History of the Blacks Mountain Experimental Forest, 1933 Through 1981

Pacific Southwest Forest and Range Experiment Station

by

Donald T. Gordon

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Chapter I

INTRODUCTION

The Author

From early 1946 until retirement in 1977, I had varying degrees of responsibility for events at Blacks Mountain Experimental Forest. Before that, I did some field work there in the summer of 1940 and spring of 1941, during the earlier time with the ego-building job title of "Minor Assistant to Technician." In between those two periods was one of Army service, beginning as a draftee and ending in Italy with a Corps of Engineers unit as Battalion Motor Officer, then Battalion Supply Officer. Duncan Dunning, Division Chief for Forest Management Research in the Experiment Station, apparently considered those last assignments as adequate preparation for my 1946 assignment as "Business Manager" for the Blacks Mountain Branch Station! There, the Forest Service was showing the world, among other things, new ways to use logging as a powerful tool in forest management. As you have already seen, I will not hesitate to use the personal pronoun rather than that dud phrase, "the author," but will hope to avoid an autobiographical slant to the telling of this tale.

The Blacks Mountain Experimental Forest Established

Before the telling of this tale could take place, there had to be an Experimental Forest and some events. Reasons for the establishment of the area will be covered later, but some of the records of establishment have been found.

Blacks Mountain Experimental Forest, about 10,000 acres in size, was withdrawn from lands of Lassen National Forest and designated as an experimental forest by F. A. Silcox, (Chief) Forester, United States Forest Service, on March 28, 1934. This action followed a search by an Experiment Station committee for a suitable experimental area east of the Sierra Nevada and Cascade Range from about Lake Tahoe to the Oregon border. The report on the proposed area was signed in 1933 by C. E. Dunston (assistant to T. D. Woodbury, Assistant Regional Forester (Timber Management) for Region 5, U.S. Forest Service), and A. E. Wieslander (Associate Silviculturist in the California Forest Experiment Station). The report was approved in 1933 by Regional Forester S. B. Show (rhymes with "now"), and E. I. Kotok, Director, California Forest Experiment Station. An interesting feature of the document is that nowhere did it designate the Experiment Station as the agency to administer or operate the Experimental Forest.

Some controversy surrounded the establishment and location of the Experimental Forest. A. E. Wieslander (1) has indicated that he "carried the load" for the Station because Duncan Dunning (Chief of the Station's Division of Forest Management Research) was at variance with individuals on the Region's Timber Management Staff. Additionally, Wieslander was familiar with the area proposed. Memorandums in Station files in Berkeley show that some members of the Region's staff doubted the usefulness of an experimental forest, and especially one as large as proposed. But, probably most important in the Region's reckoning was the thought expressed by Woodbury in January, 1932, that the proposed location of the experimental forest might disrupt the management plan of

the Eastern Lassen Working Circle of the Lassen National Forest. Particularly involved was possible violation of an existing Secretary of Agriculture agreement with The Fruit Growers Supply Company of Susanville which entitled it to bid on all timber in the Working Circle. Reducing the area and timber available to it might result in a "bad faith" charge against the Forest Service. Woodbury made other suggestions and comments.

Wieslander, in a memorandum for the Director dated April 26, 1932, answered Woodbury's comments, rejected some suggestions, and stated that Modoc and Plumas areas were found wanting. He also suggested that if the proposed experimental forest were located in the recommended area, boundary of the Eastern Lassen Working Circle could be extended to the northwest. This could make an equivalent amount of timber available to Fruit Growers. All this was forwarded to the Regional Forester by the Director on May 4, 1932.

Show replied that he still agreed with Woodbury, and suggested a joint committee to search for an alternative area during the summer of 1932.

Then, on September 8, 1932, a memo from Dunston to Woodbury (his "boss") shows that Dunston and Wieslander spent August 16 to 18 examining eastern Lassen country together. ("Wies" says that he and Dunston had always "hit it off together" well.) Dunston seemed to concur with Wieslander's proposals, with some slight modification of area. He suggested that The Fruit Growers Supply Company might favor an experimental forest, considering the kinds of logging and milling studies being planned. He also suggested that The Fruit Growers Supply Company

could be given first opportunity on sales of logs from an experimental forest.

More communication ensued. A note of urgency became evident. Wieslander says that plans had been made for a Civilian Conservation Corps (CCC) camp at Hall's Flat, which camp would furnish men for projects on the proposed experimental forest, and on that general area of Lassen National Forest. It began to appear that the CCC camp would be ready to go before the Experiment Station and the Lassen were ready.

Apparently agreement was reached on the location of the Experimental Forest, but some correspondence concerning it is missing. For, in a memo to Kotok dated July 8, 1933, Dunning set out description of land subdivision (with maps) of the final proposed area. Other agreements must have been reached, because a transit survey of Blacks Mountain Experimental Forest and the famous "hundred percent inventory of all trees over 3.5 inch diameter" were both begun by the Experiment Station earlier in the summer of 1933. As stated earlier, the Chief Forester formally designated the area as an Experimental Forest on March 28, 1934.

Accomplishments

From 1933 until 1960, "Blacks Mountain" was a busy place. The two words were used loosely to identify the camp, the Experimental Forest, or both, unless specificity was required in the context of a conversation. The body of the history will expand on the following, and other, accomplishments or uses derived from the Experimental Forest and the camp serving it:

1. A hundred percent inventory of the 10,000 acres included all trees with diameters greater than 3 1/2 inches, and mapping of timber types and types of low vegetation such as grass and brush by species. These unique data were analyzed to form the basis for sampling methods which became used widely.

2. Important contributions to Western logging methods included some "firsts":

   a. The 42 miles of roads on the Experimental Forest were the first designed and layed out for a large area exclusively for truck hauling of logs.

   b. With its own equipment, and eventually with its own crews, the Forest Service conducted its own logging on a scale not tried elsewhere.

   c. Experimentation and trials led to the design and construction of the first unguyed, rapidly portable log loader for handling overmature pine timber. This loader was the key to the success of "light salvage cutting," which revolutionized subsequent logging practice.

   d. "Light salvage cutting" of about 2500 board feet per acre was shown by a study to be no more expensive than heavier cutting. Previously, about 10,000 board feet per acre was thought to be about the minimum volume for profit-making.

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e. Progressive trials of tractor-skidding methods demonstrated that care used to save existing young trees kept to a minimum the area needing expensive new regeneration.

3. Cooperating entomologists developed a risk-rating system of recognizing live pines susceptible to bark beetle-caused mortality. Removal of high risk trees by logging became known as the sanitation-salvage system. It has been estimated that 3 to 5 million acres may have been processed by sanitation-salvage logging.

4. Four cutting methods are being compared by means of blocks of four 20-acre plots replicated each year from 1938 to 1947. All trees more than 11.5 inches in diameter were described in detail, measured, and mapped. Periodic remeasurements were continued for 20 years, forming a vast body of statistical data. Analysis is under way. Biometricians used some of the data in their inimitable way at least 20 years ago

5. The concept of unit area control (UAC) in forest management, developed by Duncan Dunning and refined principally by William E. Hallin, received most of its early and continued testing at Blacks Mountain. Although accepted for use throughout much of the Forest Service's California Region, it was difficult to teach under administrative conditions of the 1950's and 1960's. As a result, it gradually became

bureaucratized and bastardized to the point of nonrecognition in the field.

6. Methods of natural and artificial regeneration were tested under "eastside" conditions. Natural regeneration was successful only rarely. Careful planting with certain nursery stocks got reliable results every year.

7. The influence of soil surface conditions, and of low vegetation and established trees, on regeneration survival and growth were reported.

8. Project-type studies of thinning saplings, and of pruning poles, disclosed costs and satisfactory methodology.

9. A few prescribed burns for fuel hazard reduction created nearly as much new fuel (killed trees) as they consumed, were controllable following expensive preliminary work, and judged to be unsuitable for use under current condition of the "eastside" forest type.

10. The Blacks Mountain camp often served as headquarters for range scientists, entomologists, pathologists, and others working in the general area.

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11. The Experimental Forest was used extensively as a demonstration area for private and public agency land managers, foreign visitors, and college and university students and instructors.

12. The Experimental Forest served as a training ground for Civilian Conservation Corps members and new and old professional people who participated in forestry, entomology, and pathology studies and projects.

13. The camp occasionally became a source of equipment and able-bodied men for fire suppression on the Lassen National Forest.

14. Five unlogged compartments, totaling about 500 acres, are designated as a Research Natural Area for the Interior Ponderosa Pine forest type.

15. Projects undertaken served as a minor source of employment for college students, professionals, and residents of Lassen, Shasta, and Plumas Counties.

16. Meals in the cookhouse were widely and justly famous! Mrs. Lula R. Shuman, cook for many years, set standards we later strove to uphold.

A General Overview

The period covered in the history of work on the Experimental Forest (1933 through 1981) begins in the depths of the Great Depression, extends through World War II and the Korean War; through the economic and population boom of the 1950's and 1960's; through the Vietnam War; and through a dawning among some of the country's population that there are such things as renewable and nonrenewable resources--and that we must learn to use both more efficiently and carefully.

When activities at Blacks Mountain began, the Federal Government was getting involved in all sorts of public works to provide employment and otherwise stimulate the national economy. There seemed to be a forester measuring every tree, a whole new camp was built, machines and vehicles were provided to accomplish approved plans of study, and loggers and Civilian Conservation Corps (CCC) enrollees were on hand to do the logging--the most powerful tool in the forester's bag. In addition, there were batteries of people associated with the Berkeley office of the Experiment Station to punch adding machines and calculators, and otherwise to assist in processing the mass of data being collected. What a beginning!

(Here is inserted a statement that, from 1933 until 1956, professional staff was headquartered in Berkeley during winter. All assigned to the work at Blacks Mountain stayed up there for whatever time was required during summer, sometimes 6 or 7 months.)

World War II brought a number of changes. The CCC program was terminated and more loggers were hired. Loggers moved from one work place to another quite freely, because they were in great demand and

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short supply. Some foresters and others joined the armed forces. Other well-qualified foresters replaced them "for the duration" of the war. The war itself created an unprecedented demand for lumber, so logging activity at Blacks Mountain Experimental Forest was expanded to allow more rapid progress toward the desired regulated forest. Volume cut was reduced again soon after the war.

About 1950, the Experiment Station suffered a considerable reduction in appropriated funds for forest management research, so programs had to be reduced. Some staff were terminated and, in addition, shortly before and after this time a few foresters transferred to other locations. So some viewpoints and directions regarding forest management research were changed.

By far the greatest expenditure of funds at Blacks Mountain was what is known in "federaleze" as cooperative funds. These funds financed logging salaries, wages, and equipment use. Planting, thinning, and pruning of trees were accomplished with another type of cooperative fund. Our experience, California Region averages, and local estimates determined amounts to be deposited into the cooperative fund pools. The highest bidder for stumpage price of logs from the Experimental Forest became the cooperator. That company paid stumpage cost as well as cooperative funds into the U.S. Treasury. We could then use the cooperative funds to run our operation, up to the amount actually paid in. In effect, the highest bidder for the logs subcontracted the logging operation to the Experiment Station. Logs were sold loaded on railway cars or on trucks.

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Through 1951, some project research at Blacks Mountain was financed with cooperative funds. At that time, the General Accounting Office came up with a new and "unhelpful" interpretation of the contract used to collect cooperative funds. From then on, all research had to be done with funds regularly appropriated for the Forest Service by the Congress.

It might be well to interject here that, from year to year, the actions of Congress and Executive Branch decision makers appear to be pure whimsey. Of course, this isn't often the case. But people in "doing" agencies find frequent frustration in trying to get the body of work done. This is one very good reason why few forest research scientists have tackled really long-term studies--which are needed.

In 1956, research funds increased slightly and the work at Blacks Mountain became directed from the Susanville Research Center, established that year. Range and wildlife research was also conducted from the Research Center in response to a new Servicewide policy of "let's get 'em out of the offices and into the woods near their field work." At about the same time, forest management research at the Center focused on true fir type at Swain Mountain Experimental Forest, about 30 miles distant.

For many reasons, the Experiment Station quit logging with its own crew and machines in 1960, at Swain Mountain Experimental Forest as well as at Blacks Mountain. This caused a number of regrettable personnel changes, of course. And it meant that future logging would have to be done by means of contracts; several timber sales at Blacks Mountain have been accomplished by this means.

By the early 1960's, Servicewide research policy had gone full cycle, approximating "let's get 'em out of the woods and into college and

university centers where they'll have better access to computers and can commiserate with their colleagues." In 1965, the last forester (me) at the dissolving Susanville Research Center left to join other foresters at a relatively new silvicultural research center at Redding.

Since the early 1960's, the Experiment Station has done but little research work at Blacks Mountain Experimental Forest. In 1967, the last of a 10-year series of blocks of 20-acre method-of-cutting plots received its 20-year (and final) remeasurement. Two timber sales in the 1970's converted about half the Experimental Forest to a young-growth state in which no tree would be older than about 150 years. The Branch Station camp was turned over to Lassen National Forest in the early 1960's. They used it for a few years, then removed nearly every trace of it. The camp area is now only a lonely site full of memories for those who worked there.

Through all these changes, certain bodies of thought and work remained essentially unchanged. Progress continues in shaping Blacks Mountain Experimental Forest into a unit for continuous yield of wood products. The means of doing this, and the proposed timespan for conversion to a young-growth forest, have changed from time to time.

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CHAPTER II

BEFORE OUR TIME

Indians

The area in which Blacks Mountain Experimental Forest lies was most probably used, or "owned," by Indians known as the Atsugewi. Kroeber (2) indicates that some of them claimed to "own" the land from just south of the Pit River clear to Susan River, and from east of Hat Creek to about Eagle Lake and northward. Very likely, the bulk of the area was used during spring, summer, and fall, and the Indians followed or preceded the mule deer in their fall migration northward to lower elevation and lower snowfall conditions near the Pit River. These people were closely related to, but kept themselves separate from, the Achomawi along the Pit River. Descendants of the Achomawi now refer to themselves as "the Pit Rivers."

The Atsugewi left only light traces of themselves on the land. Arrowheads and chips of obsidian have been found usually around springs or wet meadows where hunters were particularly active. Water being scarce in the area, except during spring, most animals were attracted to such places. Canada geese and Mallard ducks nest at or near some of the shallow "potholes" in the area. Considering that waterfowl were once much more numerous than now, we can surmise that these people, like the Maidu who summered at "Big Meadows" (now Lake Almanor) farther south, were adept at capturing flightless young birds. Phil Lord (3) tells of a seed-grinding area worn into rock near Rim Rock Road in Harvey Valley.

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Immigrants

The Lassen Trail, used by many immigrants from the East during 1849, passed roughly from west to east through the middle of the Experimental Forest. It was explored by Peter Lassen in 1848, and touted by him as a shortcut from the Oregon Trail to the Sacramento Valley. It began in northeastern California at Goose Lake and followed down the Pit River drainage to about Little Valley. From there, it climbed west and south and followed around the west and south base of Blacks Mountain to Patterson Flat, a camping place which is now in the heart of the Experimental Forest. There was grass available here for livestock, and there appears to be evidence of a shallow dug well near the eastern end of the flat. (For many years there has been a windmill nearby, providing water for livestock.)

Where the trail crosses a modern logging road at the east end of Patterson Flat is a commemorative marker. It is made of heavy railroad iron, painted bright yellow. It was placed by an organization known as "Trails West." From there the trail followed low ground southeastward to near the location of the log cabins (Patterson Ranger Station) beside the main logging road, then climbed the draw to the saddle between Patterson and Cone Mountains. The trail descended a draw southeastward to Aspen Well at the west end of Harvey Valley. From there it coursed south and southeast past Bogard Ranger Station to Feather Lake, where it turned south.

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An alternative route developed, bypassing what is now the Experimental Forest. It split from the original trail at a location now known as Long's Cabin, about a mile west of the Forest. (Trails West has placed another yellow-painted railroad iron marker there.) From there it ran south to the west edge of Grass Valley, and followed the approximate course of the Pittville Road to join the original trail again near Bogard (4). This was an improvement, since it was several miles shorter, nearly level, mostly open ground, and eliminated the climb and descent between Patterson Flat and Harvey Valley.

The hardship of people using the Lassen Trail was painstakingly recorded by J. Goldsborough Bruff (5), who passed through the area with a company in October 1849. The long journey from the East was nearly over, and man and beast were almost used up. Between the Pit River and Feather Lake, Bruff described several recent graves; many dead oxen and some horses and mules were seen; some of these animals had been partially eaten by passing travelers. Broken, burned, or otherwise abandoned wagons were mentioned frequently. Illness was common among people in groups passing and repassing each other. Yet the hardiest and most fortunate of these overland travelers survived to begin the population and development of California.

The Lassen Trail became known as the "Death Route" and "Lassen's Horn Route" because of its difficulty. Little or no migration went over it after 1850 (6).

Another, and better, immigrant route passed within a few miles of the Experimental Forest. In 1851, W. H. Nobles, who had been living at Shasta City (a few miles west of Redding), mapped a route from that place

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to the Humboldt River near present-day Lovelock, Nevada. This trail passed along the south side of Poison Lake, and from there southeastward to Feather Lake it coincided with the Lassen Trail. At that point the Lassen Trail turned south, while Noble's Trail passed eastward, nearing Susanville and Honey Lake. Many immigrants who were headed for the gold mines of western Shasta County and the Trinity River area used this route (6).

Livestock Interests and Place Names

Summer grazing of cattle in northeastern California began in the 1850's and 1860's (4), sheep a little later.

Roberts (7) recently has given a detailed historical overview of economic, weather, and feed factors affecting the livestock industry in parts of Lassen and Modoc Counties. The eastern part of Lassen County was more particularly referred to than the immediate vicinity of Blacks Mountain, but some of the factors undoubtedly affected the area of our interest.

The winter of 1859-60 was harsh. Many cattle died. Then prices declined, and to make up for this ranchers overstocked their ranges. There was, as early as that, reduction in carrying capacity of the range, and this, with heavy stocking, caused heavy livestock losses.

A drought in 1862-64 affected all of California, with cattle losses running as high as 50 percent.

By the time of severe winters in 1879-80 and 1889-90, wild rye and other grasses were virtually eliminated by yearlong use in Modoc County.

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During the 1890's and early 1900's, there was intense use of the range by sheep, cattle, and horses (including many wild unbranded herds). The range deteriorated further.

In 1875, 56 companies paid sheep tax in Lassen County. The modus operandi of many was to "rent a forty" on a patented spring or homestead, and, using this as an excuse, proceed to graze all of the surrounding country. Cattle were also being grazed.

Robert Harvey Abbey (8) has left a vivid account of the livestock industry in the Lassen and Plumas County areas during the first three decades of Forest Service history. He was a member of a sheep-raising family who had a ranch near Oroville. In 1905, he passed the examination for Ranger near Quincy and for the next 30 years by horse, by foot, and by automobile traversed and worked in much of the Plumas and Lassen National Forests. Abbey states that sheep and cattlemen using the mountain ranges since the 1870's and 1880's and up to 1905 got along with very little friction. On June 6, 1907, Abbey was transferred to the Harvey Valley Ranger Station on the Lassen Forest Reserve. The Ranger Station had been built in 1906 by Ranger Orlander Hedrick. This was just a few miles east of Blacks Mountain Experimental Forest. In the vicinity, stockmen owned small patented holdings. Boundaries between sheep and cattle ranges were well established and "pretty well respected."

Actual numbers of cattle and sheep grazed on specific areas around Blacks Mountain before the turn of the century remain speculative. Distribution of the stock would also have been speculative, and in turn, the intensity of grazing on specific areas. Water availability would govern distribution of stock to some extent, as would competition for the

feed, and the herding of sheep. Many of the present water improvements were placed by the Forest Service only within the past 50 or 60 years.

Before Forest Reserves (later, National Forests) were established, the spring entry date on mountain ranges varied (4). Mainly, it depended on water and feed conditions in the Sacramento Valley. But grazing in the mountains continued until all feed was heavily used.

Condition of the range had deteriorated a great deal before the Forest Service was given discretion in regulating its use. So much so that at least in some places the deterioration may be continuing. This is witnessed by the gradual reduction in numbers of stock permitted on some grazing allotments. On the Poison Lake Allotment of 75,000 acres (in which most of Blacks Mountain Experimental Forest is located), 1400 cattle belonging to four permittees were allowed in 1914 (4). In 1970, only 851 cattle were permitted on the same area to Lava Livestock Company and Dye Creek Cattle Company, jointly.

The Cone Ranch Company in 1918 was permitted 4542 sheep and 847 cattle in the Harvey Valley Allotment which abuts the east side of Blacks Mountain Experimental Forest. That was the last year the Cones ran sheep in that area. By 1952, the cattle permit was down to 515 animal units, and scheduled to go lower. In 1952, August L. ("Gus") Hormay (9) initiated a cooperative investigation in range management on the 32,000-acre Harvey Valley Allotment. Lassen National Forest and a cattleman were involved. Objective of the study was to test the "rest-rotation grazing system" (10), designed to improve and maintain grazing capacity of mountain bunchgrass ranges and provide for high sustained livestock production. Special fencing, elimination of

sagebrush, planting grass seed, developing water and salt locations, and timing of grazing on different units of the allotment were all part of the system. For 30 years, the 515 count has been maintained, and grazing eventually was allowed to continue for a longer period during the summer. In this specific instance, then, grazing capacity has been slightly improved in only a few years.

An interesting observation relating to the productivity of Harvey Valley was made by an early Ranger at Bogard, Ernie Patterson, to Phil Lord (3). It was that after a severe earthquake in 1924, Harvey Valley "dried up." One can only speculate on the relationship of that observation to conditions decades earlier and later.

About 4 miles south of Blacks Mountain Experimental Forest, in the northwest part of Grays Valley (Sec. 14 of T 32 N, R 7 E, west of Highway 44), I have noticed a significant change in vegetation since World War II. The area is nearly flat, part of the much larger area of Grays Valley. Original cover was probably mostly bunchgrasses and sedge. Sagebrush and some other low broadleaves are very evident now, and there is a residual of grass and sedge. Much of the thin topsoil is gone, and where it is absent an erosion pavement is seen. Thirty-five years ago, no trees were visible in the flat area west of the highway, but now numerous ponderosa pines have become established. Some must be 7 or 8 feet tall. Lassen National Forest records indicate that sheep, owned by Cone Ranch Company, last grazed here in 1911 and that since then, a succession of permittees have grazed cattle here.

The effects of livestock pressure on the vegetation of the area under discussion have been many and serious. What is written here is by no

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means an indictment of the livestock industry. No one appreciates a beef steak or leg of lamb any more than I. We meat-eaters would be hypocrites if we didn't acknowledge the fact that we and the industry have been locked together in a scenario right out of Garret Hardin's (11) essay, "The Tragedy of the Commons": Each rational herdsman, where the range is held in common, seeks to maximize his gain by adding more animals to his herd. But this action is followed by every other rational herdsman sharing a commons. "Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit--in a world that is limited.... Freedom in a commons brings ruin to all." And this has been the pattern in most parts of the world where domesticated stock have been herded on commonly used ranges.

