread in the forest areas in the dry seasons without any effort to stop them or any criticism..

The Spaniards, of course, had extended their territorial claims north of the Golden Gate area north of San Francisco Bay, to thwart the potential southward expansion of the Russians out of Fort Ross. The missions that they had established, of course, were not in the redwoods, but were there in an effort to hold back the Russians who were always potentially there and could flood southward, or so the Mexicans and Spanish felt. The Spanish system of granting large ranchos reached to at least up the Bay area, extending from southern California on up and continued down to the area under Mexican rule. The Spanish granted about 30 major ranchos and the Mexicans in their 24-year regime developed many more, 80 the total equaled about 5000

Now for our particular part of the story, this is interesting because some of these ranchos did include redwood land (in Monterey County and over toward the East Bay redwoods, Marin County and the north about to the Sonoma-Mendocino County border.) So there are no claims on the redwoods from here up north. And of course all the redwoods south of there were not necessarily fully claimed. The Mexican emphasis was on crop production again and of course on major livestock production operation.

Yankees

The real story of utilization or exploitation of the redwoods starts with the arrival of the Yankees from the eastern seaboard. This was an entirely different culture. They came on a very small scale at first, particularly during the Mexican regime. These people were like the Russians, wood-oriented. They had a great deal of energy, they had a great deal of mechanical

ingenuity, they brought with them improved tools, and they were experienced in the use of wood of all kinds and in making a great variety of things upon which they were dependent in the eastern United States.

The first large-scale cutting by the Anglo-Saxons in the Redwood Region started in Monterey County about 1834. One of the early settlers hired some gangs of whip-sawers to cut on the Sur River area. This lumber was undoubtedly used locally and perhaps boated up to the Monterey and Carmel areas for sale. John Carson, a year later, in 1835, was whipsawing lumber up at Bodega Bay on the southern fringe of the North Coast redwoods. These were the first two men. By whipsawing, I should explain, is meant simply a sawing of logs lengthwise by a two-man saw. It is a very laborious process. Just sawing off one board at a time, sometimes using a pit that has been dug, over which the log is laid. And the production was very slow here. But by the time they arrived in this country, the American wheeling ships had come around the tip of South America and had begun to distribute a few of the first seven-foot-saws. This made a great deal of difference in the cutting of redwood in double production, probably from 200-400 lineal feet per day. And it was a back-breaking operation too.

The manufacturing of lumber passed very quickly thereafter, starting about 1840, through four phases in about 15 years. First, the whipsawing, that I mentioned, which expanded in other parts of the Bay Area redwoods, then to a system of cutting called "water mills" and then into a very brief period of small steam mills and then into a period of large steam mills. And I might mention that about a dozen men in the 1840's were cutting in various locations. This is of course before the gold rush days. They were cutting in the Santa Cruz Region, on the east side of Santa Cruz, over in the East Bay redwoods in 1840. There were men that were whip-sawing lumber and carrying it out to the Bay, loading it aboard a boat and taking it up the Sacramento River and selling it to John Sutter. And there were a

few other places where they operated too. We believe they came around San Rafael and around Mill Valley. Some of the earliest cutting was done there before 1850s

Waterpower Mills

But about this period too, the water power mill that I mentioned, was developed. This was an adaptation of the old flour grinding mill that was operated by a water wheel put in the stream. They merely hooked up a type of run on a levered arm off the water mill and by shoving the log through this they could increase production again.

Production went up in water mills from the old whipsawing methods of 200-400 feet to 2,000 lineal feet a day. So production was increasing slowly. Actually, the first use of the water mills in California was in Southern California at Mission San Gabriel by an enterprising Anglo-Saxon down there. And the first use of the water mill in the Redwood Region was on Mark West Creek near Guerneville, just north of the Russian River. This was by a Captain John B.R. Cooper who was the son-in-law of General Vallejo and it is reported that he spent \$109,000 on this mill -- that is a considerable sum for the year 1834 -- when he first built this, but apparently he enjoyed a prosperous run of lumbering there for about six years until the mill was destroyed by a large flood of the Russian River. These water mills did not replace the whipsawing -- actually they supplemented them. From 1840 to about 1850 there were a dozen more mills that were constructed in the San Antonio hills, which was the early name for the East Bay redwoods, in the Santa Cruz area on Sayante Creek, at Paradise Park near Santa Clara, and at Corte Madera in Marin County. The first saw-mill in Napa County was constructed in 1845; another one was built in Redwood City, and they also moved in the East Bay redwoods over to the opposite side, the east side of this country. At that time, some adventurous soul used to haul lumber by wagon up to Martinez. A lot of sweat went into this early cutting of redwoods, but I want to em-

phasize that it was a very small, limited operation in terms of the total amount of redwoods.

Steam Engine Mills

The forerunners of the really formidable attack of the redwoods were the first of several small steam engine mills in the area. The first one was in 1844 at Bodega, set up by Captain Steven Smith, and five years later the second was built by Robert Parker in Marin County at Corte Madera. These were fairly small mills and still were not what we would call a large production operation. So, just before the California gold rush days, the redwoods were relatively untouched because of the very slow influx of Anglo Saxons. San Francisco in 1846 was a community of about 300 people; beaver-trapping, which was the thing that had stimulated exploring through most of the western states, was operating on a very limited scale in the redwoods because beaver were not abundant in that region. The rivers, another method of exploration of coastal areas and interior areas, were largely non-navigable in the Redwood Region. So we did not have the typical types of exploration that was experienced in other parts of the country. The region, therefore, just prior to the gold rush days, was relatively unknown, particularly in the North Coast area

Redwood Lumbering — Bay Area Mills

With the transfer of California from Mexican control to the Americans of Monterey in 1846 and the gold discovery in 1848 an entirely new situation was created, which had a great progressive impact on the redwood forest. The demand for lumber, shingles and other wood products rose very sharply, particularly in the San Francisco City area and on the farms that began to be established on the flatter areas of the Bay region immediately after the gold rush. California's first lumber tycoon came forth about this time, in 1849, a man by the name of Harry Mason who had several business operations here in San Francisco. He quickly sensed

the opportunities available and he hired a number of loggers and moved over to the San Antonio or East Bay redwoods. In less than two years he had made pretty close to a half a million dollars in profit -- which is a very considerable sum for about 1850. His success of course, was aided by the fact that the price rose. In about 1847 it was \$30 per 1,000 board feet of lumber. Within a year and a half the price had risen to \$350 per 1,000 board feet and even as high during several months as \$600 per 1,000 board feet. So that's one way to make a fortune -- at least in the early days.

Actually, the cutting continued in the East Bay redwoods. It was the first area that we might consider to be cut out in California as a specific area. Four million board feet of redwood per year were shipped from the East Bay redwoods to San Francisco between 1850 and 1855. Dr. William Gibson, a resident physician of the town of Brooklyn (now Oakland) has cited in a report dozens of trees in this area twelve to twenty feet in diameter and over 300 feet in height, and he measured one stock at 32 feet in diameter. This is a phenomenal record and unknown record for redwoods. I assume this is a measurement on the ground which was not too uncommon in those days. But it does indicate that there were some very sizable redwoods in the East Bay area at that time. These all have been cut. Not one was left, and by 1860 all the redwoods in the East Bay area had essentially been removed.

We can credit this probably to the gold-rush and the tremendous developments that occurred in San Francisco, because a tremendous proliferation of logging operations started in the 1850's. This is easy to understand when we see the records that in the first five years after the gold rush about 150,000 people came to San Francisco, by boat largely. At various periods in these first five years, probably half of them or even more were located in San Francisco. So there was a tremendous market for all kinds of products as well as lumber. The east side of the Santa Cruz mountains was the first area to be cut out. There was very little logging done on the west side. It's a rugged, steep

country, difficult to get the lumber out to transport while it was fairly easy to go up the bay. There were farming communities developed there which provided quite a demand. So the early logging operations took out the east side redwoods at the time.

In 1856, Samuel O. Taylor developed a small paper mill in Marin County, which I think is of special interest too, because this mill lasted for about 30 or 40 years and apparently was a success. Also, a road was completed from the northern Bay Area to the huge stands of redwood on the Russian River in central Sonoma County. The opening of the North Coast redwoods to lumbering this started about this time. There were several saw mills in 1850 -- one in Eureka and one along the Coast of Mendocino County, but these were small and generally classified as unsuccessful mills.

Redwood Lumbering — Humboldt Bay Mills

In 1852, a mill was built at Eureka on Humboldt Bay which could cut using a large steam board and steam power to a much larger extent than had been used up to that time in the redwoods about 30,000 board feet of lumber per day. In the same year, Harry Mason, the man who had made a fortune in the East Bay, took some of his money and went up to Mendocino and invested it in a very large mill that could cut up to 50,000 board feet a day. So the production rose very suddenly. The year following, 20 million board feet were shipped out of Humboldt Bay alone. Other mills immediately followed. A hundred ships sailed from the bay carrying lumber because the operation had to be done by shipping -- there was no overland route by which it would have been feasible to handle it. In 1853, a man by the name of Weston built a mill in Crescent City. His were the first mills in the region and of course Weston, cutting out the flats around Crescent City, was largely concentrating on Sitka spruce, hemlock, some Douglas fir and other species, and not particularly the redwood, because the red-

woods are not clustered closely around the Crescent City area.

It is certainly evident that when the Eastern people first arrived in this region, challenged by the monstrous size of the redwoods and the possible profits that they could make, no doubt they were confronted with a great many problems with these huge trees which ran on the slope six to eight feet in average diameter, 200 to 300 feet high, and often weighing 300 tons. A single log that they might cut out would probably weigh 30, 40, or possibly even 60 tons. There were simply no precedents for logging and milling of trees in this type of operation.

But they built their mills at the mouths of the streams for the specific purpose that they could have a transportation system for the logs out of the woods, down to the mills by water floating, and also after they had manufactured the lumber, to carry it out conveniently by ship to different points of distribution. It sometimes took a week to fell a large tree by the systems they had at that time -- seven-foot-saws and double-bladed axes. These trees were very frequently swollen at the base and it was very difficult to cut them, so they had to go up on the trunks with boards that were dubbed in the trees and stand on those while they were doing their work -- an extremely hard task. A good many of the trees felled in the early days were completely lost because when you had a tree of 200 to 300 tons that crashes to the ground and was not felled just right on the flat surface, it would shatter and be relatively useless for lumbering purposes, and be left to lie there. So there was a great deal of waste in those early years.

Then they found that the redwood bark which can run from six inches to one foot in size at the lower portions of the trunk had a tendency to clog and damage the saws. So it was necessary to remove the bark by hand-peeling methods or by using a sharp iron-pointed bar. This, in turn, created a great deal of debris which together with the fallen broken branches and the brush that lay around, made

it a very difficult problem to haul out the individual logs. So it was a very common practice, developed almost in the beginning, to follow after they had fallen trees, a procedure of burning. They just set fire to the particular area around the tree or a group of trees and burned up all the material that might be in the way. This was simply to get the debris out of the way so that they could haul the logs down to a stream bottom. This practice was followed for many, many years. It is a procedure called "swamping" or "swamper burning."