The effects of the livestock industry have been most noticeable with respect to vegetation and soils on the flats within our area. Stock tend not to climb mountains unless feed becomes too scarce on the flats. Also, soils on the flats differ greatly from those on the slopes. Nevertheless, historical accounts indicate that slope vegetation has had a great deal of grazing pressure.

During the last 50 years or more, the timbered areas in this eastside country have been notable for an abundance of young growth trees: seedlings, saplings, and poles. A. E. Wieslander (1) says that in 1915 the country was open, that you could drive anywhere. He cruised timber in the northern Lassen then and beginning again in 1919. Travel between camping places was by wagon, and to each day's work by walking. Older stockmen have also indicated that timbered areas were once more open.

The "openness" of timber stands is undoubtedly a relative term. Obviously, there would have been no widely spaced older trees if there weren't somewhere at some time some younger trees which could mature. There is a tendency for people not to notice seedling-size trees, particularly. For example, at Blacks Mountain we found that some areas described as unstocked in the 1933-34 inventory were found fully stocked (25 trees per square chain) 20 years later with pines which had to have been seedlings in place originally. Also, saplings which can be seen over tend not to detract from an impression of openness. All this leads to the observation that not all areas were kept completely open by frequent light wildfires, either natural or set. Certainly the fires were responsible for some vistas--as well as for a lot of killed trees of all ages.

Some foresters have speculated that the abundance of young trees in the eastside area is somehow tied especially to effects of sheep grazing. As far as I know, this theory has not been studied. A sequence such as this is suspected as having happened over relatively large areas, and more than once:

1. heavy grazing destroyed much low vegetation, especially grass, fine sedges, and ground-hugging broadleaved herbs; what was left was of poor vigor; much mineral soil was exposed;

2. a heavy pine seed crop occurred and was distributed well by fall winds; the seed crop might also have been trampled into the soil, especially by sheep;

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3. winter and spring, and perhaps summer, precipitation in the seasons following--especially the first spring--created soil moisture conditions aiding pine seedling establishment;

4. somehow--perhaps because of herd distributions--pine seedlings escaped grazing for a few years and became fully established;

5. then a general fire exclusion policy allowed established trees to survive as the dense "jungles" so characteristic of northeastern California (as many as 17,000 stems per acre have been counted).

Whether or not the livestock industry can be credited with the abundance of young growth in the eastside, it can certainly be credited with contributing to place names. Stockmen were the first to begin using the resources, and probably as a means of having common reference points in unmapped territory, began naming locations.

In 1865, G. G. Kimball (12) with two partners (John W. Burgess and George Hoag) and other help drove about 3700 sheep from near Paskenta (southwest of Red Bluff) to a location south of Boise, Idaho. From west of Mt. Lassen, they followed Nobles Trail past Susanville. We learn from Kimball's journal that Hat Creek, Hat Creek Station (now Old Station), Butte Creek, Pine Creek, and Bridge Creek were already named. Kimball camped at what is now Poison Lake, but didn't call it by name. Poison Lake did show as a place name on the 1871 General Land Office map, however. I have read two versions and heard a third regarding the origin

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of this place name, so without further research will not repeat any of the three (all interesting!). One of the stories was published in 1853.

J. M. Ingalls surveyed the Blacks Mountain area for the General Land Office, dating his map of T 33 N R 7 E, MDM, on October 9, 1871. Two named roads were shown: the so-called "west branch" of the Lassen Trail which ran south from what is now Long's Cabin, and the "Dixie Valley to Susanville Road." The latter descended from the saddle between Blacks and Patterson Mountains, ran south through Patterson Flat, and south through low elevation timber to pass between Cal and Cone Mountains to Grays Valley. The naming of this road on the map would indicate a known route for wagon travel between Dixie Valley and Susanville.

Cone Mountain, part of which lies in the southeast corner of the Experimental Forest, was probably named for Joe Cone, an early sheepman, or other members of his family who had property in the general area. Cone Spring, Cone Headquarters, and Cone and Ward Headquarters are also within a few miles of the Experimental Forest (4). The family had a ranch near Red Bluff, and grazed sheep in the area as early as 1870.

Halls Flat is a generally flat area between the Pittville Road and Butte Creek Rim, extending west and south from about Jelly Camp to about Poison Lake. Many open grassy areas are located there between stringers and islands of timber which occupy slightly higher ground. The area was named by the Forest Service for W. G. Hall and sons who had cattle in the area for many years, beginning about 1880 (13). Their home ranch was near Old Station. Halls Flat was the name used for the Western Pacific section and telegraph station about one-and-a-half mile north of Blacks Mountain Branch Station. The Experiment Station office was built only

about 200 yards north of the Halls Flat Guard Station, built by Lassen National Forest in the early 1900's.

Harvey Mountain and Harvey Valley are probably named for D. Harvey or one of his descendants (4). Harvey had a "house" shown near "Lassen Spring" (now Cone Spring) in the southwest part of Harvey Valley on the 1871 G. L. O. Plat. Stanford Headquarters and Stanford Spring, east and northeast of Harvey Valley, were used by Leland Stanford's sheepherders from near Vina, a few miles north of Chico. Lyons Headquarters is located on the south edge of Harvey Valley. It was used by a sheep-ranching family from near Red Bluff.

About halfway between Blacks Mountain Branch Station and the Experimental Forest, beside a road which was once part of the Lassen Trail, "Long's Cabin" is located. The parcel of land on which it sits was first patented by Thareygood S. Elford of Lassen County in 1890 (14). It later passed to the Long family from the Susanville area. J. W. Long ran cattle in the area from at least the early 1900's, and the cabin was used as a cow camp (14). In 1923, Grover C. Long sold the 160 acres to the Walker interests (Red River Lumber Company) (15).

At the northwest base of Blacks Mountain sits the Eldridge Homestead, patented in the early 1890's (16). It is noteworthy for its barn, a rarity in this higher mountain area. The barn is fastened with wooden pegs. The Eldridge family has another ranch, which is the first plowed land encountered upon leaving the juniper flats while traveling north on the Pittville Road. They also own a locally famous round barn on the road between Pittville and Little Valley.

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Origins of names for Blacks Mountain, Cal Mountain, and Patterson Mountain and Flat are uncertain.

Timber Interests

The principal private timber landowner near Blacks Mountain Experimental Forest was Red River Lumber Company, owned by T. B. Walker and heirs. Although the Experimental Forest was set aside from other Forest Service-administered lands, more than four miles of its boundaries butt against Red River land. In addition, four small parcels of Red River land--totalling less than a section--sit within the Forest. Although some of the events in this section on Red River Lumber Company occurred after the Experimental Forest was established, they are placed here for better continuity.

Like so many other land holdings of the times, Walker lands were obtained by purchase of others' patents--often under the old Timber and Stone Act--and by purchase of others' rights to "lieu lands," and by other means. The whole was a complicated use of the existing land laws. The Walkers had many timber cruisers active in Lassen and Modoc Counties in the early 1900's--much of the activity occurring about the time the Forest Reserves were set up (15). From the cruisers' records, and by inspecting many areas on the ground, decisions were made for purchase of specific land parcels. T. B. Walker and some of his sons made some of these selections (17). Altogether, Walker interests held more than three-quarters of a million acres by the time harvesting began around Westwood in 1913. Purchases continued until their interests exceeded a million and a quarter acres.

Hanft (17) reports that T. B. Walker was interested in managing their lands for what we think of today as sustained yield. Some of his sons, however, apparently didn't have that interest. As it turned out, I think, some logged areas came out looking good, others were not as well-stocked as they might be. Some of the lands are grazed, for a fee, by livestock interests, and logs are still being sold where species or new growth permits. A planting program started several years ago began to improve tree stocking. Here again, we have an example of a producer in a competitive industry trying to sell his product at a low price, and the consumer locked with him into an economic system in which the consumer could not afford to pay more for different land treatment, even if the technology had been available.

During the late 1920's, Red River wanted more electrical power for the mill and town of Westwood. In the process of getting it they created "the pole line," a well-known reference feature of the landscape from Westwood almost to the Pit River. This transmission line used wooden poles, and passed right by the future location of Blacks Mountain Branch Station. Red River also constructed two hydroelectric plants on lower Hat Creek to power the line. These became known as Hat 1 and Hat 2 after Pacific Gas and Electric Company later purchased them and the pole line (18).

To facilitate harvesting its timber in the vicinity of the Experimental Forest and Poison Lake, Red River had nearly completed its largest logging camp (300-350 men)--named Camp Bunyan--late in 1940. It was at Halls Flat, about one and a half miles north of Blacks Mountain camp. Harvesting did not begin until 1942. Spur tracks for its

steam-powered railroad logging operation were built out from the Western Pacific Railroad line running through the area. These were at Poison Lake, Archie Spur, and Halls Flat. Archie Spur began close to the WP crossing of the Pittville Road just west of Grass Valey, ran north, and had an eastern branch. The Experiment Station began selling logs to Red River at Archie Spur in 1942, and built a log-loading facility of its own on this spur in 1943. This eliminated the long truck haul to Fruit Growers Supply Company siding at Feather Lake, and logs were loaded here through 1946.

A tragedy ocurred at Archie Spur on the night of October 26, 1943 (Fig. 1). During the placing of empty cars by a Red River train crew, a long string, with insufficient brakes set, began rolling downhill toward the WP line. The Red River locomotive could not catch the cars before they ran through a derail device and south toward Poison Lake on a nearly flat grade of the WP line for about a half mile before the brakes stopped them. A WP freight train heading south didn't see the stopped cars in time, and plowed into them about 8:30 p.m. Many empty logging cars were destroyed, and two locomotives and several freight cars were derailed. All men in the locomotives were hurt, and Brakeman Roy Barker was killed. The Red River locomotive crew arrived at the wreck immediately afterward.

The railroad spur east from Halls Flat eventually was extended through the northwest corner of the Experimental Forest to the saddle between Blacks and Patterson Mountains, and on north and east to Red River's Camp Harvey and beyond.

The whole operation out of Camp Bunyan essentially used Red River locomotives on their own lines, with long strings of cars being hauled to Westwood on the WP line with WP locomotives, the transfer being made at the Halls Flat siding. The WP locomotive engineers reputedly were leery of running their heavy locomotives any farther than necessary onto Red River's light tracks to pick up strings of cars.

Pleasure-bent loggers at Camp Bunyan were the basis for the only regularly scheduled passenger run on the WP line: between the Camp and Westwood. Each Saturday night, three or four old passenger cars full of loggers were whisked into Westwood by a WP locomotive; the train returned Sunday night. This run was known far and wide as the "Whiskey Special." Red River sometimes played host to a few Blacks Mountain loggers who walked up the track to board the train. One Monday morning I responded to a telephone call requesting confirmation of a dead man sighted beside the tracks near our camp by a WP engineer. Sure enough, not far from our camp was a man who had apparently fallen off the "Whiskey Special" or some other train and broken his head on the corner of a railroad tie. The Lassen County coroner took over from that point.

Red River had comprehensive shop facilities, and engaged in many experimental enterprises. Some were failures, others succeeded. Of particular interest, I think, are these two related by Hanft (17): "In 1929 Red River made the first experiment with diesel power in a tractor, using an Atlas-Imperial diesel engine in one of its caterpillars." And, "T. R. Wills, new superintendent of logging, decided to experiment with Athey truss wheels as a substitute for the conventional high wheels. Eventual outcome of this idea was the modern logging arch, which ended

the use of wheels. Red River was a major factor in development and improvement of the arch, ..." (It is also interesting to note that before arches fell into disuse, large rubber tired wheels replaced Athey-type wheels on some brands of arches.)

The Fruit Growers Supply Company bought the Red River Lumber Company mill at Westwood, the transfer of holdings being completed in 1946. Fruit Growers operated the mill and continued cutting Red River and other timber for several years.

Other timber interests were within transportation distance of the Experimental Forest, but none owned appreciable land nearby. They will be mentioned later as buyers of logs from the Experimental Forest.

Lassen National Forest

The Lassen Forest Reserve was established with many others by early 1905 (8). Louis A. Barrett at Quincy was Supervisor of the Plumas and Lassen Forest Reserves, and, later in the summer, of the Diamond Mountain Forest Reserve. On July 2, 1908, the name was changed to Lassen National Forest. Originally, the Supervisor's headquarters were at Red Bluff in winter, and at Mineral during summer. Later, the headquarters were located at Susanville all year.

One of the major early jobs on the Lassen was regulation of the livestock industry on the federal lands. Livestock numbers began to be reduced, stock were counted, and grazing fees charged. Gradually, sheep grazing became prohibited in some areas. In a sense, the job of the early Forest Service people was to convert the way of thinking of users of the federally-administered lands from free use to regulated use.

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Trees could no longer be cut for free use, with minor exceptions. Part of the process involved tacking signs onto trees, fence posts, etc. In some places, perhaps on the Lassen as well, the Forest Service Badge was called the "Sign Tacker's Badge." Abbey (8) reported reasonably good acceptance of the new conditions by most people, excepting specifically only a few settlers around Hat Creek.

Some range improvement work was undertaken, mostly establishing windmills and reservoirs for livestock water. Drift fences were constructed.

At the time the Forest Reserve was established, many timber claims had been initiated in the eastern Lassen area, but few sites were fully patented. Prospective owners were informed by the government that any claims south of Township 34 North would be contested, those north of Township 33 North would not be (15). This explains the extreme demarkation of ownership running eastward from the north boundary of Blacks Mountain Experimental Forest.

The major timber sale in the eastern part of the Lassen was to The Fruit Growers Supply Company, a large cooperative mill at Susanville associated with the California Fruit Growers Exchange. The mill principally produced shook for field and shipping boxes for California fruit growers. One of the terms of the sale was that the Company would have cutting rights to all the timber in the Eastern Lassen Working Circle, as marked by the Forest Service in a specified way and at a fixed price--for many years. This huge area and volume was part of an early and general Forest Service policy of attempting to stabilize communities associated with the lumber industry. The Fruit Growers operation was so

extensive that some local people referred to it as "Uncle Fruit," just as the Forest Service was nicknamed "Uncle" or "Uncle Sam." For many years, the Fruit Growers, Red River Lumber Company, stockmen, and the Forest Service were the principal people working in the eastern Lassen National Forest area.

Because so much variation existed in Government lands logged by Fruit Growers under the fixed marking system, condition of the cutover land varies a great deal. Logging itself was not done as carefully as in modern practice.

Recreation within the area of interest was confined chiefly to campgrounds near water--many with very few improvements. Near Blacks Mountain itself only a few spring areas were used by campers; no large streams, lakes, or reservoirs were present. But during deer season the whole of the eastside was and is inundated by mule deer hunters. Traffic on the dirt roads sometimes created a dust pall over the area. Within the Experimental Forest itself, however, we felt relatively safe: the Forest and more was included in State Game Refuge I-F, established in 1917 (19).

The Forest Service began early a policy of preventing and extinguishing wildfires. Abbey (8) tells of getting "fire help" from stockmen and ranchers in the earlier days. Phone lines were built by the Forest Service to connect Ranger Stations, and, later, fire stations, lookout stations, and the like. Roads, including some old wagon roads, were improved, or built by the government and private land owners. They were maintained exclusively in the summer by the Forest Service, Lassen County, and timber interests. As road and phone communication improved,

fires could be attacked more quickly. Then, in addition to government fire crews and equipment, lumber industry crews and equipment were hired, as well as "pickup" crews, particularly from large cities in the central valley.

In the earliest years, Forest Service personnel were hired as much for their ability to survive in the woods as for getting the basic jobs done. By the time I got into the woods, in 1939, much specialization of jobs already existed, and most District Rangers on the Lassen were professional foresters or range managers, and many other foresters were present and working themselves upward. Engineers were in Supervisors' offices, not yet onto the Districts. And always there were a few permanent and many temporary employees handling scale sticks, marking axes or paint guns, axes, shovels, hammers, and garbage cans!

At the time Blacks Mountain Experimental Forest was established, it was in the Bogard Ranger District, and remained so for perhaps twenty years. Through the years, Ranger District areas and boundaries have changed so that the Experimental Forest has been situated also in the Hat Creek, Pit, and Eagle Lake Districts. Sometimes we hardly knew who we "belonged to."

Within the Experimental Forest are two log cabins on an 80-acre Forest Service administrative site established in 1907 in the southern part of Sec. 12, T33N, R7E (Fig. 2). At the site, one cabin sits beside the main logging road (Road 1); the other is less visible, about 100 yards west of the first. As usual with such early sites, a meadow area was at hand for the Rangers' horses to graze. The original, or east, branch of the Lassen Trail ran through the east side of the meadow. The

cabins were called Patterson Ranger Station by Wieslander (1), and were in place in 1915. Older maps and realty records of Lassen National Forest (4) record the same name for the site. Wieslander passed the cabins several times, but never saw them occupied. Abbey (8) doesn't mention the place. Wieslander's recollection is that by 1915 the Ranger Stations at Bogard and Hat Creek were the main stations in use in that part of the country.

The Halls Flat Guard Station was mentioned earlier with place names. It was built by Lassen National Forest in the early 1900's. Abbey (8) recorded building fence in the nearby meadow in 1910, with the aid of Indians (probably from near the Opdyke Ranger Station at Hat Creek). The Guard Station, nearby meadow, and, later, the Blacks Mountain Branch Station, were all on a 240-acre administrative site designated in 1906.

A telephone line ran from the Guard Station to the Forest Service wires on Western Pacific poles nearby. That phone line must have been placed concurrently with WP track construction, probably about 1930. Marguerite Clover (21) has given a vivid recollection of a flag flying at the Guard Station in the early 1930's, indicating occupation. Yet none of the remaining early day employees at Blacks Mountain Branch Station can remember occupation of the Guard Station around 1933 or later. I would suspect occupation of the Guard Station became less convenient than staying at the Halls Flat CCC Camp, or at our camp after it was operational. I can recollect Lassen personnel using the place for only an odd night or two while working in the area. The building eventually was hauled to the present location of Bogard Station, probably in the late 1950's.

The Western Pacific Railroad

In 1931 Western Pacific Railroad completed its line from Keddie, on the Feather River, to Neubieber, beside Highway 299 in Modoc County. At Neubieber the rails abutted those of the Great Northern Railroad, which company later was bought by Burlington Northern Railroad (20).

At one point the railroad was within a mile or so of what became the southwest corner of the Experimental Forest. Early day Experiment Station employees told me that at the time "WP" (or "Wobbly P" as it was often called) was pressing government and private landowners for right-of-way through the area there was much talk of freight and passenger schedules. This influenced location of the Blacks Mountain Branch Station because it was thought that a common carrier service would become available for passengers from the Bay Area and elsewhere. The line has hauled only freight, except for the "Whiskey Special," a Saturday night run to town for loggers--covered elsewhere.

In addition to its regular freight, WP has carried many thousands of cars of logs destined for the mills of Red River Lumber Company, The Fruit Growers Supply Company, and a mill at Klamath Falls, Oregon.

At one time there was a section station at Halls Flat with a 60,000 gallon water tank on a tower, and several buildings for the foreman, crew, and equipment, as well as a telegraph station a short distance away. There is now only a building for the railroad's communication equipment.

We envied the railroad its well for furnishing water for steam trains. As I recall, it had an 8-inch casing, was about 800 feet deep, and powered by a 100-horsepower electric motor. The pump filled the

storage tank at a very rapid rate. We had a contract to buy water there for 75 cents per thousand gallons. We sometimes ran short at Blacks Mountain Branch, and hauled our needs in a 1000-gallon tank truck. The latter part of this paragraph is a little out of place with regard to time period, but fits in here best.

CHAPTER III

THE LAND

The land, of course, was here "Before Our Time." But, since 1933 we have observed and studied some of its characteristics, and can therefore better describe it. For the remainder of this history, much material will be from memory, and from file material in the Redding Office of the Pacific Southwest Forest and Range Experiment Station. Many specific publications will also be cited.

Roughly conical mountains rise individually or joined in chains from a flat base of uniform elevation: 5600 feet. The higher peaks near the Experimental Forest have elevations from 6500 to 7300 feet. Slopes are moderate. The whole area is of volcanic origin. Some of the mountains are built up of pure cinders. This is vividly apparent at the huge cinder pit at the west edge of Poison Lake. There, Red River Lumber Company removed a great volume of cinders for logging railroad ballast. Later, in the early 1950's James C. Jeskey of Susanville filed a mineral claim on the area and shipped cinders by rail from Poison Siding for several years, principally during the late 1950's. There is also a cinder pit just inside the Experimental Forest near the top of Cone Mountain.

Soils on the timbered slopes are young, rocky, and thin. Rock outcrops are frequent. The flats and some gentle drainages have varying depths of soil, most of it thin, and much of it underlain with gray clay. The clay makes for adventurous vehicle travel in spring and early

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summer. The standard fee for pulling someone's pickup out of the mud has been a bottle of whiskey.

Reports of the numbers of cattle and sheep grazed for long seasons would indicate that when white men arrived, grass must have been abundant on the flats and in the more open part of the forest. Perennial bunchgrasses are still much in evidence, but sagebrush has become increasingly evident on the flats and on lower elevation timbered slopes. Bitterbrush is present here and there, and since it is a preferred browse of mule deer and cattle, has had a hard time "hanging on."

In the higher timbered areas, bunchgrasses are still present, and mule's ear (Wyethia) is found. Greenleaf manzanita (Arctostaphylos patula) and snowbrush (Ceanothus velutinus) are the principal high brush members of the forest floor, and squaw mat (Ceanothus prostratus) hugs the ground in many places. Mountain mahogany is present on poor rocky sites. None of the brush species are aggressive here.

Mountain slopes are covered with the ponderosa pine which made this area famous as a timber source. The fine-grained wood was in demand for certain uses. Jeffrey pine is present, too, in varying amounts, but most often found near timbered edges of flats. Hybrids and back-crosses of the two pines are present. On the Experimental Forest, about 15 percent of pine volume was Jeffrey, 85 percent ponderosa. Together, the pines originally constituted 90 percent of total volume on the Forest, white fir 7 percent, and incense-cedar 3 percent. The timber type has been variously known as "eastside pine," "ponderosa-Jeffrey pine," and

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"interior ponderosa pine." Take your pick. I like "eastside pine," because it locates it pretty well, for foresters and lumbermen in particular.

On the Experimental Forest, growth rate of timber is "medium or poorer." Hallin (22) stated that "in terms of the interregional ponderosa pine site classification (23), the site index at age 100 years varies from 60 to 80 feet and averages 72. These indices correspond to 100, 125, and 114 feet at age 300 in Dunning's California site classification (24)."