The very earliest loggers had to roll the logs down into the stream beds almost by hand methods. They used the jackscrew system, a hand-cranked operation. They could not get very far therefore from the stream bottoms. Later they replaced the jackscrew system of skidding logs around and sliding them down the stream bottom with a system where they hooked up groups of eight or ten logs and a large team of oxen and very skillfully slid these down the hill into the stream bottoms. These streams in most of the Redwood Region, except for a few of the major rivers of many areas where they were logging, had very little water during much of the year. In winter, when the floods and heavy rains came, this would lift up the year's cutting of logs and float them downstream to the mill areas, where they would be confined and then taken into the mill. In this way a system of selective-logging inadvertently, you might say, developed.

In other words, the early loggers were not interested in clear-cutting or taking all the trees. They selected the best trees, those which were close to the stream, and they moved very slowly up the stream, possibly a mile a year at their best. After the lumber was manufactured -- I might say, incidentally, that this system of logging was produced in the first 45 years of logging -- this system, and modified systems a little later, produced a very fine stand of young-growth or second-growth that we now find in certain portions of the Redwood Region.

The lumber was transported by sailing schooners. In the 1870's there were 31 mills, 200 mil-

lion board feet, and dozens of schooners sailing up and down the North Coast region. One of the very obvious signs of logging, even from the ocean for people on the sailing schooners, were the signs of smoke that rose all up and down the coast from the swamper burning that was occurring in the logging operations. This is noted in several of the historical documents. Even though the burning areas were relatively small in total size, they did put up quite a bit of smoke.

A revolution began to occur in about the 1880's in the redwoods after about 30 years of logging. Yankee ingenuity and the development of mechanization sharply began to step up production. Introduction in the 1880's of logging railroads partly replaced stream running. Steam-driven schooners which could carry twice the lumber logged replaced the old sailing schooner. A 12-foot cross-cut saw was developed in place of the seven-foot Saw. A man by the name of Evans developed a gadget called the third saw for mill operation which could cut logs up to about eight feet in diameter in a single cut. Prior to that time they had known something what was known as a double-circular saw -- circular bands with teeth around the edges one hanging above the other -- and this could cut only about one five or five-and-a-half-foot log at a time.

A man by the name of Dolbeer invented the steam logging machine or steam donkey for use in the woods which finally replaced oxen in the yarding of logs. This of course greatly eased the yarding of logs and made it much more rapid. Of course this system of using ropes and cables later on to move into the woods enabled the loggers to move away from the streams into more difficult areas -- that is as far as hauling the logs is concerned. In this period also they introduced the band-saw, a type of circular saw run on two pulleys which is much thinner than the circular saw. It helped to reduce waste and to bring up the efficiency and speed of cutting. These essentially and finally replaced the old double-circular saws.

Redwood Lumbering — Bull Donkey

But the major revolution in logging and the base of increasing protest from about 1900 on against redwood logging was due to a development by a Eureka man named N. H. Pine. He developed what was known as a bull-donkey, a very powerful steam machine placed in the woods from which cables could be extended on spools run through the woods for a distance of up to several miles. This replaced the oxen and the loggers could haul very large trains of logs relatively rapidly out of the woods with this machine. Then, about 1895, they began to adapt this to logging systems called high-lead and slack-line systems -- essentially and simply a system of aerial cable run-off -- from this by donkey, very powerful and they could actually lift up these large logs into the air, swing them down the mountain sides to the landing area near the donkey, where they could be loaded on to railroad cars and then sent down, to the mill.

I say, this was a major revolution and the basis of increasing protest about redwood logging, simply because this type of logging had a fairly devastating effect on the forest landscape and particularly on forestry generation because of things that went along with it. I should explain that. Because in swinging these large logs down off the mountain side or through the forest, they didn't cut down all the trees. But the trees that were left after the initial cutting operation were knocked down by this log-swinging through the air. So in effect what you had when you got through with the steam logging operation using the bull-donkey when it really got into full swing was a scene of devastation, clear-cutting, etc. This wouldn't have been so bad, so far as the forest is concerned for regeneration and the next forest crop, if it had not been for the fact that swamper burning still continued because you had a great deal of debris then lying on the ground. In order to get at the logs and slide them out of the woods it was necessary sometimes to let this material dry for a year or possibly two years. They would set fire to it and it would burn up a good

bit of the debris and branches, etc. and the bark that I mentioned earlier, and then they could get in and continue their work of skidding out the logs.

The bad part of it was from one point of view that what we might call seed preparation. There were seeds and cones of the fallen trees and there very frequently could be good seedling regeneration immediately in the year following the original falling. But the swamper burning that followed a year or two later would burn up all the new seedlings that came in; and then of course this was still a pretty good area for wild fires to sweep through in the succeeding years and that would help prevent the regeneration. That is why I say it was a basis of increasing protest not only by those interested in the forest landscape but also people interested in forest regeneration.

Problems and Obstacles

Of course, the lumbermen were facing very discouraging problems and I think we should mention a few of these. After reviewing the literature on it, I am fairly amazed at why any lumber-man faced with the difficulties that are described wanted to stay in business up there. There were companies that were created and merged and dissolved with great regularity in the first 40 years. They had problems in transportation, particularly up in the Humboldt Bay region, because there was a mud bar across the mouth of Humboldt Bay which was called the Humboldt Bar, and only small-draft ships could sail across this to load the lumber from the various mills that developed around Humboldt Bay. So this meant that in terms of real ocean-going transportation these ships were too small to have what we might call inter-ocean transport. So they had to be brought down to San Francisco, where the lumber was off-loaded and then the lumber had to be reloaded on to larger schooners and steam vessels for further transportation into other parts of the world. So this was a costly and time-consuming operation.

Coastal storms were very frequent too in periods of lumber loading and there were ships lost and difficulties in delays in loading lumber -- incidentally, along the high cliffs of Mendocino County particularly they had to perform a very difficult operation just to get lumber from the mills on these high cliffs out to the ships. And then, of course, shipment alone was a very costly adventure, especially when it went to the eastern seaboard because there was no Panama Canal prior to about 1888. They had to go around the tip of South America and all the way back up to the East Coast where they were developing markets of course. There was one rail line around this time in the late 1800's that came into the San Francisco Bay area from the east, but this was a monopoly operation and so the company charged a very, very high price for transport of timber, which created some problems.