Climate has a strong influence on the types and growth rate of vegetation on the eastside. During the period 1935-53, the mean annual precipitation mostly as snow, varied from 9.09 inches to 29.24 inches and averaged 18.17 inches at Blacks Mountain Branch Station (22). Near the top of Blacks Mountain, a storage type precipitation gauge operated by another agency collected an average of about 22 inches of water annually during a ten-year period which partly overlapped the 1935-53 period cited above. Thunder storms occur in spring and fall, and sometimes during summer. Frequently they will wet one area and not another. Frost may occur in any month. Temperature sometimes gets as low as -20^{o}F in winter, usually into the 80's and 90's during summer afternoons. Relative humidity is nearly always low except during storms: ten to twenty percent on summer afternoons. I once measured it at three percent when Art Ford, a Lassen N.F. fire dispatcher, got jumpy and phoned that he wanted a special reading from our area. Made me jumpy, too.

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No streams near the Experimental Forest run all year. Dead drainage into the flats occurs during snow melt. Grass Valley receives the little water from the Experimental Forest. Only one spring area, near the center of the Experimental Forest, may in some years carry water as late as July.

Most commonly seen wildlife are golden-mantled ground squirrels, chipmunks, and Stellars jays and juncoes in the timber. Oregon ground squirrels are numerous on some flats. Mice are everywhere. Chickarees (Douglas squirrels) are more often heard than seen in the trees. Snowshoe hares are uncommon. Flying squirrels are fairly common, but are nocturnal.

Mule deer and pronghorn antelope are the only large herbivores. Porcupines are properly classed as herbivores, so I wish they would quit killing the tops of pine poles.

Coyotes are numerous, and badgers less so. Swainson and red tail hawks help control rodents, as do great horned owls. Black bears and cougars rarely pass through the area close to Blacks Mountain. Another carnivore is conspicuous by its adsence: the rattlesnake. For some reason it doesn't appear in the area extending roughly from Eagle Lake to Hat Creek. Garter snakes are present, though.

Canada geese and Mallard ducks breed in the area, some geese even nesting in trees! In the fall, if there has been enough rain to fill potholes in the flats, waterfowl congregate before moving on when the ponds freeze.

To sum it up, this land is a pleasant place in which to live and work during the summer: warm days, cool nights, and moderate slopes. Because of its remoteness and lack of water, recreational or other development will probably remain at a low level. It could and should be husbanded for those reasons as a livestock and timber production area. It is of more value to society than the productivity of its site rating alone might cause it to be evaluated.

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CHAPTER IV

BLACKS MOUNTAIN BRANCH STATION

Remoteness

Northeastern California is sparsely populated, with most people living in small communities and cities. Grocery stores and gas stations are found only in those population centers, mostly along Highways 395, 299, and 36. If we focus more closely on the area of interest to us, we find there are few such facilities within the area bounded by Highway 395 between Susanville and Alturas, by Highway 299 from Alturas to its junction with Highway 89, south along 89 to its junction with Highway 44, then east and south on 44 to its junction with County Road A-21 (about 3 miles south of Bogard Ranger Station), into Westwood on A-21, then eastward on Highway 36 to Susanville (Fig. 3). The few exceptions have been at Cassel and Pittville, both close to Highway 299; at Little Valley (or Bognuda Ranch) near the Pit River, and at Eagle Lake. South of the ranches in the Pit River drainage and west of the ranches near Highways 139 and 395, for many years the only known year-around residents of the area described above were those at two or three locations around Eagle Lake, at the Western Pacific Railroad section stations, and the few at Blacks Mountain Branch Station. For the past 20 years or so, those people at Eagle Lake have been the only ones left.

Location and Communication

The exact location of the headquarters camp to serve the Experimental Forest was chosen mainly for these reasons: the site was about 5 miles

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from the Experimental Forest; it was alongside the Pittville Road, which was the main dirt road connecting Pittville (25 miles northward) with Susanville (45 miles distant) and Westwood (40 miles distant) on the Red Bluff-Susanville Highway; the Western Pacific Railroad line was only a couple of hundred yards distant, and there was some propsect that rail passenger service would become available; and it was possible to position the camp superintendent's "A" house so that a fine distant view of Mt. Lassen could be had across a large meadow nearby (Fig. 4).

Unfortunately, no railroad passenger service became available. And within a few years, growth of young trees shut out the view of Mt. Lassen. So much for those considerations! For most transportation needs, personnel necessarily stirred up great clouds of dust on the roads during summer and fall, and battled snow and mud during winter and spring.

Lassen County bladed the Pittville Road from Pittville south to its junction with Highway 36, about five miles west of Susanville--a distance of 65 miles. In some years the road was bladed twice, but it was little more than a somewhat smooth boulder-bordered track between the trees and across the flats. By midsummer, washboarding on the road surface was so bad that many people placed at least a couple of hundred pounds of roadside rocks or other weight in pickup beds to help hold the vehicles on the road. However, dirt roads were at their worst in early spring, and the families who for several years lived year around at the Branch Station used the roads then as little as possible.

During the winter and early spring, travel to the outside world was possible only to the north, through Pittville. Elevation and snow depth

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decreased in that direction, and roads dried out sooner. Nevertheless, there were often difficulties. One often-told incident involved two families (Perinis and Shumans) returning from a grocery trip to Fall River Mills. They became stuck, late in the evening, in a mudhole next to the cattle-guard in the road at the National Forest boundary. There they remained overnight, running the vehicle and its heater occasionally to keep warm. The main discomfort occurred when Lu Shuman (camp cook during summer months) opened and ate from a container of Limburger cheese. People at Blacks Mountain realized their absence, so early in the morning, while the road was frozen, Ed Wilkinson ran the road grader down and pulled the vehicle out of the mudhole.

In 1961, paving was completed on the segment of Highway 44 from Old Station to its junction with Highway 36 west of Susanville (25). Work had been in progress for several years. The route followed the old dirt road between Poison Lake and Old Station, except for a new route down (or up) Hat Creek Rim. About a mile south of Bogard, a new route departed from the old Pittville Road. It ran parallel with, and west of, the railroad for three-and-a-half miles, then crossed it north of Long Lake. From there it went quite directly to the north side of McCoy Flat Reservoir. Near the eastside of McCoy Flat it joined the Pittville Road again at the junction with the old road to Westwood. Most people welcomed the paved improvement.

Telephone lines connected Blacks Mountain Branch Station with other Forest Service stations, and with a commercial switchboard in Susanville. Two-way radio communication was never available to the Branch Station.

Camp Facilities

The years 1933 and 1934 were especially busy ones at the headquarters site and on the Experimental Forest. So many people were at work there that the depression must have seemed distant. Many of the Blacks Mountain Branch Station facilities were in place within those two years. At the begining, all the people connected with Experiment Station work stayed in tents and ate at the Halls Flat Civilian Conservation Corps (CCC) Camp No. F-49, about a mile-and-a-half north.

When the Branch Station location had been picked, Austin A. "Aust" Hasel (Fig. 5) and Fred Renner layed out the camp building sites in 1933 (26). Hasel and Richard Mors began surveying Experimental Forest boundaries, compartment boundaries, and the approximate 45 miles of roads within the 10,000-acre area.

Reginald E. "Reg" Drew and a ten-man crew began the 100 percent tree and vegetation inventory of the Experimental Forest. They had initial difficulty, and had to be closely supervised for a while by Hasel, who designed the inventory system to be followed. This work will be discussed a little later.

Gus Hormay (Fig. 6) assisted with work at the Branch Station and supervised CCC personnel who built fence, a cabin, and other improvements at Burgess Spring Experimental Range--at the north side of Harvey Valley (Fig. 7).

A crew of Works Progress Administration (WPA) builders was beginning to erect buildings at the Branch Station (Fig. 8). As the first were completed, at least some of the "Experiment Station people" moved into

them. The "D" building--a small dormitory with a single sleeping room and large kitchen and bathroom--was used as a place to cook and sleep. The office--a "B" building--was used to sleep in, as was the "A" house--a two bedroom residence for the camp superintendent (Drew, a batchelor)! The "D" building was converted to a family residence ten or more years later. Two small double garages were erected, one of which was moved to the woods service station after logging started, as a residence for the "grease-monkey" who serviced trucks and heavy equipment at the end of the work day. Still later, the same building was moved back to the Branch Station "family camp." More about that later.

At the beginning of Branch Station construction and use, water was hauled there by truck from Halls Flat. But a well was drilled and cased by Van Matre Brothers, of Malin, Oregon, in 1933. The well was 600 feet deep; water was struck at 585 feet, and rose to the 525 foot level. In 1934, a "sucker-rod" piston pump was installed through 3-inch supply pipe. Through a walking-beam mechanism, a single-cylinder gasoline engine powered the unit until about 1941 or 1942 when more electricity became available; then a 7 1/2-horsepower electric motor replaced the other. A pumphouse and 5000 gallon redwood tank on a tower were installed over the well (Fig. 9). In 1937, a 5000 gallon underground concrete fire water reservoir was placed next to the pumphouse, and kept filled.

The well was generally inadequate for the demands upon it. Water conservation was a general rule. No attempt was made to water any special vegetation such as lawns or shrubs. Vehicles and heavy equipment

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were never washed unless necessary before putting them into the shop for repairs. When an "overload" of employees or visitors was present or due in camp, extra water had to be hauled from Halls Flat in the 1000-gallon tanker. When the pump was down for repairs we usually had to haul water, too.

By the end of 1937, three larger buildings were completed--a twelve-man staff house, cookhouse with day room, and shop. The cookhouse had a large kitchen, dining room, and day room (Fig. 10). The shop building had a four-bay shop and a work area and "rat room," all with heavy concrete floor. The large woodshed at one end was unfloored (Fig. 11).

Sometime between 1937 and 1941 another small "caretaker" residence was built. It had a single living-dining-sleeping room, kitchen, and bathroom. It was the only insulated building in the lot.

Interior walls of all the "living" buildings were finished with beautiful clear ponderosa pine boards with semitransparent finishes, some milled to special patterns, and mostly of six and eight inch widths. Roofs, except for the shop, were cedar shingles layed with only three or four inches to the weather. In spite of weather extremes of cold, icy winters and very dry warm summers, these roofs required only minor repairs in more than forty years.

An electric generator in camp was the original source of current for lights and small appliances. About 1943 the Station built a one and half mile pole line to tap current from a bank of transformers installed at Halls Flat primarily for use of Camp Bunyan. This allowed use of more

electric power at the Branch Station, and eliminated tinkering with a generator. The original distribution system to the buildings ran underground from a panel in the pumphouse. In the 1950's the underground cable was found to be deteriorated, so Oscar E. Stark rode herd on a project to place the distribution system on poles.

The original septic tank sewage disposal system for the camp was entirely inadequate: tile lines sometimes became clogged with roots, and the tank itself had to be unloaded occasionally. Nice jobs. We suffered along with these until 1952, when Bert Koppen, an employee and former miner at Seneca, deftly blasted a couple of new holes for septic tanks, and Earl Morrow came up from Feather River Branch Station and built huge new concrete tanks in them. Tile lines were replaced with orangeburg, and an excellent leaching system was installed. From then on out we "had it downhill with the wind."

Buildings were heated with wood stoves, furnaces, or fireplaces. Some cook stoves burned wood, others later burned bottled gas. Hot water heaters and refrigerators originally burned bottled gas, but as they deteriorated we replaced them with electric models. Refrigeration for the cookhouse consisted of a family size refrigerator in the kitchen, and a walk-in refrigerator outside.

With the investment in buildings came concern for their safekeeping during winter. The camp was close to the railroad, and many men were on the move during the depression. Drew, Hasel, and other staff went to Berkeley each winter. Gus Hormay lays claim to being the first "caretaker," probably in the winter of 1934-35. Sometime later, Alvin

"Acorn" Fessler and Edgar J. Wilkinson, who worked for the Station as loggers, were hired as winter caretakers.

During the earliest history of the Branch Station, staff people were discouraged from bringing their families along for the summer. After all, there was only one supposed family residence, the "A" house, which was labelled "the camp superintendent's." Foresters and entomologists applied pressure to Director Kotok, and within a few years families were "allowed." "Family camp," as it became known, was a few yards north of the fenced compound for the main camp. A couple of "Chick Sale" pit toilets were set up by employees, who also bought and installed about 150 yards of pipe to carry water from the pumphouse.

As jobs began to be easier to get, the Director had to be a bit more lenient in attitude toward the family camp. Within a few years, the government had bought enough tents and tent flies to take care of summer housing needs of the "regulars." However, the "regulars" had to build their own floored tent platforms if they wanted them. Then began an era of competition to have the finest set-up. Some families installed board walks, built old-fashioned evaporative coolers, for food, and joined two or three tents together for "rooms"--and Jack Bongberg even built a fancy stone fireplace for a gable end of his "living room" tent!

Eventually the Director agreed to supply a wash house--the materials, that is. The employees were to do all construction work on their own time. I recall seeing some of the initial work being done--in 1941, I think. The wash house had a concrete floor, wood walls, and shingle roof. The main part of the building consisted of two bathrooms, each

having flush toilet, wash bowl, and shower. Remainder of the building was a wash room with two double tubs, large water heater and tank, and usually two or three recalcitrant old washing machines. The latter were private property, bought and sold, and repaired by current owners. This whole was a real improvement in living conditions, and particularly appreciated by families whose children spent their days playing in the dust.

In the fall of 1946 the "grease-monkey's" cabin from the woods service station was hauled in and placed in the family camp as a dwelling. The service station was the source of another family camp residence. A portable CCC building which had been used there to store parts, tires, and cable was taken apart and reerected on concrete blocks in the family camp. Such buildings consisted of approximately eight-foot square sections bolted together. By 1951 this one was in use as a two-bedroom house with bath and kitchen-living room. My family lived at different times in both of these houses just mentioned, as well as the "A" house.

As the years advanced, work patterns changed. Use of tents gradually dropped off from about six or eight set-ups to none in the late 1950's.

Other occasional references will be made to the camp, or living accommodations, and finally will come a story of its complete removal.

CHAPTER V

BLACKS MOUNTAIN EXPERIMENTAL FOREST--BEGINNINGS

Inventory

The earliest necessity for managing a forest property is an inventory. Many people quickly acquire an incredulous look when informed of the detail obtained in the 10,000-acre Blacks Mountain inventory during two summers beginning in July 1933, and ending in November 1934.

The stated purpose of the inventory was to collect data for a detailed working plan. Austin Hasel designed the inventory scheme, and supervised the training and work on the project.

Ten foresters in addition to Hasel formed the work force: three 3-man crews consisting of a compassman-mapper and two estimators, and a crew leader were responsible for all.

The compassman made the vegetation type map, determined age class of tree seedlings, tallied reproduction quadrats, measured tree heights with an Abney level, and checked estimators' strip widths. The estimators cruised trees across the 2 1/2-chain-wide strips on their respective sides of the 2 1/2-chain measuring tape.

Timber and vegetation types were mapped down to a quarter-acre. Any discrepancy in type boundaries, where maps joined, were corrected in the field.

All trees with diameters greater than 3.5 inches were tallied by species, two-inch diameter class, and Dunning tree class. Diameters were estimated by eye and frequently checked with Biltmore stick and diameter tape.

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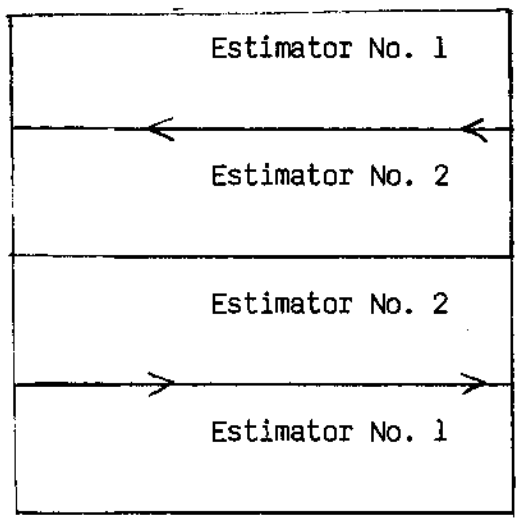
Tree seedlings were recorded by one-foot height classes and species on four one-milacre quadrats at each 2 1/2-chain interval along the compass line.

The basic record for trees of all sizes was organized by 2 1/2-acre strips, which were 10 chains long by 2 1/2 chains wide. Each quarter-section (160 acres) of the Experimental Forest was divided into sixteen 10-acre squares, which were 10 chains along each side. Each of the 10-acre squares was divided into 2 1/2-acre plots for tally, as shown in this diagram:



(drawing needed)

After the inventory was finished, tree tallies by 2 1/2-acre plots were consolidated within each of the approximately 100-acre compartments blocked out within the Experimental Forest. Where compartment lines crossed 2 1/2-acre plots, tree tallies were assigned in proportion to the area of the plot on either side of the compartment line. For each compartment, a separate inventory sheet for each tree species showed: number of poles in each 2-inch diameter class within the limits 3.6 to 11.5 inches; by the seven Dunning tree classes, and by 2-inch diameter classes, the number of trees and total (volume-table) volume in each cell.

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Many summaries of variously classed data were prepared from the inventory. And once logging began, the species, diameter class, and Dunning class of each tree marked for cutting went into another record. In this manner a close estimate of inventory on each compartment could be prepared, modified by growth and insect-caused mortality.

The "mountain" of data from the inventory were used by Hasel for five statistical studies which strongly influenced sampling methods for forest inventories. The five publications are listed in the Complete Bibliography at the end of this history.

Another aspect of inventory was the surveying of control lines, mostly along section lines, within the Experimental Forest. Reginald E. Drew (the camp superintendent) and a crew during 1933 and 1934 summer seasons ran those lines and obtained other survey detail to make an accurate 8-inch to the mile topographic map. The map showed rock outcrops which might affect logging decisions.

Roads and Compartments

As I mentioned in the Introduction, the road system on Blacks Mountain Experimental Forest was the first in the West known to be completely designed for truck logging of a large tract. It was not adapted from any previous or proposed logging railroad transportation system.

Roads were first sketched to certain standards on a contour map of the area. In the field, only minor digressions from the standards and from plotted locations were allowed. Reg Drew's survey crews apparently made the preliminary surveys. The whole area formed a basin sloping

toward Grass Valley from the crests of Blacks, Patterson, and Cone Mountains. As far as possible, roads were located to allow trucks to run downhill with their loads (Fig. 12). Austin Hasel and Richard H. Mors surveyed exact locations of all the roads after construction, and compartment lines as well.

The main utilization road, 7 miles long, began at a junction with the Pittville Road at the west side of Grass Valley, and followed along the west and north edges of Grass Valley about 1 1/2 miles to enter the Experimental Forest. It then ran generally eastward to the top of a saddle between Patterson and Cone Mountains--following the approximate course of the Lassen Trail for the final mile. Its width varied from 13 to 15 feet in sidehill, cut, and fill sections. Ruling grade with payload was 5 percent, maximum 7 percent for 750 feet; maximum grade against payload was 5 percent for 750 feet. The general minimum radius of curvature was 60 feet, absolute minimum 50 feet. Turnouts were to be intervisible. The surface was to be 8 inches of crushed rock.

Primary roads totalled 12.3 miles. Widths were 11 to 12 feet in the various types of sections. Grades with payload were: ruling, 5 percent; maximum, 10 percent for 750 feet. Maximum grade against payload was 5 percent for 750 feet. Limits of curvature were again 60 and 50 feet. Turnouts were to be no more than 1000 feet apart, and the surface was to be dirt. Secondary roads totalled 26.7 miles. They had the same standards as for primaries, except that work was held to the minimum necessary to provide a passable roadway.

The original system consisted of about 46 miles of roads. Intensity of the roading was roughly three miles of road per square mile.

Clearing was kept to a minimum. Logs were dragged off the right of way and left. Depending on concentration, brush was either lopped and scattered or piled for burning. In order to reduce the accumulation of logs along roads, only those snags liable to fall across roads were felled during clearing. Drainage structure installations were considered necessary in only a few gully crossings because surface runoff is normally light.

All labor and a large part of the equipment operation was done by the CCC. Work was begun about 1935, and finished in 1938.

Mechanized equipment consisted of tractors, trail builders ("bulldozer blades"), rippers, portable compressors, blade and motor patrol ("road grader"). A "rock picker" blade on a tractor was successfully used to remove loose rock from the grade without wasting the dirt needed for surfacing.

Gravel and dirt were obtained from a shallow borrow pit in the sagebrush flat in Compartment G 12-16 to provide surfacing for those portions of the primary roads that were too rocky to provide surface material in place.

A small portable crusher was first used for surfacing the main road. It moved along the road as it was surfaced and was fed with small rock hauled to the roadside. Its use was discontinued because the crushed rock could not be sized, much of it was too large, and it was difficult to maintain a supply of small rock at the roadside. A quarry was

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developed in Compartment A 18-16 near the junction of Road 19 with Road 1 (the main utilization road). Here a small semiportable crusher was installed. A number of organizational and machinery problems at the quarry were finally overcome. Then coarse rock for base and fines for surfacing was obtained, hauled to the job site in dump trucks, and spread with a motor patrol.

The crushed rock was spread on a surface only 8 or 9 feet wide. This early proved to be too narrow a road bed, especially on turns. Some of the early trucks dumped their log loads, particularly at a sharp turn in the main road at its junction with Road 19. The crushed material was spread out wider (and thinner), and this action solved the safety problem. But the road always held up well with a minimum of maintenance.

One important road was never built. It should have extended northerly from near the eastern junction of Road 3 with Road 1, between two tiers of compartments on Patterson Mountain. A rough road through Compartments P 26-25, P 23-26, and P 25-29 partially relieved the situation one year.

Road 14A, a 3/4-mile secondary, was punched through newly-numbered Compartment C 4-32 at the time it was logged in the early 1950's.

An important feature of all dirt logging roads in the eastside is their need, when in use, for adequate watering to keep the soil compacted and smoooth. A few days of even moderate traffic without water reduces them to the consistency of a flour bin, and, as the saying goes, "hanging in the trees." Because of a usual scarcity of water sources in the area, hauling is often expensive. A thin oil or asphalt coating sometimes has been substituted for continuous watering.

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A compartment system was installed on the Experimental Forest for purposes of logging convenience and control, and for inventory record keeping (Fig. 12). One hundred compartments were tied in with the road system and topography between the roads, so that logs could be skidded downhill from any part of a compartment to the nearest road without crossing a compartment boundary. In some cases lines were drawn arbitrarily to get compartments of desired size if topographic features were not ruling. One hundred acres was the average compartment size.

Compartments are grouped into five blocks on the basis of topographic location. Blocks are lettered, with "G" for Grass Valley, "A" for Aspen and Patterson Flats, "B" for Blacks Mountain, "P" for Patterson Mountain, and "C" for Cone Mountain.

Compartments are numbered according to how far the center of the compartment lies north and east of the southwest corner of the forest, distance being given in 10-chain units. The block initial precedes the compartment number.