The river running of logs could be disastrous. If you had an especially heavy flash flood or disastrous year of heavy rains, water could pick up a whole year's supply of logs from the streams and sweep them right past the mill and out into the ocean where they would disappear, this would be enough to wreck an average operator.

In addition to that it is recorded that most of the sawmills in the North Coast region burned at least once in the course of their history if not twice or three, four or five times. So this was a very costly venture too, because I doubt that there were very good insurance policies, available in those days.

Market Development

Developing a stable market for redwood was a great problem in the first half century of utilization. The wood was not well regarded, particularly in the eastern markets in competition with wood that were more familiar to those people. For San Franciscans and other Californians, it was cheap, available nearby, fairly easily worked and very important, very durable. But it was also very frequently sold in rough green condition, and it was very frequently

poorly manufactured and not well dried. So the competition with the eastern markets was a very difficult proposition. There were severe price fluctuations and lumber price wars. At one period there was a very low tariff put on Canadian lumber and a flood of Canadian lumber came down even into the Californian markets. This was a factor in closing out a number of redwood mills at that time.

The essential point in the latter half of the 19th century was the realization by the people who were trying to stay in business that big-ness was required. They needed a large acreage, they needed large efficient mills, they needed the best machinery that they could get, and they very frequently had to buy up railroad operations for their lands, ships and schooners. So it was a very sizable financial venture to weather the storms that occurred along the coast, the fires and the price wars and all the other things that occurred.

But by 1897 conditions had fundamentally changed after 40 years of logging. So had the logging system, as I mentioned earlier. Lumber transportation cost had been reduced because the Panama Canal had now been built. A new railroad had entered the California region and the competition here and the pricing problems dropped the price very considerably for lumber transportation to the eastern seaboard. The West Coast cities not only around the San Francisco Bay Area but also in Southern California were developing very rapidly and providing a market and of course there was a foreign nation market that was developed to a certain extent over these years. Lumber prices were rising before 1900. There was better utilization and manufacture; the general use of bandsaws was a great help in the mills, they began to install dry-kilns even before 1900 to dry the wood more rapidly and to help in the sales of redwood. Production was up. Some of the mills could produce as much as 100,000 board feet a day.

Not only was lumber production on the rise, but also the market for railroad ties, which they had been selling at the rate of about 50

million a year, was holding up very well and sales of shakes and shingles, a very good market for redwood products, continued during this period at a rate of about 50 to 100 million a year.

The federal government helped out in the Humboldt Bay area by dredging the Humboldt Bar so that larger ships at least could enter and load lumber.

After 40 years of logging the redwood forest, interestingly enough, had been reduced in total acreage by less than 15%. What this illustrates is the slow procedures of logging and the large volume of wood per acre that the companies were operating in. The major cut had been in Mendocino County by 1900. About 150,000 acres had been cleared there. Humboldt County had about half of this amount cut and Del Norte County only about 3,000 acres, and a good bit of that was spruce and fir. Sonoma County had a good deal of cutting along the Russian River; Marin County was nearly cut over at this time. The redwoods in Napa County had been cleared, as of course, had those in the East Bay and on the east side of the Santa Cruz Mountain.

At this time they had been logging about 4,000 to 5,000 acres per year. The industries were very well organized and consolidated compared with the early tumultuous days. There were about two dozen major mills in the North Coast region, plus a number of smaller mills. Eleven companies owned about one-third of the total redwoods in the North Coast area, that is in ownerships over 20,000 acres. Essentially they had solved the problem of providing large log supplies that were needed for this increased mill capacity, with the bulldozers and the high-lead logging. And production began to move up in about 1900 to about 500 million board feet a year, doubling the average production of the previous 20 or 30 years.

I think it is interesting to note here that the redwood young-growth in the first 40 years of logging and for some years thereafter, were really there as an accident of nature. They were

not there as the specific designs of the lumber companies or any foresters that might have been hanging around or other people. Of course, you must understand the primary emphasis was on the logging of old-growth and after it was cut, the young-growth or whatever followed was not considered to be useful at all except for something I'll mention in just a minute.

Well, this steam logging that I mentioned, that is of a more destructive nature from the point of view of future timber production, continued from about 1895 to about 1934, a period of about 40 years, and then on about half of the redwood land for about another 10 years thereafter, until just after World War II. A change began to occur really in the Redwood Region in attitudes towards logging and forest regeneration when the forestry profession was established in the United States shortly after 1900. And the U.S. Forest Service (they were originally called the Bureau of Forestry) was established about the same time. And there was a great acceleration of interest in redwood forest logging and management at this time.

As a matter of fact, several of the redwood industries actually called on the Bureau of Forestry about 1900 to come out and make a study of the potential for future sustained-yield operations. And this was done by a man named Fisher who spent about six months in the region with a crew of men taking sample plots and then wrote a publication that is still a useful reference today. Actually many studies followed the development of the forestry profession and the establishment of the University of California School of Forestry at Berkeley. The Forest Service Experiment Station was established in 1926 by a great variety of men, Fisher, Clark, a consultant by the name of Mason, Professor Emanuel Fritz, in the audience tonight, Mr. S. P. Shaw of the U.S. Forest Service, R.C. Wilson presently of the Experiment Station, Person and Hallon, and others. These studies which were increasing in number as the years went by generally criticized large clear-cut and burned areas which showed there had

been little consideration for regeneration or for sustained-yield in those earlier years.