The exterior boundary lines of the Experimental Forest, and all compartment lines other than roads were cleared just enough to improve visibility along the lines, and marked with dabs of red paint on sides of trees facing the lines. Red-topped two-by-two-inch stakes were also placed about every 250 feet along lines. Where comartment lines angled or intersected with each other or roads, permanent transit hubs were set. These hubs were capped 1 1/2-inch galvanized pipes set in concrete. To facilitate reestablishment of lines, a second hub was set on line about 150 or 200 feet distant, and its azimuth recorded.

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Compartment numbers facing appropriately were stamped into the metal hubs. Most compartments lines were repainted in the late 1950's.

During the 1950's, compartment numbers were assigned to five areas not previously included in the system. All lay east of the ridges of Patterson and Cone Mountains. Two were logged by the Experiment Station--C 4-32 and P 13-36--logs going to Fruit Growers at the time they were logging the Harvey Mountain Sale. The Experiment Station agreed that Lassen N.F. could include timber from the other three compartments--P 18-36, P 22-33, and P 28-30--in a sale just east of there during the 1960's.

Research Plans

By early 1937, inventory of the Experimental Forest was behind; some of the inventory data had been analyzed; a camp was mostly built; the road system was about three-fourths completed; entomologists thought they had a system for reducing severe losses of pine to bark beetles; and Duncan Dunning (Fig. 13) had written a detailed plan for development and research at Blacks Mountain. He was responsible for the early direction which research took, and the planning and supervision of events to accomplish it.

In order to put Dunning's thoughts in perspective, consider these facts: in late 1937, the first pine stumpage from the Experimental Forest sold for $2.00 per thousand board feet--fir and cedar could not be sold; civil service entrance salary for a professional forester right out of college was $2,000 a year--with a 5 1/2 day work week, this amounted to $0.87 an hour; the federal government could borrow money for 2 1/2 or

3 percent, and this was considered by some foresters a reasonable rate of return to be had from federal timberlands; from some private timberlands only butt logs were hauled to the mills; in many places there was little demand for federal timber, because many mills could still cut all the private timber for which they could find a market; and where federal timber had been cut in the West, regeneration of brush was more common than regeneration of conifers.

Immediately ahead was the opportunity to begin gaining the knowledge required to manage timber stands for sustained yield--if that was a valid concept. A look into Dunning's thoughts is provided by the introductory portion of his "Outline Plan of Development and Research, Blacks Mountain Experimental Forest," dated February 18, 1937:

Principal Objective

> The Blacks Mountain Experimental Forest was chosen as a center for research in management and silviculture for the ponderosa pine type of low site quality characteristic of northeastern California. The area is suitable for new research; for tests on a large scale of treatment, methods, and equipment indicated to be desirable by previous small scale experiments; and for demonstrations of such treatments, methods, and equipment as proved to be efficient in practice. It is hoped there may be concentrated here a series of coordinated studies of management, economics, utilization, and silviculture with a single objective--determination of the measures necessary to make sustained yield forestry possible on lands of this character.

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Justification of Project

The practicability of sustanined yield has been a subject of controversy for many years. Those who have faith in the general principle must turn for support to successes under circumstances differing from those prevailing here, or to results of uncorrelated studies of doubtful pertinency.

The Forest Service is committed to a policy of sustained yield management in the national forests. We are actively encouraging and promoting sustained yield management for private lands. Such policies cannot remain secure indefinitely unless reasonable chances of success can be demonstrated.

However confident we may be that sustained yield management carries with it incommensurable values in stabilized labor, healthy soil, and sane recreation, we must answer ultimately these questions: Which of these areas dedicated to growing timber are submarginal for timber crops? What modifications in financing, utilization, and silviculture are necessary to enable sustained yield on areas which obviously cannot continue to produce on a scale commensurate with mere exploitation of reserves?

Careful review of research records which have accumulated during the last 25 years, suggests these conclusions:

Growth, even after regulation, will be lower than we anticipated for extensive areas now dedicated to timber crops.

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Silvicultural practices, necessarily adopted as temporary expedients, have not resulted generally in the expected advances toward regulation.

These statements carry obvious implications. Very low rates of income must be accepted, as least from lands poorer than average. Costs of production must be adjusted to these low levels. The forest custodian cannot continue to overtax the forest--even for a long preliminary regulatory period--unless a greater portion of the toll from unearned reserves is more effectively applied toward increasing stocking, reduction in losses, and improvements in stand structure.

Only a spirit of optimism can support beliefs that, somehow, growth will be very much more rapid than records indicate; that mere fire protection will insure future merchantable stands; that economic selective culling will incidentally result in some somblance of forestry; or that any other cutting practice will approach forestry, if essentially subjugated to the aim of unreasonable profit for an inefficient custodian.

There appears to be an inclination to endorse as forestry what is now practicable as lumbering. There is constant pressure to scale down public forest practices to the standards of lumbering. Response to this pressure is manifested in many ways. The standard of stocking is placed at 500 seedlings to the acre when at least 1000 are necessary; merchantable trees

and merchantable logs are redefined to provide a margin of profit for poorly equipped operators; compromises have been necessary in the treatment of undesirable species which are left to usurp the soil on the slim chance that their relative values will be higher in the future; sanitation measures are reduced to palliatives; timeliness of cutting for reproduction must be dispensed with; thinning to promote growth is incidental to lumbering; control of shrubs and weeds cannot be attempted; logging damage restrictions are lenient; protection of the soil and of wildlife values are still embryonic concepts. Resistance to this pressure has been made more difficult by studies designed to encourage private industry.

Studies thus far conducted of isolated phases of utilization--the woods and mill studies--have been directed at problems peculiar to lumbering. By accurately delineating the marginal material, the lumberman is enabled to cull his stands with greater efficiency. Since the aim is to coax the owner through self-interest to leave some remnant of a reserve stand, the larger the trees which prove to be submarginal, for the moment, the more gratifying the results of the study.

An exacting distinction between the objectives of lumbering and forestry should preclude acceptance of the results of such studies as directly applicable to management of public lands. If it is accepted that 24-inch pines and 32-inch firs cannot be cut at a profit, the outlook for sustained yield is distinctly unfavorable.

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New types of studies are necessary where the approach is directed toward discovery of methods and equipment to enable profitable utilization of trees that are small, poor in quality, of inferior species, or all three combined; where the recognized purpose is regulation; and where public resources other than timber receive due consideration in determining costs.

No formulas have been discovered which can be safely endorsed as bases for radical changes in Forest Service policy. Such changes do appear necessary. Research has indicated a number of promising leads worthy of test on a fairly extensive scale. The project must be adequately grub-staked. Several persons and agencies must aid without restraint if success is to be attained.

Those paragraphs give some insight into the character, personality, and writing ability of Dunning.

Then followed a great deal of plans and reasons for them. I will touch on only a few, for the plan itself is available, and some specific ideas were later changed or had to be abandoned. It seems best to concentrate on work which was accomplished.

Dunning characterized the area as a group selection forest. Timber and reproduction covered 9094 acres of the Experimental Forest. Total volume was nearly 168 million board feet; the average volume per acre was 18,485 board feet. Ponderosa and Jeffrey pines constituted 90.5 percent of volume; white fir 6.5 percent, and incense-cedar 3 percent. Bark beetles were causing much timber mortality throughout the eastside.

About 10 percent of volume of the Experimental Forest was judged to consist of trees of high risk to insect attack.

Yield tables for even-aged stands and other data for selection stands indicated that, at 140 years: the average tree (all crown classes, 11.6 inches and greater in diameter) would be 16.2 inches in diameter; the average dominant would be 20.5 inches; the largest trees would be about 30 inches; the probable normal yield (from Myer's tables (23)) under regulation would be 25,260 board feet to the acre; and mean annual increment would be 180 board feet to the acre. Dunning thought the tabular value should be discounted to 80 percent, to allow for deficiencies in stocking, giving a yield of 20,209 board feet to the acre. The cut in the 140th year would be one seventh of this value, or 2887 board feet, leaving a reserve of 5244 board feet distributed through the six age classes less than 120 years. Average annual growth rate of 144 board feet to the acre would have to be attained. Dunning recommended that the 140-year rotation with 20-year cutting cycles be followed.

Ultimate objectives were: sustained yield of sawtimber; net income of not less than 2 1/2 percent from the timber crop alone; a secondary crop of forage for deer and livestock. Watershed values were practically nil.

Ponderosa and Jeffrey pines would be favored.

The immediate objective was to bring the forest under regulation by application of the accumulated high-grade reserves to finance silvicultural treatments and permanent operating improvements.

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Flexibility of cutting in timber and in space were emphasized to take advantage of a myriad of stand conditions and guide them toward a regulated forest. Light initial cuttings would be necessary in various places to (a) insure a large amount of seed, (b) prevent invasion of shrubs before establishment of pine reproduction, and (c) promote rapid harvesting of scattered high quality trees over a large area. Conversely, heavy cuttings were needed in some places to (a) release young growth pines, (b) salvage as rapidly as possible the large proportion of decadent trees. Dunning estimated that probably 75 percent of the virgin stand should be cut during the first 10 to 12 years.

Cultural treatments such as cleaning, thinning, pruning, and sanitation were badly needed.

Logging damage must be closely regulated to protect advance growth.

Slash disposal should vary with degree of cutting, fire danger, and insect hazards.

Distribution of cut by character of trees was to be in this order:

1. Trees most susceptible to insect attacks, as classified by the bureau of Entomology and Plant Quarantine.

2. High value large trees.

3. Tree classes governed by stand graphs.

The method of operation was to be for the government to perform all logging operations up to delivery of logs on cars at a railhead. Dunning considered that it would be practically impossible to write a contract that would be sufficiently flexible and at the same time insure the validity of research results. In addition, the timber industry was

somewhat dubiuos about the practicality of the light early cuttings--about 2500 board feet per acre--and had no ready equipment to do such work.

An operation utilizing CCC enrollees was thought possible if a trained overhead could be secured and a tenure of enrollees could be prolonged to permit training (their enrollment was for six months).

A small mill located in the research area was thought to be most desirable if actual income as well as research was to be a consideration. (It was thought that, at the very least, a government mill would cut shipping costs by about half. A mill never materialized.)

Here I should add that available records rarely reveal the discussions, planning, and understanding which must have preceded documented events by many months or several years. A good example is that Dunning's plan above, witten in February 1937, is the prelude to arrival of a complete logging outfit (equipment) beginning in August of the same year. I can't imagine such accomplishment having taken place in the past 30 years. Perhaps fiscal conditions within the Government were much more simpler in those depression years.

The Entomologists

Entomologists were the closest research associates of the foresters working at Blacks Mountain, and they stayed the course. Those particularly involved were mostly assigned to the Berkeley office of Division of Insect Investigations of the Bureau of Entomology and Plant Quarantine. In the 1950's, as a result of reorganization of the Department of Agriculture, the functions of that Division were

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transferred into the Forest and Range Experiment Station of the Forest Service, at Berkeley.

Bark beetle-caused mortality in the pine forests of northeastern California has been mentioned before (Fig. 14). Direct control had been attempted before the mid-1920's, and continued at least into the mid-1930's. But a concensus developed that such control efforts did not pay off. Direct control involved the felling of obviously attacked trees and removing the bark with axes to expose and kill insect broods by means of sunlight, dry air, and, in some cases, fire.

An undated report by K. A. Salman titled "Results of the 1934 Blacks Mountain insect control project, Lassen National Forest," indicates that 3320 trees on 15,590 acres of the "Blacks Mountain Unit" were subject to direct insect control work--"fell, peel, burn." Vance A. Brown, who bacame a well-known forester on the northern California National Forests, was Lassen N.F. foreman for the job. Work began late in October 1934, and continued until January 7, 1935, when heavy snowfall prevented further work. The report doesn't specify that the Experimental Forest was within the "Blacks Mountain Unit." However, Ralph Hall recollects that it was. And over the years I saw on the ground trees that had had "the treatment."

Attempts at classifying trees susceptible to beetle attacks involved such men as John M. Miller, Hubert L. Person, George R. Struble, F. Paul Keen, Kenneth A. Salman, and J. W. "Jack" Bongberg (Figs. 15 and 16). A recent paper on the history and development of what came to be known as "The California Pine Risk-Rating System" (27) covers the details of

development and application of the system, and I shall borrow freely from it.

Early attempts were made to relate "susceptible trees" to Dunning's (28) tree classes--with poor success. Keen (29) expanded Dunning's 7 tree classes to 16 in an effort to include relative tree vigor in a classification system. However, there were too many trees in the susceptible classes, requiring the removal of too much of the stand. Additionally, 16 classes became cumbersome.

Final formulation of the California Pine Risk-Rating System was made by Salman in 1936. He became convinced that if a forest manager was to reduce the chances of bark beetle losses, the cutting should be light enough to cover stands quickly. He took advantage of the observation of workers making annual loss surveys in northeastern California in the early 1930's. They had reported that most trees killed could be characterized by various kinds and degrees of crown deterioration before attack. These observations were crystallized into a study by Salman in 1936. A three-class structure was preliminarily tried, but Salman's field crew found that four classes were better for field application. From this study, the elements of high risk were described as follows by Salman in 1937 (30), and by Salman and Bongberg in 1942 (31):

> --thin or sparse foliage complement, short needles, and the dying of twigs and branches were characters of the trees that become infested and die--active or recent top-killing infestations, and the localization of branch or twig injuries, and the thinning and shortening of foliage in portions of the

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crown also occurred in many of the trees that died--green trees which exhibited those characters were likely to die and were considreed high-risk trees. High risk characters were absent in healthy appearing trees considered (lower) risk from insect attack under normal conditions--gradations were segregated into four degrees of risk for application in field tests (Fig. 17).

It is stated that the California System risk classes are not, in themselves, a timber management system, but are, instead, silvical principles.

The basic experiment to test and verify the California System was started in 1937 on the Blacks Mountain Experimental Forest. All the high-risk trees, i.e., Classes III and IV, were removed on 322 acres; added to the high-risk trees was a sufficient volume of lower-risk trees to ensure a cut of 2500 board feet to the acre. In the following 6 years about 2800 more acres were so treated. The average volume removed was 15.7 percent of the merchantable stand. An annual 100-percent cruise of cut and uncut compartments provided data on loss by classes of trees.

Bongberg reported in 1939 (32) that the first year's test was a very satisfactory 91 percent reduction in annual insect-caused timber loss. At the end of 10 years, Bongberg (33) reported that the reduction in annual beetle-caused mortality ranged from 67 to 92 percent with an average of 82 percent for the 10-year period. The final results covered a 22-year period. In that report Wickman and Eaton (34) showed, basically, that the loss reduction was 80 percent.

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The application of this risk rating system to selective logging became known as sanitation-salvage. In 1939 and 1940 large-scale applications were made elsewhere, and "the word began to spread."

A refinement of the California System is a penalty system in which penalty points are assigned to crown and stem characteristics of a tree. It was devised and found very useful for training inexperienced tree markers. Paul Keen devised the first such system in 1941 (35). That system was modified several times, the last by Ralph Hall (36).

Changes in risk were found to occur. Furniss (37) reported a photo study begun by Charles Eaton. Of 32 trees observed over 13 years, 2 showed an increase in risk, 3 showed no change, and 27 showed a decrease in risk. In another study, Furniss and Hallin (38) found a slow change to high risk trees. They recorded one high-risk tree per acre in an area 16 years after all such trees had been removed.

I would like to emphasize that the reported risk-rating system was not a "one shot deal," nor one which was to be repeated endlessly as a management system. It was designed to be applied first as a quick "once-over" to reduce losses in virgin eastside stands. Other silvicultural concepts were to follow it. For example, at Blacks Mountain, high-value trees were cut along with high-risk trees when needed to "sweeten" the volume cut per acre to a total of about 2500 board feet. Soon, overmature trees which suppressed groups of poles were also cut. And slightly later, as many pole groups became released, attention focused on releasing saplings. The trick was to apply sanitation-salvage cutting to the entire area rapidly, and not get slowed

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by too many other considerations. After that first treatment, when we began to apply the unit area control concept to the Experimental Forest, we continued to cut any trees which had passed into the high-risk classes (III and IV).

And entomologists rightfully point with pride to the fact that the California System was the first risk-rating system of its kind to be developed and applied--and it was successful.

Logging

The light cuttings considered essential to reducing insect-caused losses posed problems which the early planners--particularly Dunning--apparently had faith they could solve. Tractor- and truck-type logging are mentioned in early plans. Correspondence is missing regarding the planning for and ordering of equipment to get the job done. Labor was to be accomplished by CCC enrollees from the Halls Flat Camp, supervised by a few experienced personnel (Fig. 18). The enrollees were to benefit from the training. (And, I might add, I met a logging truckdriver who got his first training in that way. I also heard of a few Blacks Mountain-trained men following woods work after World War II.)

By the summer of 1937, conditions were mostly in readiness to begin logging. Equipment began to arrive on August 4, 1937. From that date through September 24, Reg Drew kept a lively diary of events. He had responsibility for the logging until early 1943. Equipment which arrived by rail was unloaded at Halls Flat and at Fruit Growers Camp 10, about 7 or 8 miles northeast of Bogard.

The initial logging equipment list consisted of:

3 tractors: Caterpillar RD-8 with hoist and Hyster arch complete
Caterpillar RD-7 with hoist and trailbuilder (dozer blade)
Allis-Chalmers SO model, complete with hoist and Carco arch

1 hoist, double drum, diesel powered, Silent

5 trucks, logging, Ford

5 trailers, logging, single axle, Standard

1 truck, chassis, for water tank, Ford

1 tank, water, 1000 gallon

1 pump, Pacific, "Y" type

Miscellaneous blocks, hooks, chain, wire rope, load binders, jacks, babbitting supplies, axes, wedges, marlin spikes--all seemingly in abundance.

And the bill for all of the above? $43,386, plus freight!

The first timber marking was to remove high insect-risk trees. Felling on a compartment area marked like that began on August 17, 1937. Considerable confusion and frustration existed in the initial effort to get logging underway. L. E. Wood, a CCC camp foreman, apparently was but little experienced with logging work, especially use of equipment and rigging. Until the last minute, a clearcut agreement with Fruit Growers (who was buying the logs) on how logs would be loaded at their Feather Lake landing seemed to escape all parties involved. The logging trucks and trailers began breaking up, and local and manufacturers' mechanics

were hard pressed to patch and strengthen them. Clutch facing on the RD-8 burned out--wrong facing for the job. And so it went.

A few logs were concentrated at a landing. A completed "A" frame for loading trucks was erected and guyed on September 2, and two trucks were loaded out. The "A" frame was used to load trucks through September 15, only.

Reg Drew had received a telegram from Dunning on August 25, in which he was instructed to hire a logging foreman. The particulars of the hiring are missing, but on Labor Day, September 6, the logging foreman arrived and Drew "took him out to look the layout over." The logging foreman was Davis S. "Buster" Carleton (39), who worked in that capacity until his retirement late in 1955.

In the next few days, the gin pole loader at the railroad was rerigged (Fig. 19), the CCC was on a fire, two trucks broke down, and two tractors were shifted in opposite directions the 22 miles between the woods and Feather Lake.

On September 20, a key piece of equipment, which had arrived a few days earlier, was put to use. This was a Le Tourneau industrial crane, which replaced the "A" frame loader at the woods landing (Fig. 20). In gearing up for logging, the Experiment Station had consulted with and sought assistance from equipment manufacturers in an effort to solve the need for specialized machinery for the light cuttings planned. Le Tourneau was the one manufacturer which responded positively--by lending this crane. It worked--particularly in that it was rapidly transportable along woods roads. As originally furnished, with rubber

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tires, the machine had a strong tendency to bounce when heavy loads were lifted, and even more so when heavy loads were released suddenly. Within 2 or 3 years, the rubber-tired wheels were replaced with large, hollow steel wheels which could be filled with water. Problem solved. Another problem was that the crane tied up a tractor as a power source and "anchor" for lifting logs, and as motive power to move the crane to different landings. This problem, too, was solved in a later development which will be covered. But, generally, this loader was an important stepping stone in portable loader development.

From the time of this beginning until the Experiment Station ceased its own logging (1960), minimum damage to residual trees of all sizes was a constant concern and practice. At first, tree lengths were yarded whenever possible to bucking landings in openings (Fig. 21). At some time in the early 1940's, this practice was abandoned, and logs were bucked to length where trees fell. This was found to cause least damage when done carefully.

Details of the remainder of the 1937 field season are lacking until Hasel submitted a report on December 23. He showed that 625,560 board feet net had been delivered to Fruit Growers. The volume came from three compartments east of Grass Valley. Covered acreage was 240, resulting in a cut of 2604 board feet per acre.

Other work accomplished during the season was:

a. roads completed except for surfacing main utilization road;

b. a survey of insect-caused mortality, the first since 1933-34, which showed a loss of 203 board feet per acre per year;

c. 38.8 acres were prepared for demonstration, and a guide to timber marking practice;

d. in an age-diameter relationship study, rings on 984 stumps were counted.

Repairs and overhauling of the many pieces of equipment involved in the project are poorly documented over the years, especially the early ones. In the winter of 1937-38, repair work on some of the equipment was done by Carleton and Earl A. Morrow at the Feather River Branch Station near Quincy. Trucks and light vehicles were probably repaired there during winters, perhaps as late as 1942-43. It seems doubtful that the tractors were hauled there. Those were probably repaired at Blacks Mountain Branch Station as needed during the summers, and majorly during spring and fall outside the logging season. A mechanic from the U.S. Forest Service Equipment Shop at Redding was usually on hand during summers at least into the early 1940's. In addition, some CCC personnel assisted with equipment servicing and tire work for the duration of that program. The equipment maintenance program changed during the years, and will be mentioned later on.

1938 became the first year with a full logging season. Two new International logging trucks with Fabco trailers were added to the fleet for a total of seven (Fig. 22). The logging crew and equipment was organized like this:

Felling--Two and three crews consisting of two hand sawyers and one undercutter; supervised by bullbuck.

Limbing--An average of five axemen; supervised by bullbuck.

Bucking--Sawyers in pairs, normally four sets; log marking done by a subprofessional; generally supervised by bullbuck.

Bunching, tree length--AC or RD-7 with Carco arch; driver and two choker setters; trees skidded to main trails or natural openings, then bucked; supervised by log boss.

Yarding, double log lengths--RD-8 and Hyster arch; driver and two choker setters; logs swung to landing after being bucked to 32's (and shorter); supervised by log boss.

Truck loading--RD-7 or AC and Le Tourneau crane; tractor operator and two hookers (note: all log hoisting at Blacks Mountain operations was always done with a crotch line and bell hooks); a top loader acted as loading landing boss, and was a paid employee.

Truck hauling--Five Fords, two Internationals; seven drivers; supervised by log boss. Scaling by paid employee as trucks were loaded.

Railroad landing--Silent hoist and cable system; hoist operator and two hookers, when unloading trucks. Top loader was an experienced Fruit Growers Supply Company employee who supervised crew when loading railroad cars; the whole under general supervision of log boss.