Livestock Production on Redwood Lands

Now I mention that the redwoods once cut over were considered to be generally valueless for future production in these earlier years. But they were considered to be valuable for livestock production, and possibly erroneously. The cutover lands were largely sold or leased to ranchers who owned lands bordering on the east of the redwoods. They were used also by companies to provide grazing for their own livestock and for the animals that were used in logging. By 1925, the major companies in this region had devoted about 86,000 acres to livestock grazing. You must consider at that time that cattle grazing was considered to help reduce the fire hazard on cut-over land, which was a very important aspect at that time. And, of course, at the same time it was generally recognized that cattle grazing was destroying any forestry production that might have occurred on these cutover areas. But there were very tremendous efforts made to convert land to grassland. There was seeding and there were attempts to remove stumps that cost up to \$500 an acre incidentally. It was a very difficult task, because by now I think you're familiar with this fact redwoods have tremendous vitality. You can cut back the sprouts for as much as five or 10 or even more years, and they keep sprouting back again. You can burn them. You can dynamite them. You can blast them. And they still seem to keep coming back up. Not all of them did, but a great many of them did under this kind of treatment.

By 1931 the attitudes had begun to change on grazing. The ranchers and other people were beginning to realize that grass production on the soils that were amenable and suitable to redwoods were not particularly suitable for grazing purposes. But by 1931, nevertheless, 143,000 acres of redwood land had been converted to agriculture, grazing, highways, towns, farms, orchards, power lines, and so on.

Now, we should mention that there has been a period we could identify as a forest conservation period. I would date this in the Redwood Region roughly from the year 1900. Before 1900 there were sporadic protests, particularly by state agencies about forest destruction, abuse of the scenic aspects, and timber trespass, from time to time. The center of the criticism often focused on the detrimental effects on watershed runoff, on the change of climate in the particular area, on the waste that was occurring on fires, both swamp or burning type fires and wildfires that occurred. It is reported that about 1900 or even before that Mendocino County was burned over -- that is the total acreage, not in one fire; but in succeeding fires in different areas - at least once in every five years, which is quite a bit of burning. And these, of course, were accidental fires primarily that we're talking about which spread out.

After the turn of the century, the emphasis was still on fire control so far as activities in redwood lands, but increasingly on the problem of obtaining adequate forest regeneration. In 1899, the Federal Bureau of Forestry did a cooperative six-month study in the Redwood Region; and concluded that the cutover land should be protected from fire and grazing. It would reseed and resprout very well if this was done. And the trees would grow very rapidly to merchantable size. The bureau also insisted that logging should be less destructive to young trees and that better methods of logging were feasible and economic. These were important conclusions for this early date. But due to the methods of operating at that time and for a number of years afterwards, these recommendations essentially went unheeded.

About 1920, there were fairly drastic federal regulations proposed for controlling logging in the region. Ex-chief forester Gifford Pinchot was one of the leaders of this movement. There were also proposals for the state to buy up the cutover lands from the private individuals and reforest the lands. But all this went unheeded. In 1923 a state fire patrol bill was enacted which required private landowners to

patrol their lands for fire and protect against them. But the Redwood Region was excluded from this particular bill. Many of the redwood landowners believed that fire was not an important problem for the moist dense old-growth redwood forest or possibly even on the cutover lands at least as far as they were concerned. In 1924, forestry was helped along in the Redwood Region by the enactment of the federal Clark-McNary Act which fundamentally, provided money to assist in fire protection on privately-owned land, and to help establish forest nurseries in the state.

Reforestation Programs

In 1922 there were three rather important developments so far as the Redwood Region was concerned, to which the major industries in the region gave particular attention. The first of these was a study done by consultant D.T. Mason for six redwood companies, a rather elaborate study indicating that better forestry practices were possible, that regeneration was a problem, and a number of recommendations that since have been enacted into law. Professor D.C. Bruce of the University of California School of Forestry at this time also published a study. His second-growth volume tables demonstrated rather clearly the phenomenal ability of young-growth redwood to grow very rapidly to merchantable size. And Professor Fritz's analysis of a particularly fast growing stand of young redwood, was also a very significant point of development at this time.

As a result of these studies and as a result of some other activities of a more critical nature of their logging methods, the ten companies in 1922 got together and launched a reforestation program. They established three nurseries at Scotia, Caspar and Fort Bragg, and in nine years they planted 12.7 million trees on 26,400 acres, 80% of which were redwood. The cost was \$234,000 in total or about \$2,340 per company per year. Unfortunately, it didn't solve the problem for various reason -- wildfires, rodents, and lack of knowledge about planting -- only about 20% of these planted trees finally

survived. And it didn't solve the problem in another way. Because during the period when they were planting 26,000 acres, about 90,000 acres had been cut over in the Redwood Region since other people were not doing planting. This was a help and a start on the total problem, but it was not a final solution. About this time, too, the selection system of logging in the redwoods was advocated by foresters to move away from the old clear-cut system. This required a special kind of machinery which was not available. They had tried logging with a small, light and under-powered tractor in the 1920's, but this was not too successful.

It was not until 1934 that a reasonably successful tractor was developed which could handle the large logs in the woods and thus enable selective logging. The lumber code of the NRA -- The National Recovery Act of 1934 -- was enacted which, fundamentally, required by law that five seed trees per acre be left. As you may know this law was declared unconstitutional a year later. But the lumber companies by this time found out that the tractor logging could work very well. They also found out it was a more profitable system, actually than the old systems under which they could be operating. And there were other advantages. So they stuck with the system of selective logging, at least in the main. Not all of the companies, I'm talking here only about the major companies that really were logging selectively by tractors. This got started about 1936.

The best tractor was developed after it was used I believe up in the northwest area. Professors Kruger and Fritz went up to that area and this resulted in the establishment on the Hammond Lumber Company of the first heavy suitable tractor. But even after this period and after World War II, about half of the acreage of the redwoods was still being steam logged.