Equipment maintenance--Serviceman (a paid employee), assisted by two CCC enrollees; mechanic furnished by U.S. Forest Service Redding Shop; under general supervision of log boss.

The Division of Forest Products in the Experiment Station first attempted to gather logging costs records in 1938. Thomas J. Orr, Jr., who worked with the data, was unhappy with the results, and made numerous suggestions for improving the data-gathering system.

During the 1938 season, about 1,665,000 board feet, net, of pine logs were sold to Fruit Growers.

The "big thing" begun was the establishment of a block of method-of-cutting plots which will be described here.

Methods-of-Cutting Study

Dunning decided that, on the Experimental Forest, three methods of cutting would be tested against each other and against uncut areas in a formal plot situation. The three cutting treatments became known as HFS (heavy Forest Service), which removed about 80 percent of the total volume in a single cut (with a 60-year cutting cycle, no further cutting would occur during the study); MFS (modified Forest Service), which removed about 40 percent of volume (with a 30-year cutting cycle, no further cutting would occur during the study); and SS (silvicultural-selection), in which a first sanitation-salvage cutting would take place, to be followed by silvicultural treatments as needed by stand conditions; in practice, the sanitation-salvage cutting was followed, after a few years, by cuttings applied to follow the principles of Dunning's "unit area control" concept (UAC)--which will be treated later. The fourth "treatment" was always designated as "C," for control, and was uncut. Austin Hasel designed the study plan in 1938 before plot installation began.

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Beginning in 1938, each year for 10 years a block of these four kinds of plots was established in such an area that all representative stand conditions in the Experimental Forest were covered. In a few of the 10 years, one or two additional plots were also added, principally CC (clearcut) and IS (insect salvage) plots. The 10-year duration of installation was designed to reduce the effects of yearly weather differences on final results. Forty-eight plots were established, which, with their isolation strips, covered about 1200 acres.

These plots were placed close together, with isolation strips (usually 1 1/2 chains wide) all around them. Each was 10 by 20 chains--20 acres--in size. Boundaries were carefully surveyed, brushed, and painted. The surveyors placed orange-painted stakes at 1-chain intervals on lines run through the whole plots, so that 200 one-tenth-acre units were established. Any stakes knocked out by logging were reestablished.

All trees over 11 1/2 inches in diameter had serially-numbered metal tags nailed at breast height, and diameters measured to 1/10 inch. In addition, each tree by number was mapped by eye and/or pacing, with reference to stakes delineating each 1/10-acre unit of the plot. Each tree was the subject of a very detailed crown description, and all 16-foot logs (and half-log length at top) were graded. About 400 to 500 trees were initially found on most plots.

(Here is the place to mention that much of the detailed description of each tree consisted of coded symbology, utilizing letters and shapes. This study was begun before computers were available, so all nondigit

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data eventually had to be converted to be usable in modern data-processing systems. William W. Oliver, a silviculturist in the Redding Silviculture Project of the Experiment Station, devised the first conversion code to be used on this job. Field records alone for the method-of-cutting study filled a whole file drawer, and the monumental conversion job had to be done as funds became available, mostly in the 1970's. As this history is being written (1981-82), analyses of this fantastic body of data are finally becoming available.)

All poles 3.6 to 11.5 inches in diameter were counted, but not tagged, by 1/10-acre units. Also, line samples to the nearest 1/10-chain along main cruise lines recorded areas stocked with smaller trees, and high brush, low brush, unstocked, and other categories of condition.

In order to standardize the marking on plots for each of the three cutting systems, continuity of personnel was sought. Paul Kevin, of the Region 5 Timber Management Office, marked all or most of the two different "Forest Service" plots. I believe Jack Bongberg marked all of the SS plots for their first cutting of high insect-risk trees.

Wherever possible, plots were placed with the long dimension running up- and downhill. During logging, a main skid trail was placed as close as possible to the centerline of the plot. Shorter feeder trails angled into the main. The feeders were kept to a minimum to reduce damage to established young trees.

After logging, each cut plot was reexamined in detail, and all changes were recorded. All plots were reexamined 5, 10, and 20 years after establishment. So the installation began in 1938 and the last examination occurred in 1967.

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During a few years, seed crop developed to the extent that it was sampled by a system of 3-by-3-foot seed traps on the plots. Discovery was made that abundant seed crops may occur as seldom as once in 10 years.

Sometime in the 1950's, finances for the Forest Management Research group in the Experiment Station got so low that Hallin proposed abandoning the remeasurements. However, the Regional Office in San Francisco decided that since it had so much area in California cut by these systems it wanted the methods-of-cutting study continued. Agreement was made between the Region and the Experiment Station that the Region would help finance remaining remeasurements. Only the portion of the study dealing with trees 11.6 inches in diameter and greater was continued until study termination in 1967.

CHAPTER VI

WOODS, CAMP, AND OFFICE: 1939-1947

1939: Logging

When the season was finished, the staff found that the output of CCC enrollees had increased over the previous year. This in spite of the enrollees having been firefighting 25 working days. A few changes had occurred, including a group of young men with better attitudes toward their work. The buckers were taught to work singly. A sufficient number of trucks was on hand: two Diamond T logging trucks and trailers were obtained, bringing the total to nine. The Ford trucks hauled average loads of 3.4 thousand board feet; the Internationals and Diamond T's, 4.4 thousand. Paid overhead consisted of a logging boss, saw filer, bullbuck, loading boss, truck boss, landing boss, log marker, and scaler. Total volume was about 3,000,000 board feet, all pine.

Detailed cost records were kept during this season as well as all others. Because of variables involved, particularly with respect to labor costs, records were believed to give only a rough indication of true values, and the different cutting systems could be compared only relatively. As early as this year, recommendation was made to conduct a cost study based on performance of professional loggers rather than on that of CCC enrollees.

1939: Mill Study

A mill study was made by the Division of Forest Products in 1939-40 at Fruit Growers mill. Logs were from 83 trees selected on the 20-acre 1939 clearcut plot which was part of the methods-of-cutting study. About 120 to 140 thousand board feet of logs were used. Selection of trees was based on a diameter distribution within all four insect-risk classes. This was the first of a proposed series of studies to be done at different locations. The trees turned out to be generally low quality, open grown, and not typical of trees on some of the other 1939 plots.

The ultimate hope in mill studies was that a system of tree grades could be developed. Hereford Garland's report (40) indicated that the study led nowhere in particular. As far as I have found, the series of proposed studies was abandoned.

1940: Logging

During 1940, it was difficult to keep a full crew of CCC enrollees; there was much turnover. Late in the season, the 9th Corps company was disbanded and a 4th Corps company brought in as replacement. In October, four experienced loggers were hired to augment the CCC crew, but an unseasonable storm stopped operation on November 1. As a result, only two of five plots to be logged were completed, and part of a third was done. Net volume approached 2,250,000 board feet, and for the first time this included some white fir. Railroad car loads this season averaged 13,056 board feet!

Crew makeup was about the same as previous--when a full crew was present! Two new pieces of equipment were used all season: a third Diamond T logging truck and trailer, and a Berger two-drum hoist. The Berger hoist replaced the Silent hoist at the railroad landing at Feather Lake. The Silent hoist was placed on a log sled attached to the Le Tourneau crane in the woods: another step in loader development (Fig. 23). This freed a tractor to assist with yarding, and it was badly needed for some of the longest log hauls. Some hauls on the plots were up to 4000 feet; average haul from plots 1, 3, and 4 was 2800 feet, compared with a maximum average haul of 1000 feet in previous seasons. The long hauls were occasioned by lack of a road beneath the top tier of compartments along Patterson Mountain--and the road hasn't yet been built.

The annual report indicated that the cost system to date was not providing answers needed. Drew proposed a study based on relationship of cost to tree size.

1940: Application of Methods

By 1940, sanitation-salvage cuttings had already shown satisfying reduction of insect-caused mortality. The entomologists continued to survey cut and uncut areas at Blacks Mountain. The Forest Service began application on the National Forests; one large timber sale on the Plumas in 1940 was marked for sanitation-salvage cutting. The Collins Pine Company at Chester began using high-risk marking techniques on its property. Here was one of those rare occasions when results became so obvious so early that application began before any full-blown research papers were published.

1941: Logging

Only a one-page annual report for this 1941 season was submitted to Dunning by Hasel in January 1942. World War II had begun on December 7, and I expect that was already influencing everyone's work. Volume delivered to Fruit Growers was 3,850,000 board feet, and this included some volume from 1940 plots not finished in 1940.

Output records for all crews engaged in felling, limbing, bucking, and yarding were kept by crew and method of cutting. Part of my duties in the early summer consisted of keeping records of tree and log numbers at a bucking landing and a truck landing.

The CCC enrollees worked only a 6-hour day, and left the logging scene in midafternoon. It was the custom for all the paid hands then to "high-ball" until their quitting time the loading of as many trucks as possible against the morrow's hauls to the distant railroad landing.

As it turned out, 1941 was the last season in which CCC crews were used.

Carleton had lived at the CCC camp during previous seasons, but had his family with him this summer in a tent set up at the woods service station at the junction of roads 1 and 2 (Fig. 24).

1942: Logging

There was but a brief logging season in 1942. The CCC program was abolished because of the war, so only the methods-of-cutting plots (6) were processed with a full complement of professional loggers in the fall.

Red River Lumber Company began cutting its land west of the Experimental Forest in 1942, and had built the railroad spur called "Archie" for hauling the timber. That company bought the logs from the Experimental Forest, and loaded them out with their own McGiffert steam-powered loader along the spur. (One of those loaders was a sight to remember! It was so fast it used two sets of hookers--one working, one resting. They ran!!) This procedure saved the cost of the truck haul to Feather Lake.

1,500,000 board feet were delivered during the short season.

1943: Logging

The 1943 season was full of changes. The contract with Red River called for the first time for cooperative deposits to be made for slash disposal on 781,000 board feet, and for snag and sanitation tree disposal on 79 acres. This is a good place to mention that, except for safety reasons, snags ordinarily were not cut on compartments which had had only sanitation-salvage, or sanitation-salvage plus release cuttings. The reasons for this were: (1) that snags were numerous and averaged about 30 or 32 inches in diameter, and (2) if these had been cut, they would have severely interfered with felling and yarding during other silvicultural treatments which were to follow in just a few years. Broadly speaking, snags were not cut until areas had been relogged under the unit area control concept, beginning in 1950.

Reg Drew resigned, apparently before the logging season began. Dunning assigned Hasel to take on primary responsibility for logging. There was pressure to increase the logging output as part of the war effort.

Red River had pulled out of Archie Spur, but left at least the lower part of it intact. The Station built its own cable-controlled loading device at a landing on the spur, using the Silent hoist. Red River furnished railroad cars to be loaded, and hauled them as needed--usually daily.

During the winter of 1942-43, the "ultimate" in portable log loaders was built at the Feather River Branch Station (Fig. 25), and hauled to Blacks Mountain on logging trucks. "Buster" Carleton, the logging superintendent, was the principal architect, but Earl Morrow, the Feather River Station superintendent, and Marvin P. "Peg" Hail, mechanic from the Forest Service's Redding Shop, also contributed a great deal of practical knowledge and skills (Fig. 26). This loader was, above all, rugged, portable, and easy to operate. The sled was 32 feet long. It utilized the heavy steel wheels from the Le Tourneau crane, elevated the operator for a good view of the proceedings, and had sufficient weight to counterbalance most logs at Blacks Mountain. The "A" frame boom was 36 feet long, and movable. It was lowered to 20 or 30 degrees above horizontal when traveling. The boom remained unguyed, due to stability of the whole unit. The loader would handle logs to 38 feet in length, and up to 3 thousand board feet in volume. It had a direct lift of 12 tons. A few exceptionally heavy logs were parbuckled, or lifted one end

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at a time, onto a truck. It was built at low cost, and was cheap to maintain. During one lengthy test, average truck loading time was 13 1/2 minutes, including time to apply binders and wrappers. When being moved with a tractor and arch, its average rate of travel was 300 feet per minute. In 32 observed moves, it averaged 1890 feet per move, and averaged 9 1/2 minutes from the time it quit loading at one landing until it was ready to load at the next. The gradual development of this successful loader introduced the era of rapidly movable log loaders, introduced successful types of light cuttings, and undoubtedly spelled the beginning of the end for most railroad logging.

In 1943, three people joined the project to become permanent fixtures. Joe Perini for many years was winchman on the log loader, heavy equipment operator and mechanic, and finally logging foreman (Fig. 27). He married one of "Buster" Carleton's daughters--Doris. Kenneth B. and Lula R. Shuman--"Buck" and "Lu"--hooked on, "Buck" until the project was terminated. "Buck" worked as a hand bucker, timber faller, hooker, and in his last year as the camp cook. "Lu" was camp cook for about 10 years, and was justly famous for the meals she turned out--as well as "plain old boiled rice" for dessert when the hired hands hadn't remembered for a spell to compliment her on her delicious pies. "Lu" found it necessary to stop work in the cookhouse in the early 1950's. Doris Perini worked with "Lu" in the cookhouse during some of the war years.

Two foresters--Marius M. "Dee" De Meyer and Robert F. Nelson (Fig. 28)--were hired to handle details of forestry field and office work. They carried for several years the principal load of installation and observations of the methods-of-cutting plots.

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The first power saw for the project was put to use in 1943, although most of the felling was done with hand saws. The early saws used for falling and bucking were heavy 2-man machines (Fig. 29). "Mall" saws were used for several years. They weighed about 100 pounds. Until about 1950, such saws were used for felling only, hand bucking still being done on our project.

Red River bought the pine logs again--about 7,800,000 board feet worth. Production was up! The crew consisted entirely of professional loggers. And this was what had been desired in order to make a more valid cost study. The first logs were delivered June 10 and the last on November 11. Log delivery was delayed a month in the spring because of delays in getting the contract approved. A full crew consisted of 32 loggers (usually 3 or 4 short) plus camp cook, flunky, and bullcook. Yarding was done by log lengths from the stump. Slopes were gentle, only 3 to 9 1/2 percent. Because of the short haul to Archie Spur, only two to four trucks were used daily, depending on length of haul. Probably the Internationals and Diamond T's were used.

1943: Cost Study: A Landmark!

Hasel had a cost study ready to go, applied it this year, and in 1946 published the results (41). A great deal of effort went into obtaining daily log-making output by crews, and yarding and loading time per load. All trees had been numbered with paint, and after bucking, each log was identified by tree number and log position in the tree. Gross volume of each tree was available from local volume tables, and all logs were scaled.

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The study indicated that light cuts were economically feasible in areas accessible to roads. The most important finding was that differences in cost encountered were due almost entirely to tree-size makeup of stands marked rather than to intensity of cutting.

1943: Camp

Early in the season, there was some turmoil. The delay in getting the timber sale contract signed meant that the logging crew had to be put to other work--unspecified. Earl Morrow handled the town runs and other administrative chores early in the season, then returned to the Feather River Station. Financing for the Institute of Forest Genetics at Placerville was poor in 1943, so William "Bill" Cumming, the Station superintendent there, and Mrs. Mary Jane Elliott, the secretary, went to Blacks Mountain for the rest of the season to handle the administrative work, runs to town for supplies (at least twice a week), and such chores.

Records indicate that 1943 was probably the year when Blacks Mountain Station was tied by its own powerline into the large transformer bank tapping current for Camp Bunyan from the high voltage pole line between Hat Creek and Westwood.

1944: Logging

Logs were sold again to Red River Lumber Company and loaded on cars at Archie Spur. The same type crew and equipment were used as during the previous year. The season was longer, and 9,260,000 board feet were delivered.

1944: Cost Study: A Repeat

Records for the 1943 logging cost study were analyzed during the intervening winter. The same study procedures were used in the woods during 1944 as had been used in 1943. Output for 1944 was used to test accuracy of the regression estimates of log-making time based on 1943 data. And to make a long story short, the estimates were accurate.

1944: Camp

Clark H. Gleason, a forester in the Station's Forest Influences Project, was assigned as business manager of the camp for the season (Fig. 28). He told tall tales of having to make runs way down into the Sacramento Valley hunting for chickens to feed the loggers when there weren't enough war ration coupons to get red meat. (Judging from my own experience during the immediate postwar period, I would guess he also had problems finding freshly dated "snoose" for the loggers.)

Sometime during the fall, an abandoned CCC barracks at Halls Flat was bucked in half and skidded to the Blacks Mountain camp. There, the halves were set up on a couple of large logs, rejoined, the interior was remodeled slightly, a septic system built, and electricity and water hooked up--and there was a "new" bunkhouse with individual bedrooms. The

bunkhouse came into use in 1945 and acquired the name of "2 Street" after a well-known "hangout" area for loggers wintering in Sacramento.

1945: Logging

Fruit Growers Supply Company was in the process of buying Red River Lumber Company's Westwood operation this year. Since the railroad logging operation was part of the deal, the Experiment Station sold logs to Fruit Growers and continued to load them on railroad cars at Archie Spur. About 6,890,000 board feet were delivered, including 447,000 board feet of white fir. Beginning with this year, if there was any white fir or incense-cedar to be cut, those species became part of the sale.

1945: Camp

Clark Gleason was again business manager of the operation. He was the last to have to deal with procurement difficulties caused by war-time rationing.

In the fall of the year, Dunning relieved Hasel for other duties, and assigned Victor A. "Vic" Clements responsibility for all activities at Blacks Mountain.

1946: Logging

Again, logs were sold to Fruit Growers--loaded on railcars for the last time (Fig. 30)! Volume reached 4,762,000 board feet, including 111,000 feet of white fir.

In April, a Caterpillar D8 tractor in a huge box was unloaded from a flatcar at Halls Flat. (The box was so subtantial that for many years

range researchers used it as an equipment shed for a wheeled tractor and miscellaneous implements.)

1946: A Year of Personnel Changes

Overall responsibility for activities at Blacks Mountain changed again in this year. William E. "Bill" Hallin (Fig. 31) was assigned to relieve Vic Clements in the fall.

I was rehired to serve as business manager of the project. My wife, Lydia, worked as part-time clerk during the summer and following winter. The Division of Forest Management hired six other foresters that summer. Three of them began putting on their boots at Blacks Mountain: David Tackle, R. D. "Don" Cosens, and David C. Maul (Fig. 32). After the summer season was over, we felt pangs of parting with the two foresters who had started with the project in 1943 "for the duration," and rendered sturdy service in the meantime: Marius M. "Dee" DeMeyer, and Robert "Bob" Nelson. Both had been kept so busy setting up methods-of-cutting plots and with other work that they had no opportunity to initiate research of their own.

1947: Logging

Several new things occurred in 1947: logs were sold to a relatively small mill--Indian Head Lumber Company, just over the hill to the north at Little Valley; the contract specified logs to be sold on buyer's trucks at our woods landings; "K-V" cooperative funds for timber stand improvement work were collected for the first time.

All three species were sold to Indian Head: pine, 4,500,000 board feet; fir, 98,000 board feet; and cedar, 78,000 board feet; total, 4,676,000 board feet.

Snag felling became a minor project, where it had been incidental before. Old snags created before sanitation-salvage cuttings had begun falling across roads in winter, so some of the most hazardous roadside areas were cleared. On a few compartments where reentry was not scheduled for a long time, all snags were cut.

1947: Research

The last block of four methods-of-cutting plots was installed in 1947.

A crown removal study was installed in compartment G4-3, according to a plan by Tackle. Twenty-five, 50, and 75 percent of live crowns were removed from dominant young trees in order to study their reaction. (After a 10-year remeasurement, I concluded that half the live crown or six-tenths of total height could be pruned without adversely affecting growth rate (42)).

Three blocks of eight 1/10-acre thinning and pruning plots were established by Tackle this year. The study design was quite complicated. Sometime after the final measurement, we lent the data to a graduate school forester who thought he might use it in partial fulfillment of an advanced degree. Under the guidance of one of his professors, the student learned that the data were not capable of being analyzed in a meaningful way.

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1947: Personnel

Douglass F. Roy, one of the six new foresters hired the previous year, worked part of the season at Blacks Mountain (Fig. 32). His assignment saw him working parts of most seasons until the mid-1950's at Blacks Mountain.

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CHAPTER VII

1948-49: A QUIET INTERLUDE AT BLACKS MOUNTAIN

Logging Project Departs

Early in the spring of 1948, all equipment and personnel connected with the logging project moved to the Stanislaus Branch Station near Strawberry, east of Sonora. The assignment there was to begin on the Stanislaus-Tuolumne Experimental Forest the first pilot-plant cuttings using Duncan Dunning's unit area control concept of stand treatments. Oscar E. Stark, a graduate of the New York State Ranger School, joined the project as a scaler that year; through the years, he performed a myriad of functions as a member of the staff, and became logging superintendent upon Carleton's retirement (Fig. 33).

1948: Research

Dave Tackle, with a small crew of students, installed several new studies in 1948. Ray Horsley, caretaker at the Stanislaus Branch Station, was assigned to Blacks Mountain Branch for most of 1948 and 1949.

An abundant pine seed crop was pending in the fall. Before seedfall, Tackle selected nine former log landing areas for a study of natural regeneration. Each area had a bountiful seed source adjacent (plenty of cone-bearing trees), and all were scarified with a Townsend offset disc mounted on a small wheeled tractor. Condition of the surface before scarifying was recorded. Just before seedfall, rodents were poisoned with sodium fluoroacetate (1080)-treated grain, placed on each area and within a quarter-mile buffer strip around each area. Results are treated later.

A "thicket thinning" experiment designed by Hallin was begun and later expanded. In dense thickets of saplings, individual trees were released by eliminating other trees within certain radii, depending on diameter of released tree. Some poles were later thinned this way, too. After remeasurement, we learned that researchers in another Experiment Station had found this thinning method to show little release to the selected trees, because many of the trees surrounding the cleared area were still utilizing the cleared space with their root systems. The studies were so similar, and visible results so alike, that no effort went into analysis.

Work was accomplished on a pruning time and cost study, designed by Tackle, involving 309 pole-size pines. Trees were pruned with pole-type saws to 10, 14 1/2, and 18 1/2 feet. In general, not more than one-third of live crown was removed. The amount of time required to prune each 4-foot section of the stem was recorded. And for each 4-foot section, the number and diameter of branches was recorded. Tackle summarized the data, but was unable to analyze it due to other activities.

Additionally, about 2000 crop trees were pruned on four compartments.

1949: Research

No new studies were begun in 1949 at Blacks Mountain.

Seed germination was high on sites scarified and poisoned in 1948. Tackle counted seedlings on plots in 1949. He was able to use some of the data from this experiment in partial fulfillment of his Master's degree at U.C. Berkeley. Roy continued examination of the plots through

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the fourth year and found that the relative amount of competing vegetation before scarification had a marked effect on results (43):

Competing vegetation:	Seeds germinated per acre	Seedlings established per acre at 4 years	
	(number)	(number)	(percent)
None	33,329	11,017	33
Light	11,420	1,277	11
Medium	3,816	139	4
Heavy	2,914	127	4

The areas used for the study above have been observed closely over the years, and one with abundunt saplings was thinned so that trees could grow freely rather than stagnate. The areas frequently were shown to visitors (Fig. 34).