A few companies were using a system of leaving wedges in the cable logging system to provide seed sources. But it wasn't until well after World War II ended that most of the major companies moved to selective logging, almost all of them.

The 1930's is an important period in the Redwood Region so far as the lumbering companies go; and the attitudes towards forestry. There were important changes in attitudes not only toward the logging method, but in general views on the importance of reproduction, the possibilities of sustained-yield. There were plenty of problems still prevalent. But, as I said, about over half the total acreage still was not owned by the major companies that were beginning to become oriented to forestry practices as we understand them.

I just want to summarize very briefly some of my earlier remarks and also bring us up to date in a rather succinct manner. I hope anyone who is around today who knew logging 30 or 40 years ago or longer might say that there has been a tremendous amount of progress. This is just to indicate how relative everything is. And certainly it's true that after World War II there was a major shift in the redwood industry compared with what they were doing in the 1900's and 30 years following. But to some other people who have looked at it for a shorter term or looked at it from a different point of view progress is pretty slow. I've even known some foresters who are concerned with the redwoods who think progress is pretty slow, but then we all have a tendency to think in those terms.

A number of things have happened since the end of World War II. The population migration to California and movements around the country, the housing boom, the increased lumber demand, continued mechanization improvements both in logging operations and in the mills, a movement away from debarking the trees in the forest so the swamper burning could be discontinued and the stopping of burning to prevent damage to the residual trees left, the decrease of waste, which is still too much very likely but is still not as much as it was 50 years ago, by half at least, improved utilization, and increasing sensitivity to fire prevention and to the needs of forest regeneration. Lumber production has again risen over the earlier period of the twentieth century to nearly one million board feet a year starting in

the latter part of the 1940's, and over 109,000 acres a year are logged annually. A reassuring note so far as the University School of Forestry is the employment of foresters which started on a fairly sizable scale after World War II. Also there has been particularly in the 1950's a continued concentration and enlargement of ownerships going back to the ideas that they discovered in the 1890's that bigness was almost essential to efficient, good operation.

But for the region as a whole, I think I should emphasize that progress has not been uniform. The forest practices have varied widely and in some places still do. It depends very much on the ownership of the land and the size and the purpose and the financial condition. Actually in 1949, the date of the most recent breakdown of this type, 46% of the land was owned by forest industries and government agencies -- the agencies own a very limited amount, by these agencies and industries that have a primary orientation to what we're talking about as good forest practice. This means that over half of the lands were still owned by miscellaneous individuals, some holding fairly sizable ownerships, some were very concerned about good logging, good forest regeneration and forest management, but some others who did not care at all. So I think these are important things to remember.

Forests Practices Act

The Forests Practices Act created by the Legislature of the State of California occurred in the middle 1940's. This required the leaving of four seed trees per acre, or cutting by an alternate method approved by the California Division of Forestry and the State Board of Forestry. There is particular emphasis, I might say, at the present time, on insuring a crop of new trees on areas that have been logged by any method. But even some of the practices done under the earlier Forest Practice Act, which has been modified and intensified several times due to problems of inspection, of interpretation, and of bringing legal suit against someone who was deliberately violating it, even under

this there have been some unfortunate types of cuttings. I think we have to acknowledge this. The principal companies that were interested in permanent production were not too concerned about the passage of the Forests Practices Act because they felt they were exceeding their requirements already.

Though the utilitarian value of the redwoods was quickly recognized and exploited, the sentiment to preserve samples of this unique great forest was very slow to develop, remarkably slow. It lagged far behind the general national park movement and some other state park movements and also behind the drive to preserve the Sierra redwood or giant sequoia.

But the dramatic change in the landscape from a virgin forest to cut-over and burned landscape which began occurring about 1895 was emphasized only occasionally in those earlier periods. There was very little mention of it.

Redwood Parks

One of the more interesting developments occurred in 1867 when a man by the name of J. W. Welch bought some land down near the Santa Cruz area and was so impressed by the large growth of trees on his property, that he withdrew and held on to 350 acres which he said he did not want cut under any circumstances. Later Henry Cowell whose property adjoined Welch's developed the same feeling and because the rest of the country was being pretty well logged over, this formed quite a contrast in this general region. So they capitalized on it as good businessmen would in those days and they charged people a dollar to go in and look at the old giant redwoods that existed near Santa Cruz area. Well, this is interesting because it really led indirectly to the formation of the first state redwood park at Big Basin about 1902.

And it came about in this way — a man by the name of Andrew Hill was a photographer who had been hired by a newspaper to take some pictures of old coast redwoods. One of the places he went was to the Welch Grove and he

paid his dollar, took his camera in, and was taking some pictures. Henry Cowell followed him doing this and was very unhappy about the thing and berated him and Hill said, "I'm doing you a favor. I'm going to publicize this area and you'll get even more dollars from people coming to see your area." But this did not persuade Cowell and he really ran Hill off in anger.

Well Hill was considerably upset about being ejected from the Welch Grove, as it was called. And a few weeks later went over to Stanford University, still incensed about the fact that there wasn't an area where the public could enter at a reasonable price and take pictures and look around. So he gave a speech to a group of people, some of the professors at Stanford University and others. And as a result of this speech, the Sempervirens Club was formed. The Sempervirens Club apparently developed enough influence in the next few years to go up to the state legislature and obtain \$250,000 which was used to make the initial purchase of a California redwood park which later became known as Big Basin.

Incidentally, the 3,800 acres in the first purchase contained only about 1,500 acres of virgin redwood. Shortly thereafter, a lumberman in Santa Cruz County by the name of Middleton donated an additional 1,300 acres of brush and cutover land to the Big Basin Park region. In 1874, Colonel Armstrong up in Sonoma County along the Russian River was particularly excited about a chunk of land he had that contained some fine old redwoods on it. And he planned to hold on to them and he refused to have them cut. He tried for a number of years to give this 440-acre tract to the state but the state would not accept it. In 1890, Sonoma County purchased this from his descendants for about \$70,000 and held it as county park until 1934 when it was transferred as Armstrong State Park to the state park system.

The next public reserve occurred when a water company over in Marin County planned to flood the canyon that is now contained in Muir Woods National Monument. Congressman

William Kent, as many of you know, saved this area by purchasing 440 acres. He tried to give it to the federal government and they wouldn't accept it either. He tried to have it declared as a National park and Congress would not do this. So finally President Theodore Roosevelt under the prerogative available to him at that time designated this as Muir Woods National Monument. This is the reason we have it, the only federal park ownership in the Redwood Region.

Now, the program leading to the establishment of most of the present redwood state parks really originated on a trip up the old Redwood Highway, up what is now Highway 101, on the east side of the highway, up to the area of the present Humboldt Redwoods State Park, the south fork of the Eel River, the Eel River, and even further north. The men on this trip were Dr. Merriam of the University of California, later president of the Carnegie Institute, Dr. Henry Fairfield Osborns, the president of the American Museum of Natural History in New York, and Madison Grant, the chairman of the New York Zoological Society. These men were essentially responsible for establishing in 1919, the Save-the-Redwoods League. Other prominent, influential and effective men were later added to the ranks of the Save-the-Redwoods League in one capacity or as other men like Steven Mather of the National Park Service, Henry S. Graves, chief of the U.S. Forest Service, Congressman Kent, previously mentioned, Charles Wing, the chairman of the State Redwood Park Commission, Emanuel Fritz, Laurence Merriam, and a number of others.

Their initial objectives were to purchase redwood groves for state parks, to establish a redwood national park, to protect the timber along scenic highways then under construction in California and in the future and to encourage the state to purchase and reforest cutover redwood forest land. They received nationwide publicity in a National Geographic Magazine article. This article later was essentially reprinted and widely distributed in a New York Zoological Society bulletin. The Geographic article listed seven small groves in Humboldt

and Mendocino Counties that should be preserved and three major forest areas as outstanding possibilities for national park status. These included the Redwood Creek area above Orick, an area they listed as 50,000 acres; and areas around Klamath and the Smith River areas in Del Norte County; the Bull Creek-Dyersville Flat area now in Humboldt Redwoods State Park, and the surrounding watershed of 20,000 to 25,000 acres. This was listed as potential for a national park and later for a state park.

Well, in 1920 a federal study on the possibilities for a redwood national park was instituted by a resolution of Congress. The study was made by regional forester Paul Reddington of the State of California with a committee comprised of Professor Bruce of the University of California, M.C. Pratt, the deputy state forester, and R.F. Hammond of the U.S. Forest Service. They studied the potential and recommended that 64,000 acres in the lower Klamath River Basin and an additional 1,800 acres on the south fork of the Eel River should be preserved, the former in a national park. A bill was instituted based on these premises. The bill passed the House but was not considered by the Senate, although Steven Mather did say in 1924 that he expected the next national park created under his jurisdiction would be in the redwoods. But nothing came of it and it was 25 years more or less before a national park was again attempted in the redwoods.

The task, then, of reserving redwoods in the state park system really devolved primarily on the Save-the-Redwoods League and the state. It is a remarkable story of joint private-government cooperation and persuasion. The Save-the-Redwoods League, because of the initial rebuffs, I believe, abandoned the national park idea and concentrated on four major projects. Bull Creek-Dyersville Park and the Highway approaches; the Prairie Creek area; the Del Norte Coast areas, and the Mill Creek-Smith River area now in Jedediah Smith Park up in Del Norte County. Their original objectives have largely been achieved.

The state finally came through, we can put it this crudely, in 1921 by appropriating \$300,000 and at the same time established a matching principle for the establishment of parks. So this \$300,000 that they made available was available only on the basis that \$300,000 in donations would be made available for the establishment of redwood parks. There was a great initial response to the Save-the-Redwoods League program. In the first two years they had 4,000 members and donations of \$150,000, which is a fairly phenomenal record. It was comprised largely of California, New England, and East Coast people at that time. There were immediately many large and small donations. The Stany-Shakey Lumber Company gave 40 acres in Mendocino County, the Hammond Lumber Company 30 acres on the Eel River, and the Sage Land and Improvement Timber Company \$11,000 for purchase of lands in Prairie Creek.

And the counties began to contribute. Humboldt County, of all things considering the present environment, bought 166 acres for \$40,000, for the purchase of some lands in Prairie Creek Park. That was a very sizable amount in those days. Del Norte County contributed \$2,500 to buy 22 acres for Jedediah Smith Park. And Sonoma County, as I mentioned earlier, had contributed essentially a \$70,000 park in the Armstrong Redwoods. And there were thousands of small donations as well as large. A man by the name of Edward Harkness contributed a half a million dollars for purchase of lands in Prairie Creek, James Irvine \$25,000 in Prairie Creek, and of course, John D. Rockefeller over the years a total of around three million dollars, which helped the program along quite a bit.

Now it's important to understand in the development of the state parks that these parks were not autonomously and automatically created in a single entity. Rather, the parks individually had a start with the purchase of some lands and then they've been added to and pieced together over a period of about 45 years. And we should acknowledge the fact that lumber companies have held certain se-

lected choice pieces along the rivers of the old-growth redwoods for future purchase.