Logging Project Returns

The pilot plant test of unit area control at the Stanislaus having been completed, personnel and equipment of the logging project returned to Blacks Mountain in the fall. There was one exception: the Blacks Mountain portable log loader, having served 7 years--the last two wrestling with very large logs--was stripped of its hoist and rigging and left behind. Carleton thought it was getting a bit loose-jointed from its recent wracking. Before the 1950 season began, the loader was rebuilt with Douglas-fir logs obtained from the Duffy Creek area east of Westwood. It was used, then, until 1955.

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CHAPTER VIII

DETAILED TIMBER MANAGEMENT AT BLACKS MOUNTAIN EXPERIMENTAL FOREST--1950 THROUGH 1961

Unit Area Control is Developed

From 1950 through 1961, activities at Blacks Mountain centered around detailed management activities in the application of the unit area control concept which Duncan Dunning had developed. In the hope that a discussion of the concept will help unify a reader's understanding of the historical account to follow, I will get a little ahead of the story here and in other places. I will borrow freely from Hallin's 1959 bulletin (22), which is the source for detailed discussion of the management we practiced.

In 1948, Dunning committed much of the resources of the Forest Management Division to a trial of his unit area control concept. The first 2 years were spent learning how to fit some of the parts together in the high-site mixed conifer stand at Stanislaus-Tuolumne Experiment Forest. Application of the concept in the ponderosa-Jeffrey pine type at Blacks Mountain began in 1950.

As discussed previously, the high insect-risk marking system applied and studied in the early years at Blacks Mountain was neither a one-shot application, nor a system to be repeated endlessly. Its intended use was to reduce to an acceptable low level the high mortality rate of a forest consisting mostly of overmature trees. When this had been accomplished,

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other silvicultural management measures were to be applied. These were to bring the forest gradually into a proper distribution of age classes so that sawlogs (and peelers) could be produced and harvested at a relatively even rate each year. Stand treatments applied under the unit area control concept were believed to be an appropriate way to accomplish this objective.

The words "unit area control" don't convey a meaning to most people until they are defined. We'll approach it this way, and I quote from Hallin's bulletin:

"The forest is even-aged by small groups. The overstory in ponderosa and Jeffrey pine stands is predominantly overmature, but it is broken by small groups of immature and mature-age classes and by openings. The total area of these intermediate age classes is small, and this complicates stand regulation. Seedlings, saplings, and poles are represented in much of the forest as advance growth, both as an understory and in openings caused by losses in the old stand. Scattered older residuals may be present in young stands. The age classes are not evenly distributed. Instead they form a mosaic of small homogeneous units . . . .--a variable pattern of many even-aged groups.

"Some groups are differentiated not so much by age as by other stand condition--density, thrift, or advance reproduction. They vary in size from a fraction of an acre up to 5 or 10 acres. Despite its variability, then, the forest is composed of small units, even-aged and with distinct differences in stand condition." . . .

"As work progressed, the research staff saw that each small, uniform

group of trees had different silvicultural requirements. They were convinced that the cutting methods being used did not recognize this pattern of growth and therefore would answer few of the questions plaguing forest managers.

"Duncan Dunning conceived the idea of making homogeneous units or groups of trees rather than individual trees the subjects for management (44). Although the idea of "detailed control of stocking on small areas" was not new, the idea of applying such a system to stands rendered highly variable in condition by natural factors was. Dunning chose the term "unit area control" because it was descriptive of the system.

"A "unit area" is a single natural stand unit, one of the homogeneous parts making up the mosaic pattern of the forest. Although the units vary in size from a fraction of an acre to many acres, each has a particular combination of such characteristics as age, species, composition, and stocking. It follows that different combinations require different silvicultural treatment.

"The word "control" describes the aims of management. Of first importance is control of the ground by desirable trees rather than by brush or inferior trees. Control also means regulating the distribution of age classes and maintaining a growth rate of desirable species commensurate with site and age class on each unit area. The forester exercises control by preparing and executing a plan of regulation and by applying silvicultural treatments at the proper time."

A forester must keep all the forest area in his charge under frequent general observation. This so that he can detect early symptoms of things

going wrong: wind damage, a buildup of insect-caused mortality, dwarfmistletoe infections, infections such as rusts and root rots, and damage caused by wildlife or livestock. But at each cutting cycle he must examine a designated area very carefully. This time-scheduled act (at 20-year intervals at Blacks Mountain) requires that decision should be made regarding each stand unit. In practice, we found that we must always give primary consideration to the dominant (tallest) trees within each of the units--whether to cut, leave, thin, weed, or prune. And any harvest cutting in a unit might lead to a following treatment: thinning released understory trees or pruning dominants among them; preparing an area for planting within a few months: these are but two examples.

A key to the successful application of the unit area control concept is to do the silvicultural treatments as they are needed--harvesting, regenerating, thinning, and the like. Because there were no real great changes in logging methods during the period 1950 through 1960, I believe it will be easier for a reader to follow classes of activities completely through that period.

Logging--General

Logging crews varied in size from 10 to 16 men, depending on needs of the season. Character of available men changed during this period: most of the old-time "lumber-Johns," "boomers"--mostly single men whose lives were closely tied to logging camps--were passing out of the picture. Some skilled men were still available, but we had a problem getting and keeping them. Many of the newer men had families, or otherwise preferred

living in town. Also, we could not put in overtime hours. Wage rates were redetermined every year, and on an hourly basis were comparable with those in private industry. By the mid-1950's we had a few conscientious men who returned each summer. Particularly remembered are Charles A. "Chuck" Widaman and Albert J. "Al" Fontaine. Chuck became head choker setter (sometimes called "head rigger"), while Al worked the last few years as hoist operator. Both also assisted with planting, pruning, camp maintenance, and the like for an extended season.

During our tree marking operation we mapped numbered trees. Fallers and yarding crew were given map copies and liked using them because it made their work easier. The maps also showed areas to be regenerated, and site preparation and planting crews also found this useful. We trained crews to keep damage to residual trees of any size to as low a level as possible.

Following completion of logging on compartments, we removed snags by pulling over with a "long-tail" cat or (mostly) by cutting. As mentioned previously, we didn't want the numerous down snags to interfere with logging.

Beginning in the early 1950's, we used the unit area control concept as a basis for relogging methods-of-cutting plots which had first been subjected to a sanitation-salvage cut. In 2 or 3 years, we cut two of such plots in order to catch up to an approximate 10-year recutting on the balance of them.

Following is a tabulation of log purchasers and net volume cut for the years 1950 through 1960:

Year	Log purchaser	Net volume, feet board measure			
		Pine	Fir	Cedar	Total
1950	Indian Head Lbr. Co., Little Valley	5,279,730	101,830	60,770	5,442,330
1951	"	4,637,100	397,380	140,890	5,175,370
1952	"	2,594,640	153,740	129,900	2,878,280
1953	"	2,109,600	238,300	179,380	2,527,280
1954	Fruit Growers Supply Co., Westwood	2,552,440	392,190	55,470	3,000,100
1955	Scott Lumber Co., Burney	2,240,270	42,510	9,250	2,292,030
1956	Little Valley Lbr. Co., Little Valley	2,439,020	42,370	162,010	2,643,040
1957	"	1,036,230	177,140	45,390	1,258,760
1958	"	1,062,220	63,220	31,700	1,157,140
1959	Susanville Lumber, Inc., Susanville	936,120	89,060	75,920	1,101,100
1960	Little Valley Lbr. Co., Little Valley	1,937,340	21,050	199,430	2,157,820

Logging 1950

In the spring, we received an International TD-18 tractor with single drum hoist, bulldozer blade, and protective canopy for the catskinner

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(Fig. 35). It was "farmer's cat," and numerous things broke on it during the first couple of years. After we had enough heavy duty parts in it, it didn't hold us back so badly. (So much for General Services Administration's purchasing policies! We tried to specify a cat with yellow paint on it, but got beat down. We knew "the other brand" would hold up in the woods and be cheaper in the long run.) We had poor production from our cutting crews, and ended the season using contract cutters.

Timber marking followed unit area control concept, with the exception that we deferred regeneration cuttings.

Numerous snags (746) on the cut areas were pulled over with a D8 tractor with a "long tail" and a very lively crew! Only experienced men were used on that job. Nobody hurt.

Logging 1951

Beginning this year, and subsequently, all tree felling was by contract crews. This worked out much better than crews paid an hourly rate.

In this year we made the first regeneration cuttings (as well as other cuttings), and disposed of slash and competing vegetation with a bulldozer in preparation for planting in the spring of 1952. We also began the recutting of the methods-of-cutting plots which had previously had a sanitation-salvage cutting.

Logging 1952

A good seed crop was pending in the fall, so several regeneration areas were cut in a way to leave abundant seed trees around them. Nearly 16 acres of regeneration cuttings were made, in addition to others.

We had the opportunity to rent a D-7 Caterpillar with Fleco brush rake and operator for most of the regeneration area clearing. We found it to be superior to a dozer blade for the reason that it moved less dirt into slash piles.

Logging 1953

During the previous year or two, we began to abandon use of logging arches except where stands were quite open or the haul was long (Fig. 36). By 1953, arches were mostly in disuse except for moving the log loader.

Logging 1954

In this year, ground skidding was the rule, and damage along skid trails was low.

In 1953 we had tried running continuous paper strips (from rolls) along preselected skid trails before fallers went to work. The first type of paper didn't work out well. In this year we used rolls of wet strength crepe paper, which worked out fairly well for falling and yarding crews alike. With trees cut to lay at about a 30-degree angle with skid trails, damage to the reserve stand was cut even more. In ensuing years, we used the technique often where released understory was thick.

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Road 14A was built this year for access to the timber in compartment C4-32, which was not in the original management unit.

Logging 1955

California State logging safety rules implemented a few years previous to this specified that no new cross-haul truck-loading outfits (like ours!) could be built and used. Also, that when older units required major repairs, they must be phased out. This for the reason that one or more hookers was often out of sight of the hoist operator, creating a potentially dangerous situation.

So we had been looking for an alternative. A possibility turned up on a government surplus list during the 1954-55 winter: three 20-ton Link Belt Speeders (cranes) in usable condition, at the Stockton Naval Supply Depot. I wired Carleton, who was on leave, to meet me there quick. When we met there, we were shown the equipment by whom else but "Peg" Hail and another former Forest Service mechanic! (You may remember that Hail was one of the builders of the portable log loader.) The rigs looked good, and one especially was recommended--so I recorded appropriate numbers. Not long afterward we received word that we were to get what we wanted. Somehow, word got to Hail. He arranged to swap tires among the three units so that we got the best, and steam-cleaned the whole rig and tuned both engines before the outfit was shipped by rail to us at Westwood. With a little reinforcement of the lower part of the boom, and one new gas tank, we were in business with an outfit that could load trucks backed up to it--giving the hoist operator better visibility (Fig. 37). Peg Hail came through again!

In this year, the TD-18 ground skidded logs, the D-8 towed an arch most of the time.

Within a few days after the sale contract and cooperative agreement were signed, the purchaser announced a shut-down for 17 days. We logged for about 3 weeks, then had to let some of the crew go. We had to deck more than 750,000 board feet in order to keep part of the operation going--and on and on the repercussions went. Beginning with the next year our contract specified, in effect, that only God could shut us down!

In the fall, part of the crew began felling timber and clearing right-of-way for the first road into Swain Mountain Experimental Forest--about 25 miles from Blacks Mountain.

Buster Carleton, the logging superintendent, had injured his back in a log loading accident in 1954. This left him with a leg which "dragged" a little, and made it hard for him to get around in the woods during the 1955 season. He wound up with a heart attack in the fall. This led to his retirement. All who were left in camp pitched in to help move Buster and his wife, Edith, out of the "A" house, and started for their new home in Sonora on November 13 in a snowstorm.

Oscar Stark was promoted to logging superintendent, and Joe Perini to logging foreman, after Carleton's retirement.

Logging 1956

Little Valley Lumber Company, at Little Valley, bought the logs in 1956. They were successor to Indian Head Lumber Company, whose mill burned. The other main event to affect us was the creation of the

Susanville Research Center. Our timber-oriented research became complemented by a group consisting of range and wildlife researchers.

Logging 1957

We were scheduled to cut logs both at Blacks and Swain in this year. However, the lumber market was depressed and no one wanted the red and white fir logs from Swain. The budget was busted, and we had to farm out our services to whomever "had money." I was a pogey assisting with bitterbrush research for a while.

In the spring of the year, we received a versatile rubber-tired logging machine called Wagner LG-14 Logger (Fig. 38). It had about the same pulling ability as a new D-7 size tractor, and had much faster "out" times than a caterpillar-type tractor. It was a very nice machine to maneuver.

Logging 1958

The crew loaded out the trucks in only 12 1/2 days, once they got a run at it. Daily output was about 93 thousand board feet. Some wet weather in June caused 7 days of lost time for the trucks.

A 3-year sale had been made at Swain Mountain in the spring. The scene moved there after work was completed at Blacks Mountain at the end of June.

Logging 1959

In addition to the Wagner Logger and the TD-18 tractor, this year we had help from a D-6 Caterpillar obtained from a surplus list. Although

it didn't have the power of a larger rig, it seemed surprisingly fast when empty. It had been obtained principally to operate a scraper (also from a surplus list!) during road construction work at Swain Mountain.

In this year, additional material was sold from Blacks Mountain: 21,000 board feet of dead and down cedar to Melvin Arnold of Susanville, and 63,000 board feet of fading and dead pine to Little Valley Lumber Company. Both did their own work.

Logging 1960

An unusual creation this season became known as a "prototype fuel break." As Maul and I marked a 5-chain-wide strip of timber bordering road 4 for about a half mile in compartment P23-26, we found that required treatment was all "release" or "regeneration" cutting. This meant that all overmature trees would be cut. Fire researchers in the Experiment Station had been curious about costs of creating a fuel break about 5 chains wide in this timber type, and we had been asked to look for such an opportunity. So we prepared one, recording costs (45). In addition to removing all large trees, we severely thinned residual saplings and poles, as well as a little brush--using both machine and hand work. Slash piles were burned after snowfall (Fig. 39). Tree growth has been rapid on this Site III area--probably reflecting greater availability of soil moisture per tree. Some natural reproduction became established near the western edge. The whole became an important demonstration area, not only as a fuel-break possibility, but as an illustration of the accelerated growth rate of trees on medium sites if they had plenty of growing space.

During the slash cleanup, Joe Perini had a severe back injury while operating the TD-18 bulldozer. Regrettably, the injury caused disability retirement and still handicaps Joe.

Logging Project Ends

Another disability retirement in 1960 was the whole logging project--after logging was completed at Blacks Mountain. The principal causes were: severe cost over-runs (above engineering estimates) occurring on road construction at Swain Mountain; and a decision in the Berkeley office to cream our cooperative logging funds 23 percent for Berkeley overhead, when we had allowed only the usual 10 percent in our cost estimate for the 3-year contract which began in 1958: a wipe-out! In addition, the logging project was taking an inordinate amount of time from research. So, rather than fight a continual fiscal battle, we thought we could sometime in the future work with contract logging for our needs.

Logging equipment, tools, and supplies were all transferred or sold.

The Experiment Station had little use for the Blacks Mountain Branch Station after this. But the Lassen National Forest had recently come up with a new fire plan which showed a need for a fair-sized crew at about that location. In 1962, most buildings were transferred to the Lassen, while we retained use of the "A" house, "D" building, a room at the office, and the "rat room" in the shop. When we finished fall remeasurement of the last block of methods-of-cutting plots in 1967, any real need for the buildings ended. Not long afterwards, remaining facilities were transferred to the Lassen. The Lassen used the camp for

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a few more years, then sold some buildings and otherwise wiped out most traces of it.

Regeneration

At the time we began regeneration cuttings at Blacks Mountain (1951), there was concern for how well we could restock newly prepared areas. Keeping control of the ground was essential. There was no consistent record of regeneration successes in the eastside--other than the natural regeneration that was so abundant over so much of the area. We tried to save that; it was a free gift.

So, in the first few years there was a scramble to try many things. In 1951, Roy began an investigation of planted seedling survival which tried several classes of planting stock of ponderosa and Jeffrey pines. The relationship of ground cover conditions to survival of the different seedling classes was part of the study. 1-1 stock was shown to be superior to 1-0 stock for both ponderosa and Jeffrey pine. However, ground cover conditions were more important than class of stock. Two years after planting, survival was best on bare ground and poorest where vegetation was heavy; logging slash and stony ground also reduced survival (46). Through the years, there has been improvement in stock shipped from nurseries in California, so it is uncertain how current class of stock would respond in relation to stock of 20 or 30 years ago. Our general experience within the next few years clearly showed that there must be no low vegetation close to planted seedlings.

Another trial, begun in fall of 1951, tested the usefulness of small, cylindrical, screen seed protectors--about an inch in diameter and 3 or 4

inches long. These became known as "K-screens," named after their originator, Joseph Keyes of the U.S. Fish and Wildlife Service. Each screen was placed in a hole in the soil punched with a stud or dibble (leaving about an inch of the screen above ground), loose soil was placed in the screen to nearly ground surface level, then two or three seeds were placed on that soil, and the seed covered with about 1/4 inch of soil. The top end of the screen was then pinched so that an opening only about 1/4-inch wide remained. Three thousand two hundred and fifty one screens were placed on 5.35 acres. Results in the next year were poor: a high proportion of the screens were frost-heaved out of the ground, and rodents apparently reached into many that were not heaved--we had just spent a lot of effort feeding mice.

We also placed a lot of cone- and dome-shaped screens over seedspots. These fared somewhat better, but were certainly not a howling success.

In 1952, we made even greater efforts toward our regeneration interests. In the spring, 14 acres were planted with 1-1 ponderosa pine seedlings from the Feather River Branch nursery. We planted seedlings at 6- or 7-foot spacing to get about 1000 seedlings per acre. Within the next few years, our plantings had about 70 percent survival at the end of the first year, and they hung on well after that. When we could see what good survival we were getting, we spaced seedlings farther apart. One former landing area, planted in 1952, became a valuable demonstration area. Soil there was severely compacted and held but little moisture. All trees there were stunted, and over a 15-year-period probably suffered about 90 percent mortality. About 1973 or 1974, we had a crew from

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Lassen National Forest thin all plantations established between 1951 and 1961.

During 1952, a medium seed crop could be seen coming on. Before cones matured, we built a large cone-drying shed; as soon as it was completed, we began filling it. We extracted 65 1/2 pounds of ponderosa pine and 87 1/4 pounds of Jeffrey pine seed from the cones, and shipped the seeds to a cold storage facility in Berkeley. The cone shed was used in other years to dry pine and true fir cones. But we used only a small part of the pine seed during future tests at Blacks Mountain.

Some regeneration area cuttings in 1952 were designed to get heavy seedfall from adjacent trees. Before seedfall, grain poisoned with sodium fluoroacetate (1080) was placed for rodent bait on 10.7 acres and wide buffer strips around the openings. Light rain occurred, spoiling the poison, and some rebaiting was done. More rain. In the next spring, sampling uncovered an abundant rodent population which had been well-fed by the seed. Regeneration results were mighty poor. And very different from the natural regeneration success obtained from the 1948 seed crop, related in Chapter VII.

From then on, we were more firmly committed to planting in the eastside. Good seed crops were known to come at infrequent intervals (perhaps once in 10 years), and even then results were uncertain. Planting, however, could be done every year--control!

After 1953, the only seeding tried was a test by Sturgis McKeever (47) of the effectiveness of dieldrin as a rodent repellent on areas having pine seedspots. In 1959, he concluded (from areas seed spotted in 1958) that granular dieldrin (5 percent, at 5 pounds per acre) was

unsuccessful in preventing rodent depredation; but there was some indication it was effective in controlling cutworm damage to seedlings.

Through the years, plantations were examined occasionally. Some found to have poor stocking were replanted, including, too, areas where natural regeneration or seedspotting had failed. During the years 1951 through 1961, 106.7 acres were regenerated.

We felt that our plantation successes were due to the care exercised at nurseries, and care in transporting, storing, and planting--as soon as we could get to the plantation sites in the spring. With a couple of exceptions when we mooched added help from the friendly District Ranger, we did all planting with our own crews. As a result, considerable pride was noticed on the part of most all who detoured from time to time to see how "their" trees were doing (Fig. 40).

Pruning

Pruning and thinning are the two principal stand-tending measures available to a forester to improve the quality of his output and to keep trees growing at an acceptable rate. At the size to which trees will be grown at final harvest in the eastside (average, about 24 inches d.b.h.) no natural pruning can be anticipated. Not all potential crop trees should be pruned--only those which will be carried to final harvest.

At Blacks Mountain, we pruned trees only after overstory had been removed. No trees were pruned within 30 feet of large trees remaining at edges of released areas because of the severe competition for soil moisture. Criteria for selecting prunable trees were severe (22, p. 43). These defects disqualified trees for pruning: crook; rot; large

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scars; bayonet tops; mistletoe in trunk, on branches above pruning, or within 1 foot of the trunk in branches that would be removed in pruning. Trees had diameters of four to twelve inches, with limb diameters usually not greater than 1 1/2 inches. Heights pruned were 10, 14 1/2, and 18 1/2 feet, removing no more than half the live crown. These heights are based on a one-foot stump, trim allowances, and four-foot segments (possible peeler bolts) to make a 16-foot sawlog. The earlier that pruning can be started, the better. Trees not pruned to full height at first can be completed at later entries into the stand.

Pruning was done by hand, with curved pruning saws on poles of different lengths. Before we quit pruning we investigated some good-looking mechanical pruners which were being developed in the late 1950's.

Pruning on the Experimental Forest was done by staff and student help from 1947 to 1952. In 1952 we financed a cooperative arrangement with Lassen N.F., in which they furnished convict crews from the Harvey Valley or Halls Flat camps, and Forest Service crew foremen. Ronald Bakerville started the first crew for us. Other foremen worked with inmate crews through 1956. In 1957 we had financial troubles and began using willing men from the logging crew, because we could extend the length of their work season by paying them out of timber stand improvement (K.-V.) funds. We used this arrangement through 1960, when pruning was last done.

During those years, we kept record of 26,043 trees pruned to the three mentioned heights, on 4490 gross acres. Prunable trees per acre varied considerably on areas where overstory was removed. For sake of

economy, crews were kept out of parts of some compartments where reconnaissance indicated that prunable trees were scattered widely.

Thinning

Much of the area in the eastside pine type is blessed with a free gift of young growth. At Blacks Mountain we saved as much of it as possible. The general attitude was that we didn't want areas skinned off to the point that they would need regenerating, and that it was preferable to select crop trees purposefully rather than accept whatever was left by unregulated yarding activity. Sapling stands were often badly stagnated because of their extreme density, and/or because of suppression by overstory. Pole stands nearly always had some differentiation of crown classes. Because pole stands were considered to be able to respond well to release from overstory, and because it was believed that they would be too costly to thin until a merchantable product could be expected, only sapling stands were thinned.

Hallin (22) summarized specifications for trees to be released by thinning in this way: "Because crop trees released by thinning can be cut in an intermediate harvest, requirements for their selection are not as exacting as for crop trees to be pruned. Crop trees for the final harvest are the first choice for release and should meet the requirements for those to be pruned. Crop trees that are to be removed in an intermediate harvest should (1) have a good straight terminal leader, (2) be relatively straight and perpendicular, and (3) be reasonably vigorous. Differentiation of crown classes in seedling and sapling

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stands is not as pronounced as in older stands; consequently uniform spacing can be emphasized. Forked trees, bayonet-topped trees, and badly barked or bent trees will usually be removed in thinning operations."

The first thinning attempted was incorporated in a thinning-pruning study in 1947. Twenty-four 1/10-acre plots were treated. Thinning and pruning were done "by hand," the thinning to a type of "D+" formula. No analysis was possible.

In 1953 we bought some recently-developed power saws (Fig. 41) which could be used for thinning. We tested them, and decided that it would be too costly to pile created slash in small nearby openings--two slash pilers would be needed for each saw operator. In 1954 we were unable to recruit forestry students to do the type of work we wanted. (For a pilot plant test we thought it desirable to employ forestry students who could be trained quickly to select their own trees--as well as operate and maintain the saws.)

Basically, a 9-foot spacing between trees was desired, to create a stocking rate of about 500 released trees per acre (Fig. 42). As crews became more adept at their work, we learned to use more sophisticated criteria in choosing trees to cut or leave, and this resulted in certain economies. In 1955, Ze'ev Vered and Thomas C. Bouse (from U.C. Berkeley) worked as a two-man crew; in 1957, Dennis E. Teeguarden, also U.C., supervised a crew of three to four students. This latter arrangement was best, since reconnaissance and stringing of work by the foreman saved a lot of time that crew members would otherwise have spent in walking through areas not requiring thinning.

During the two seasons of operation, about 520 gross acres were covered, and more than 22,000 trees released on 45 net acres. Thinning required an average of 2.8 man-minutes per released tree, including all categories of time. At wage and equipment rates paid then, investment in released trees was about 10 cents each (48).

The first saws used had a chainsaw-type cutting head. Later we had some saws with circular saw blades. The latter worked best on stumps up to four inches in diameter, the former best on trees with stumps greater than four inches. Our general impression of the saws was that they were somewhat flimsy, for about a quarter of crew time was spent maintaining or repairing them. I would expect that better saws are now available.

In the mid 1950's we had a Lassen N.F. crew thin about 58 gross acres of poles: the eastern half of compartment C 1-23, and a 5-chain-wide strip bordering Road 1 in compartment G 7-6. The latter was in pure pine on a site in which there seemed to be no response after several years. In C 1-23, white fir was mixed with pine. Pine was favored where possible, but fir was left where needed to avoid holes in the stand. Beetles killed an undetermined proportion of the released trees in C 1-23 within a year or two. An entomologist concluded that thinning was done at just the wrong time of year. This was the only instance in which we had an insect problem resulting from work in young stands.

Porcupine Control

About 1948 or 1949 Tackle noticed an unusual number of pole-sized trees with dead tops. All were caused by porcupine girdling. Joseph

Keyes, a U.S. Fish and Wildlife Service zoologist, examined the Experimental Forest and a lot of surrounding area, and concluded that there did seem to be a buildup of the porcupine population. He came again in 1950, taught us how to recognize porcupine "rest trees," and recommended that we place strychnine-laced salt blocks high in the rest trees if we wanted to reduce the population.

The block installation began in 1950. We also found a couple of denning areas in rock piles, and put granular poisoned salt there, too. The number of blocks was increased over a period of three or four years, and all blocks examined (and replaced, where necessary) annually. At each location I examined the surrounding ground within a radius of about 200 yards, counted dead porcupines, and sprayed them with aluminum paint to eliminate recounts. Each year a few bodies were found--22 in 1953--and, in addition, a few were clubbed or shot. The activity was terminated in 1955, because damage to poles was obviously reduced.

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CHAPTER IV

A MISCELLANY

Visitors

Through the years, visitors of many kinds came to Blacks Mountain for many purposes. Professionals who had work in the area for a day or a week; occasional Lassen N.F. personnel, and groups from other National Forests; colleagues from the Pacific Northwest Forest and Range Experiment Station; groups from the Region 5 office in San Francisco.

In the early 1950's we had the pleasure of hosting numerous visitors from nations overseas--some for a day or two, one for two weeks. One group of Turks, interested primarily in range management topics, held our interest at one point while telling of the productivity of one range in their country which had to be a world-beater.

One afternoon someone called from the Hat Creek Ranger Station to say that they had just given directions to "some limey" who was on his way to spend the night with us. After supper, Doug Roy and I had a very interesting conversation with John Dalkeith, "the limey." He turned out to be a Scot. After he had made several references to forestry work on "the estate," Doug asked him how big it was. Dalkeith's reply was to the effect that you could hardly get from England into Scotland without passing through it. We showed Dalkeith our work the following day. Several days later when we picked up mail in Susanville we got a late green sheet from the Washington Office instructing all hands to extend courtesies to Dalkeith, son of the Duke of Buccleugh, who was making an

irregularly-scheduled tour in the U.S. He got our best effort, anyway; we never did have a red carpet.

A group of foresters from Spain thought all the logging work they had seen was "brutal." Their concern was that all damaged seedlings, saplings, poles, and limbs would find an eager market in their country. A Finn who hadn't yet been to many places in the U.S. accompanied me to an unusual log-peeling operation Fruit Growers had briefly in Westwood. A four-foot diameter white fir log was put into the lathe, and most of the time seemed to have veneer flying off at 20 miles an hour. When an 8-inch core was kicked out with a bang, the Finn held his head and exclaimed "That's what we start with!"

An Indonesian forester, R. Hardono Narioadiredjo (Fig. 43) found much to interest him, and stayed about two weeks in 1951. He was also fascinated by the depth of snow beside the highway through Lassen Park (where the Roys took him); by a homespun rodeo managed by Ned Bognuda at Little Valley (where the Gordons took him); and by an intense hail storm at our camp one evening.

Three Taiwanese visited us: Mr. Du, Mr. Yuen, and Mr. Pao-chang Kuo (Fig. 43). Kuo is now a professor at National Taiwan University in Taipei. I have had occasional correspondence with him, and a delightful brief visit from him in early 1982. Dave Maul and I showed the sights one day to a Pakistani, who told us that one of his country's problems was how to put more people to work; he wasn't interested in labor-saving machinery or concepts.

In 1953, University of California forestry summer camp students were brought to Blacks Mountain for a "show-me" trip. This was the beginning of an annual event which lasted into the early 1960's, then became combined with an additional "show-me" session at Swain Mountain Experimental Forest. Within a few years the Blacks Mountain trip was abandoned.

We had a good combined session with California Division of Forestry staff from Sacramento and U.C. Forestry School faculty. The Regional Forester's Advisory Committee chose Blacks Mountain as a good hideaway for an intensive session of deliberations. We helped to host a spring meeting of the Northern California Section, Society of American Foresters. Small groups of range management specialists sometimes stayed in our camp while Gus Hormay and Donald R. Cornelius showed them their nearby study areas.

Since the pilot plant work we were doing was highly visible, we were happy to show it to as many as were interested.

Financing

In retrospect, I would judge that only during the period 1933-1941 was there adequate financing to have people, facilities, and machinery or tools in place to accomplish at appropriate times the desired work at Blacks Mountain Experimental Forest.

Particularly after World War II, cooperative work funds paid for direct logging costs, much of the cost of maintaining the camp, and appropriate parts of professional and administrative salaries for people

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engaged directly or indirectly in tasks associated with the logging phase of the work. As mentioned earlier, though, a sudden increase in the amount extracted from cooperative funds for administrative overhead created a crisis in 1959-60.

Funds which became scarce for us, however, were appropriated (by Congress) funds passed down through the Forest Service hierarchy for research. This is a complicated process, influenced by personal whims and a lot of inflighting, too detailed to describe here--but similar, I'm sure, to practice in private industry and other governmental agencies: the battle of the budget. I think that after about 1951 there were never two whole professional forestry positions financed for work at Blacks Mountain or, for that matter, both Blacks and Swain Mountain Experimental Forests research together. After 1951, we could not spend even a little bit of cooperative money for research. When financing fell to about 1 1/2 professional positions, or lower, we were in trouble.

When the total financial picture for our line of research made me press for an end to the logging project (1960), it was obvious that there would then be no more cooperative logging funds to finance parts of professional salaries. The end result was that I was the only Blacks Mountain (and Swain Mountain!) guy left around. All other personnel were laid off or transferred. Not a happy feeling.

Somewhat later--best estimates are 1967 or 1968--another event further lowered to absolute zero any prospects of research at Blacks Mountain. It was a "realization" that all eastside pine research was to be centered at Bend, Oregon, under the aegis of the Pacific Northwest

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Forest and Range Experiment Station. I sought research help on this point from several knowledgeable people recently, and learned again how poorly the Forest Service documents its history. It appears that someone in the Washington Office thought that all research for a forest type should be centered in one place--and Bend was chosen. In 1968 a General Functional Inspection recommended disestablishment of Blacks Mountain Experimental Forest. A subsequent analysis by the Berkeley office of the Experiment Station justified maintenance of the area as an Experimental Forest, and led to a decision for withdrawal of the recommendation by the Washington Office.

In 1974, a Functional Research Inspection by David Tackle of the Washington Office confirmed the soundness of the decision. And so the area awaits further decisions!

A Change in Philosophy

Because of pressures of maintaining installed studies at Swain Mountain after the close of the logging project, Blacks Mountain was nearly ignored for about 12 years. A week or two per year of method-of-cutting plot remeasurements until 1967, and some mandatory prescribed burn studies, were the only activities there.

This is getting a little ahead of the story, but we were still thinking about Blacks Mountain. I became loose from the Susanville Research Center, which was phased out, and transferred to the Silviculture Project at Redding, where Doug Roy was Project Leader. Off and on we discussed options for Blacks Mountain, and became influenced by

the fact that old-growth timber was disappearing rapidly from eastside forests. This meant that if we continued the management plan, which Hallin so carefully prepared, we would extend the period of conversion of old-growth to young growth beyond the time when this action would be meaningful except in an academic way. In the late 1960's we discussed with Ernest L. ("Doc") Turner, Timber Management Officer of Lassen N.F., the possibility of periodically cutting large increments of old-growth: would this disrupt the Lassen's plans for managing the Eastern Lassen Working circle, or interfere with total timber sale program? He concluded that it would not. We were too busy with other things to take any action, however. We thought the best use we could make of the Experimental Forest, since there appeared to be no prospect for research there in the immediate future, would be to convert if fairly rapidly into a young-growth forest. Only trees less than 150 years old--Dunning's classes 1 and 2 and seedlings, saplings, and poles--would remain. All necessary regeneration would be done, and overdense young stands would be thinned. And this is still the approximate aim. Then, if research money should become available in the future, it can be expended in young-growth stands like most everyone else has.

Claim Jumpers

The Experimental Forest is not quite "new," and has appeared for years on all maps of the general area. It is dedicated to research, and is surrounded by private land and land administered by Lassen N.F. The Forest Service Manual sets the specifics of relationships between

National Forests and Experiment Stations where activities on Experimental Forests are involved. Basically, the Lassen and the Station must first agree on any activities which the Lassen would like to initiate on the Experimental Forest, or, the Station can request the Lassen to do certain things. There have been some humorous and some unhappy situations where these relationships were not observed.

When we lived in Susanville, like all locals we read "The Lassen Advocate." One night I noticed a Lassen N.F. advertisement for timber to be sold by the Pit Ranger District on Blacks Mountain (as a geological location). Government land in two of the Sections mentioned had a familiar ring. Sure enough, when I checked a map next morning I found that government land in Sections 2 and 3 in the northwest corner of the Experimental Forest were included--about 1000 acres. I was able to head that off.

There is a feature of the landscape--though scarcely visible from Road 2--which someone may stumble across and wonder about someday: an earth dam, at least 100 yards long, and 8 or 10 feet high, near the west end of Patterson Flat. It wasn't discovered until a year or two after it was built. When we inquired of the friendly District Ranger, he had to run it down for us. The answer came in a day or two to the effect that someone on his timber management staff had given Little Valley Lumber Company permission to build it late in the fall as a possible means of flooding Patterson Flat with plenty of water for road watering! The dam never did hold water; soil underneath was too porous. Bliss Haynes, Lassen's engineer, thought a carload or two of bentonite clay worked into the soil by cattle might do the trick, but it was never tried.

Elmer Butler, a widely-known member of Bogard District's timber management staff, once got astray and marked a flock of trees in about a 50-yard strip inside our boundary. I rebrushed and painted our boundary for about 3/4 mile, and we got that all straightened out before any damage was done.

And so it has gone. I cite a few incidents as a caution to Station and Lassen personnel who may sometime read this: keep your guard up!

CHAPTER X

NEW HEADQUARTERS

The Susanville Research Center

A change in the research style of the Experiment Station began to take shape late in the summer of 1956. The Susanville Research Center was established with August L. Hormay as Research Center Leader. During September and October a staff was transferred in, found homes, and began its work from the new location. Gus considered November 1 a good time to state that the Center began to function. Our quarters were in the Knoch Building at Main and Lassen Streets; we shared upstairs office space with the Supervisor's Office, Lassen National Forest. (Later the S.O. and Center moved into a new building at the corner of Nevada and Maple Streets.)

The purpose of the move to Susanville was to get the Center staff close to its field work locations. Several staff members were transferred from the Berkeley office of the Experiment Station, but several were new. Two of the Station's research divisions were represented: forest management, and range and wildlife. Not all of the following Center staff members were present at the beginning; some joined shortly afterward:

Forest Management: Donald T. Gordon, David C. Maul, Oscar E. Stark, Joe Perini (who continued to live at Blacks Mountain), Stanley E. Spurgeon (administrative assistant 1959-61).

Range and Wildlife Management: Richard Hubbard, Lowell Adams, Jack Reppert, Donald Neal, Ray Ratliff, Reed Sanderson, Lyle Brown, and Lynn Rader.

Cooperative Zoologist: Sturgis McKeever of the Department of Zoology, U.C. Davis.

Clerical: Mrs. Ann Rathner was secretary for several years, followed in order by Mrs. Evelyn Ward, Georgiana "George" Weisgerber (who was talked into shortening her last name to Sanderson), and Mrs. Janet DeWitt. (Mrs. Ward transferred to the Station's Silviculture Project in Redding.)

Joe Woolfolk, Division Chief for Range and Wildlife Management on the Berkeley staff, was appointed by Director George Jemison to "ride herd" on the Research Center. Russell K. LeBarron, Division Chief for Forest Management, still worked closely with those of us in the forestry projects. Bill Hallin took a transfer to the Pacific Northwest Forest and Range Experiment Station's research location at Roseburg, Oregon, about the time the Center was established at Susanville.

Fiscal year 1958 was a near disaster. A timber sale, to begin work at Swain Mountain, failed in the spring of 1957, due to a slump in the lumber market. Logging was conducted at Blacks Mountain on schedule during the summer, but the two sales had been "tied together" with respect to cooperative funds in our budgeting. During the fall, winter, and spring following, Dave Maul and I were farmed out to the range and wildlife group. We worked mainly on bitterbrush investigations. And, of course, that fouled the meager budget for that group. But the Swain

Mountain timber was sold in the spring of 1958, and because it was a three-year sale we felt a little safer.

Sometime after the Research Center began functioning, a group of citizens knowledgeable of natural resources in northeastern California was asked to assist in providing direction to the Center's research program. An advisory committee for the Center in 1960 had these members: Fred Abbay, lumber manufacturer; C. Hormer Vincent, resident manager of Fruit Growers Supply Company; Norman S. Nicholson, Ranger, California Division of Forestry; L. E. "Bing" Francis, bank manager; V. A. Parker, Supervisor, Lassen N.F.; James Gilman, California Department of Fish and Game; Harry Rathner, District Manager, Bureau of Land Management; T. S. "Stan" Brown, California Agricultural Extension Service; State Senator Stanley Arnold of Susanville; Brunnell Christensen, cattleman; and William Jenkins, rancher. As a group, and as individuals, the committee observed and was informed of studies in progress. They suggested some things concerning study direction, and could have increased their input if research financing could have kept pace. However, funds became scarcer, and, since they were all busy men, they decided they should disband, even before the Research Center began to be closed out.

I think the Research Center at Susanville served its purpose well--getting professionals situated in the field where they would be close to the area of their research responsibility. And we had a congenial group. Some work at Blacks Mountain, and nearly all field work at Swain Mountain, could be accomplished by commuting from Susanville.

Contacts with personnel in the Supervisor's Office, and the District Ranger's Office, both in town, were made more easily than before. And I have no doubt that personal relationships with field personnel of private and public employers help keep potential ivory tower types from getting too far off base. The amount of time spent in travel status to confer with data processors and statisticians in the Berkeley office was minimal, and for that reason relatively inexpensive.

As mentioned in an earlier section, financing and "official" philosophy changed to approximate "get 'em out of the boondocks and into university centers where they have good access to computers and can commiserate with their colleagues." Shortly after the logging project ended in 1960, funding for forest management research dropped to the point where only I was left of that group. Although I was assigned to the Silviculture Project with Doug Roy in Redding about 1963, I successfully pleaded the economics of staying in Susanville until I finished a body of field work at Swain Mountain in 1965. Other personnel in the range and wildlife group were being transferred out. Lynn Rader became Research Center Leader after Hormay took a transfer. In late 1965 or early 1966 the Susanville Research Center was finally closed out.

The "Redding Silviculture Project"

The research unit in Redding has had more than one label, but "Silviculture of Sierra Nevada Conifer Types" has been one of them--hence the common use of abbreviations.

By June of 1965, when my family moved to Redding, research at Blacks Mountain was reduced to a week or two annually of methods-of-cutting plot remeasurement through 1967. Research at Swain Mountain Experimental Forest was continuing, however.

The Redding project was begun with high expectations in the early 1960's. Support for a large research center seemed to be building: one which would encompass foresters, entomologists, pathologists and support personnel. Land at the Forest Service's Northern California Service Center at the Redding Municipal Airport was designated for a large office-laboratory building--plans for which are still on file.. Somehow, that never materialized, and the project became of modest size and dealt principally with silviculture subjects.

Quarters in Redding were, and are, in a building shared with the Supervisor's Office, Shasta-Trinity National Forests.

Douglass F. Roy became Project Leader at Redding in the late summer of 1963, about the time I became assigned there--even though I remained in Susanville for a couple of years. Doug had been preceded first by Willard Jackson, then Robert Echols, both of whom had been "holding down the fort" in anticipation of expansion. William Oliver, James Mallory, and Chester Stone had desks before Doug arrived, and James Griffin arrived soon after. Mrs. Ward became the secretary, transferring from Susanville Research Center. Philip McDonald arrived from Challenge in the summer of 1965, about the same time I did. Robert Powers was employed as a student, and within a year or two he graduated from Humboldt State into a permanent berth. Although there have been several

additions to the complement of researchers at Redding since my retirement in 1977, I will mention only that first Robert J. "Jim" Laacke, then Robert Neal, were made directly responsible for records of and events at Blacks Mountain. Doug Roy continued to move the transcription and analysis of the methods-of-cutting plot data as funds and technical support became available.

Although Redding is a principle center for the lumber industry in the noncoastal part of northern California, it is distant in time from any experimental forests. Consequently, scientists have had to incur travel expenses for most field work. And "travel" has been the first budget item restricted by agencies in the executive branch of government whenever "things get tight."

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CHAPTER XI

PRESCRIBED BURNING

In the late 1950's the Experiment Station found that various members of its staff were having to oppose publicly a surge of opinion favoring prescribed burning. They judged, from training and intuition, that at least some proposals for prescribed burning were invalid. (An extreme case in my personal experience was a question by a prescribed burning proponent as to whether we had ever tried that method for pruning at Blacks Mountain. Glory be!) A difficulty within the Station was a lack of California-based data as a basis for any real debate. So Keith Arnold--Station Director at the time, and himself having been a fire-eating kind of researcher--decreed that there would be prescribed burning studies accomplished on experimental forests. Period. And so I was informed in 1959 by Russ LeBarron, Division Chief for Forest Management Research on the Director's staff. I presume that Russ was able to mooch a little money out of Fire Research for some assistance. But better than that, Russ was interested, and got a little charcoal on his knees! Blacks Mountain was the place.

Because of the kinds and distribution of fuels in the eastside, and the density of advance growth in most places, we decided that if prescribed burning could be used it would have to make significant fuel hazard reduction and yet not destroy that wonderful free gift of young trees. And it would have to be capable of application on rather large acreages in order to keep fixed costs low.

Craig C. Chandler, a fire researcher with the Station at the time, wrote burning prescriptions and monitored weather for a few days prior to the burns, got special weather forecasts for our area, and otherwise helped with the work.

We started with very simple objectives, and learned better how to monitor effects of results as we went.

The first burn had as an objective the killing out of unwanted cedar seedlings and saplings beneath a 0.2-acre mature tree group. The burn was started at 5:30 p.m., September 28, 1959. All went well until unexpected gusts of wind (10-15 m.p.h.) ran the fire up the dry bark of mature trees and into some crowns. We concluded that any further burns under such severe conditions would be out of the question. Only timely and repeated application of water kept this fire from becoming a disaster. However, the objective was accomplished.

The second burn was early in the following spring, May 16, 1960. This time we tried to reduce the deep accumulation of needles in a dense pine pole stand, 0.88-acre in size. The needles were dry at the surface, wet beneath. First ignition occurred at 7:00 p.m. Fired strips tended not to burn well, so the remainder of the area was fired rapidly in order to produce enough heat for a continuous burn. The burn didn't go too well, but it hit a small dry tree crown left from logging two years previous. There the fire rose into the pole crowns for two roaring runs--and that put a big hole in the stand. In most places, very little of the needle litter was consumed by the fire.

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The "third burn" was on an area where more than an acre was burned in the spring of 1961, and about half the area reburned in the spring of 1962. Again, we tried for fuel hazard reduction in a pole stand. Before the burn, however, we thinned two or three groups of saplings, and removed all branches from poles to a height of 5 or 6 feet. We monitored the area in great detail--trees, fuel, vegetation by types, etc.

This time, we had burns which never got out of control, because we made a costly investment in fuel rearrangement to prevent crown fires. In addition, litter and duff had been scraped from around the bases of selected crop trees. The unfortunate occurrence after this burn was that so many of the smaller trees died. On the area burned once, there was more total dead fuel than existed before the burn. On the area burned twice, there was about three-fourths as much dead fuel after the fire as before.