In 1927, the State Park Commission and the Division of Parks was created. And the control of the California Redwood Park or the Big Basin Park was transferred from the California Division of Forestry to a new Division of Parks. And at the same time, a six-million-dollar bond issue was created, again with a matching principle. So ultimately this provided through the thirties a total of about 12 million dollars, for the purchase not only of redwood parks but other state parks

A survey of California lands for the parks was also made at this time by Frederick Law Holmstead. Here is a quote from his report which I think is pertinent for those years. This is dated 1928, "With minor exceptions, the forests of California, unlike those of the East never extended over much land fit for agriculture and with good economic management, they will be perpetuated where they stand, but not as they stand. These venerable forests, made up in part of the oldest, largest and most, impressive of all living things, when once cut, will probably never more be seen by man, though other remote descendants live on in California of unchanged climate thousands of years longer than it has taken to grow the trees we see. For to let the trees grow so old and large is uneconomic for timber growing.

This generation has received as a tree inheritance from the past ages, a hoard of forest wealth. Regarded as economic or exchangeable wealth not increasing at normal rate of interest, it calls for liquidation and is being liquidated by lumbering operations just as fast as it can be pushed on a somewhat glutted lumber market."

He had a point of view too. "But if any of the future generations, for thousands of years to come are to have an opportunity of enjoying the spiritual values obtained from such primeval forest; this generation must exercise the economic self-restraint necessary for passing on some portion of this inheritance instead of cashing in on all of it." Of course, this was 1928

and as I said, there has been since that period a very considerable increase in the amount of acreage in redwoods.

Holmstead made 18 specific recommendations for redwood park locations and of these 18 all but five eventually reached state park status. Of course, the state and the Save-the-Redwoods League have worked hand in glove together over the years. The state has responded, not only in 1927 with the six-million-dollar bond issue, but in 1938, certain oil royalties, portions of the oil royalties from state-owned oil lands, were devoted to state park purchase, and in 1945, the state appropriated \$13 million for purchase of parks without the matching provision and then in 1964, of course, we had a \$150 million bond issue passed, \$85 million of which was for acquisition.

Now, I think we should say something briefly about redwood land prices, particularly for virgin redwood areas. In 1900, you could buy a pretty well-stocked old-growth virgin acre for about \$100. Between the period 1920-1940 the price would have been roughly \$200 to \$600. There's some variation from this of course. Between 1940 and 1960, the postwar years the price nearly doubled on the average from \$500 to \$1,000 an acre.

And now perhaps five or ten years after the last price mentioned, you would pay from \$3,000 to \$5,000 and possibly more for a virgin redwood acre.

Well, I think we should mention a couple of other reserves in the Redwood Region. Many of you may be familiar with the proposal by Helen Gatagan Douglas for 1946 for a Roosevelt Memorial Forest. This proposal would have set aside under federal control 2.4 million acres in the four North Coast counties which is practically the whole Redwood Region, in addition to some other lands. In this proposal there would have been four parks totaling 340,000 acres in size, including the land then in the state parks. The estimated original cost was about \$215 million and in the modified re-introduced bill a year later this price nearly

doubled. It was strongly opposed by lumber and livestock groups, local governments and the California Legislature and went down to defeat and was not heard from again except sporadically about 1949.

Another type of reservation are the national forest redwood purchase units, not parks but areas that are to be under the jurisdiction of the U.S. Forest Service. During the Depression Years it was even proposed at the local and state level, that the federal government through the U.S. Forest Service, buy up a large acreage of redwood area. This started out about 1934 and the total acreage mentioned was 863,000 acres to be divided into a northern redwood purchase unit and a southern purchase unit down in the Mendocino County area. Now since 1934, Congress has appropriated the money sufficient to buy 14,491 acres and it has not been moving very fast over the years. The prospects of obtaining additional acreage do not: appear to be very bright. So this is the Forest Service ownership in the Redwood Region.

Then in 1947, the state purchased 47,000 acres for about \$1.5 million in an area extending east from Fort Bragg in Mendocino County and now know as Jackson State Forest. An additional 5,000 acres of a federal recreation demonstration area was given to the State of California that time, which then contained about 6,000 acres of virgin forest. Since 1952, logging has been going on in this forest under the approved forestry practices of the California Division of Forestry and in ten years the stumpage return from sales in \$405 million. So it is a pretty fair investment. Jackson State Forest is required to pay taxes to Mendocino County in a manner similar to the surrounding private lands. And then finally, there is a little area immediately east of the Napa Valley area in Napa County which does contain about 150 acres of redwoods that have been cut over.

This is on the Los Pasados State Forest, a small area of about 840 acres in total that lies just about as far from the coast as any redwood bodies we know, about 40 miles. But this area

probably will not be cut in the future. As I said, it was already cut over. It's second-growth forest and is primarily used as a 4-H Camp and a fire station for the State Division of Forestry. Then, of course, the industry, the California Redwood Association industries have opened up to public recreation in the North Coast, starting at the Navarro River and going north. Originally, they announced 230,000 acres would be open for public recreation and more lately they have announced 760,000 acres. Of course, at the present time and for the near future, this seems to be primarily a day use operation. They are allowing very little overnight use or camping.

Now, just to contrast, very briefly, the original forest as I have known it, with the present forest as I have known it. The elk and the antelope which were quite prevalent all through this region, though not in the interior of the forest necessarily, stay to the peripheral edges and the openings of the redwood forest. The grizzly bear probably did roam through the forest. These are largely gone except for a herd of elk up in the Prairie Creek Park area. 90% of the original forest has been cut over or converted to other uses at the present time. About 200,000 acres of virgin commercial forest remain, mostly in the northern Humboldt and Del Norte Counties. This will most likely with present cutting rates be gone in about 20 years, leaving about 30 more years of what we would call residual cutting of old trees that have been left behind in earlier logging spotted here and there throughout the region. The park forest in terms of virgin forest, constitutes about 50,000 to 55,000 acres. The best young-growth that now exists that's available for logging operations is in those areas that were cut prior to the steam logging days.

(Remainder of talk was not recorded).