We prepared another area to attempt a fall burn after fuels had been wetted some. Again, the objective was fuel hazard reduction in a pole stand. Plans were cancelled in three successive years because of unfavorable weather.

We achieved our objective in these studies: data applicable to eastside pine stands. But we had to conclude that broadcast burning is not feasible in the eastside pine areas designated for high-level wood production, whether for fuel hazard reduction or thinning young stands (49). And I would add now: at least not until trees in current young growth stands are much more widely spaced.

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CHAPTER XII

NEW MANAGEMENT ACTIONS--1972 AND LATER

How It Started

I mentioned earlier that Doug Roy and I had decided that the best future for Blacks Mountain Experimental Forest was early conversion to a young growth forest. The Lassen stated that periodic sales from the area would not interfere with any of their timber sale plans. But at the Redding project we were strapped for time and had prepared no areas at Blacks Mountain.

Then in 1972 the lumber industry had been having such good markets that it was pressing for additional sales of government timber. President Nixon instructed the Forest Service to come up with a bunch immediately. The Service's response became known as "super-sell" timber. California's contribution was to be about 60 million board feet.

On July 27, 1972, while taking U.C. forestry students on a tour of Swain Mountain, an Eagle Lake District man drove up and said the Ranger insisted on talking with me on the radio. He wanted me to come to Susanville for an immediate meeting. I told him I was tied up tight with the U.C. bunch until noon the following day. So I agreed to a meeting at Swain Mountain with a few Lassen people at noon the next day.

At the noon meeting the next day, Lassen's Timber Management Officer announced that Supervisor Berlin had decided to cut all of the Lassen "super-sell" allotment of 20 million board feet at Blacks Mountain Experimental Forest. I raised immediate objections. I was told that

Berlin would phone the Washington Office, if necessary, to get this volume. He also stated that arrangements were sought to get Doug Roy and Don Lynch (then Assistant Director in the Station's Berkeley office) to a meeting at Blacks Mountain the next week.

(How do I remember the details? They're in my official diary. I recognized that this was all contrary to Forest Service policy (which I confirmed later by finding appropriate sections in the Forest Service Manual). Briefly, National Forest Administration had no direction over activities on an experimental forest except through written agreements with Station Directors.)

The meeting at Blacks Mountain took place on August 2. In the meantime I returned to Redding and discussed the affair with Roy, who was as incensed as I. It was obvious that the rush! rush! atmosphere would get us no research at all through the cutting of a high proportion of area and remaining volume on the Experimental Forest. At the meeting, Lynch, Roy, and I were present for the Station; Berlin and several Lassen staff; and Bob Dasmann from the Regional Office. The same ground got plowed over. Roy and I got no help at all. I didn't hear anyone say, "OK, you can have the timber." But Station personnel were placed in an acquiescent position by directed turns of the conversation. And I was to meet Lassen personnel at Blacks Mountain August 7 to arrange details of the work of preparing the timber for sale.

This I did, and gave written record of what records we wanted and what some important sales conditions were to be. I was promised that all conditions would be met.

But in the rush of getting timber marked, the Lassen personnel who did the field work could not recognize and record Dunning tree class of all marked trees; some tree diameters were apparently guessed at; and recorded numbers of trees did not agree with some detailed compartment checks which Roy, Oliver, and I made. This meant that we would have no good record for adjusting numbers of trees, tree classes, and volumes for each compartment--for which we had to that date kept detailed inventory records. And since scaling was to be done at the mill, there would not even be a record of total scaled volume removed from each compartment. Total loss.

I could extract more from the diary, and write for several hours more things concerned with that "action," and the sale which followed. The sale actually was advertised and sold in two parts.

It followed that the Director and Regional Forester realized that they needed a written agreement of the nature specified in the Manual. Other discussions took place, and I was instructed to prepare an interim management plan for Blacks Mountain whereby increments of old growth would be removed every few years. This I did, and what precedes in this chapter can serve as a file record of what happened to the old management plan, and why the new interim plan became implemented when it did.

Patterson and Cone Sales

These two sales were the result of the "super-sell" program. The Patterson Sale was awarded to Coin Timber Company, Susanville, on

November 27, 1972. The estimated volumes to be cut were:

Ponderosa and Jeffrey pine	10,324,000 bd. ft.
White fir	72,000
Incense-cedar	503,000
Total	10,899,000 bd. ft.

The Cone Sale was awarded to Sierra Pacific Industries, Susanville, on November 28, 1972. The estimated volumes to be cut were:

Ponderosa and Jeffrey pine	12,050,000 bd. ft.
White fir	249,000
Incense-cedar	366,000
Total	12,665,000 bd. ft.

During the logging of the Cone Sale I was shocked to see how much logging practice could deteriorate without a shutdown. I had a lot of respect for the Lassen's Project Sales Officer on the job, having worked with him before at Swain Mountain, where we got a somewhat better logging job done. But I could scarcely believe practices going on for which the Sales Officer felt he could get no official support for a shutdown. My main objections were: (1) too much carelessness with and damage to advance growth, and (2) landing size, number, and soil compaction from rubber-tired front-end loaders. I insisted on a ripping of all landings to an 18-inch depth.

In my opinion, logging practice on the Patterson Sale was superior to that on Cone Sale.

Thirty-nine compartments were included in the two sales. As much as possible I confined them to lower elevations, poorer sites, scattered old-growth.

Estimates for sale area betterment on the two sales were:

	Cone acres	Patterson acres
Planting	30	12.4
Precommercial thinning	1,261	722
Dwarfmistletoe eradication	238	235

No records of total betterment work completed were located in Redding files, but some records are available.

Blacks One Sale

This was the first sale prepared after the Cone and Patterson Sales. Marking was completed in 1976; sale was made in 1977 to Sierra Pacific Industries, but deferred for cutting because of a dry year, which meant lack of water to apply to roads.

Five timbered compartments plus G 17-16 were included in the sale. Volume estimates were:

Ponderosa and Jeffrey pine	3,300,000 bd. ft.
White fir	180,000
Incense-cedar	130,000
Total	3,610,000 bd. ft.

Thirty-nine acres of regeneration areas were planted. Thinning was done on 204 acres in 1980 or 1981.

Blacks Two Sale

This sale went to Sierra Pacific Industries, Susanville, in 1980. Five compartments were involved. Volume estimates were:

Ponderosa and Jeffrey pine	2,530,000 bd. ft.
White fir	180,000
Incense-cedar	130,000
Total	2,840,000 bd. ft.

Planting is not yet completed on 35 estimated acres. Thinning estimate was for 235 acres.

Blacks Salvage Sale

This sale was engineered to reduce a buildup of dead trees over 13 compartments. It was sold September 2, 1980 to Bill Schmitt Logging. Volume cut was 670,000 board feet. Over 400 thousand feet were marked before the sale, and an additional amount (over 200 thousand) during the sale.

Patterson Salvage Sale

This sale involved some trees east of the Patterson-Cone Mountain ridge, and some west of it. It was sold to Don Phillips September 21, 1981. About 150,000 board feet of dead trees were salvaged.

IN RETROSPECT

Research and the pilot plant test at Blacks Mountain Experimental Forest have had a marked influence on forestry practice in California. The foresight of Dunning, in particular, in initiating activities which could lead to so many benefits, is to be admired.

Among scientists there is always that part of the conscience which asks, "Did I ask the right questions?" It's like the story of two men who approached a river down South and thought about going swimming. They asked a boy playing nearby, "Any snakes in the river?" "Nope," replied the boy. The men peeled down and swam around for a bit. One asked the boy, "How come there ain't any snakes in this river?" The boy replied, "Alligators ate 'em." Considering the times in which the earliest concepts were developed for research at Blacks Mountain, I think questions asked were as good as could be framed. In the early thirties, no one could foresee the heavy demands that would be placed on Forest Service-controlled timber in such a short time. There were predictions of "timber famine" as early as the turn of the century, but in the early thirties there was still a lot of private timber.

It would seem that earlier work should have begun to cover such topics as were included in earliest plans, such as thinning and pruning. It just didn't get done--perhaps there were already too many irons in the fire. There were old thinning plots--many of them--scattered around the State; many were hacked out by Dunning and Show in their early years. But early ideas on thinning were found to leave far too many trees per acre, so there was no analysis and transfer of information.

Having observed the rapid growth rate of planted seedlings, and of trees thinned on at least Site III, for 25 to 30 years, I am optimistic that trees in managed eastside forests can yield certain volumes faster than indicated in Meyer's tables. Possibilities for timber (and livestock) production in northeastern California should get a very close analysis. A factor regarding total productivity of the area over a very long period has probably not been given enough weight. That is the unlikelihood that very much of the area will ever be lost to other kinds of development: there will never be enough water available there to support other development.

USDA - Forest Service
GPO 962-478
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rope" = cable; "Caterpiggle" = Caterpillar tractor; "strangulator" = a choker, or a carburetor choke; "pluckup" = pickup; and, of course, a splicing fid was called by its trade name--to mention a very few.

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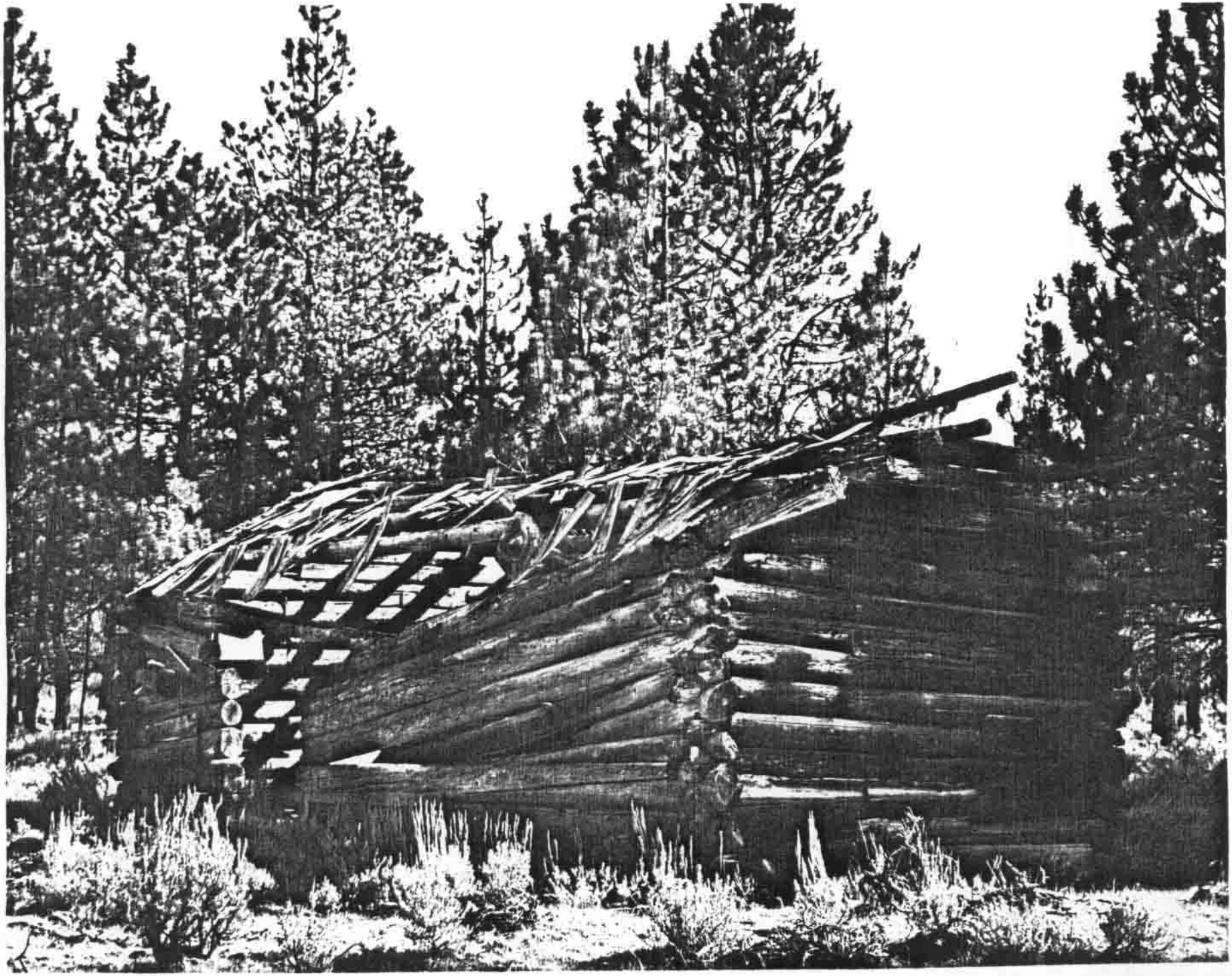
Figure 1--Two views of railroad wreck on Western Pacific Railroad line at Archie Spur, October 26, 1943. Photos by A. A. Hasel.



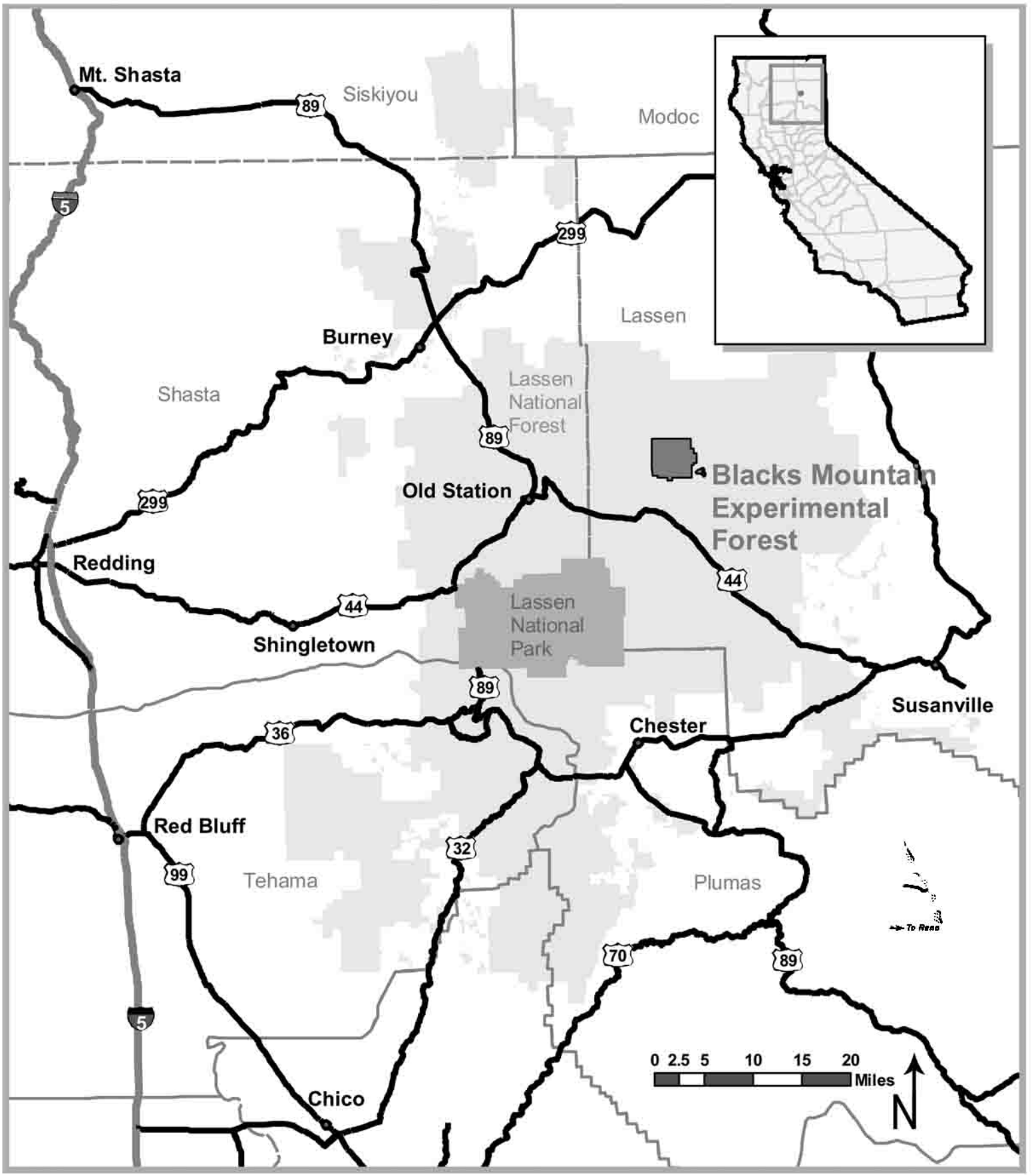


Figure 3

(Note: I have attempted some crude updating on this map: roads, road numbers, and railroads. I could furnish expert guidance for a good draftsman — or just use old out-of-state maps. It served before. dg)

Figure 4--Mount Lassen view (center) from front porch of "A" house at Blacks Mountain Branch Station. 1934 photo by A. L. Hormay.

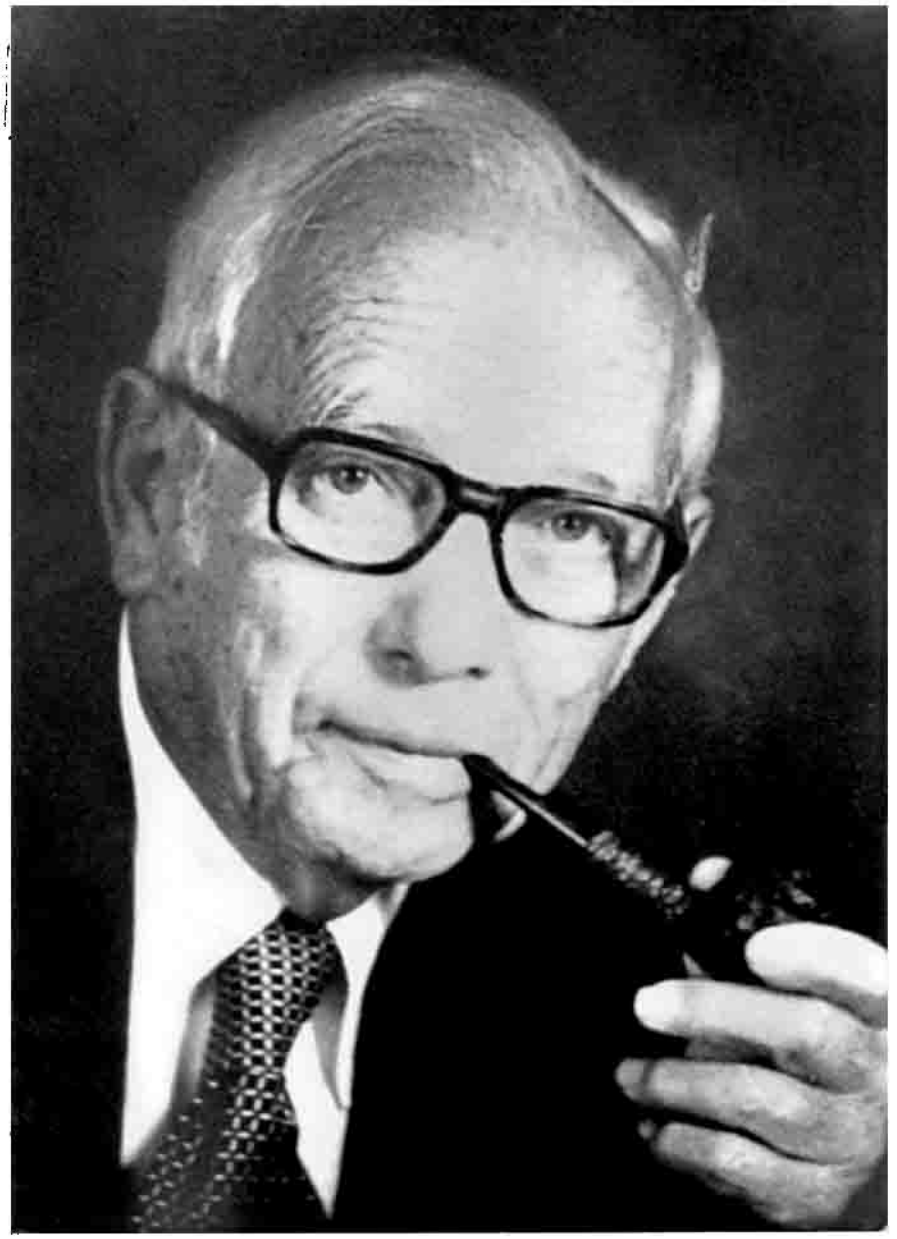


Figure 5--Austin A. Hasel, designer of original inventory of Blacks Mountain Experimental Forest, and the method-of-cutting and logging cost studies. Surveyed roads and compartment boundaries. Had responsibility for logging project and forestry field work until summer of 1945.

Figure 6--August L. Hormay, early worker at Blacks Mountain Branch Station, in charge of development and operation of Burgess Spring Experimental Range and Harvey Valley Experimental Range Allotment. Developed rest-rotation grazing system. Leader of Susanville Research Center. Photo by Hormay.

Figure 8: Buildings at the Blacks Mountain branch station include (left to right) an office/laboratory, superintendent's residence, bunk-house, 2-car garage and garage woodshed. In addition there is a pump house and tank tower, 600' well, 4-stall garage wharehouse, mess hall (95% complete), and a doormitory complex except for the interior finish (1938).

Figure 9--Upper, drilling well at Blacks Mountain Branch Station. Photo by M. W. Talbot, 1933. Lower, pumphouse water tower, and 1100 gallon tanker. Photo by A. A. Hasel.

Figure 10--Twelve-man staff house (top), and cookhouse with day-room (bottom). Photos by A. A. Hasel.

(Could be reproduced as panorama)

Figure 11--"The shop." Woodshed at left end, four large bays in center, and work-storage area and "rat room" at right. Gas pump was "ten gallon visible" type (glass cylinder at top), operated by three-foot-long hand lever on far side.

Figure 13--An inspection group at Blacks Mountain Experimental Forest. Left to right: Duncan Dunning, August L. Hormay, Myron W. Talbot, Davis S. Carleton, Victor A. Clements (behind), all California Forest and Range Experiment Station; U.S. Senator Chavez (New Mexico); Frank J. Jefferson, C. B. Morse (standing), Regional Office, U.S. Forest Service, San Francisco; J. E. Elliott, Supervisor, Lassen N.F.; Philip C. Johnson, B.E. & P. Q., Berkeley. Photo by Johnson 10/25/44.

Figure 14--A "horrible example" of bark beetle-caused pine mortality at Blacks Mountain Experimental Forest, before the area was covered rapidly by an entomologist-devised system which removed trees susceptible to beetle attack. Photo by Hasel.

Figure 15--Some entomologists with interests at Blacks Mountain. Above, left to right: F. C. Craighead, Ralph C. Hall, (A. A. Hasel, C.F.&R.E.S.?), F. P. Keen, K. A. Salman. At left, J. W. Bongberg.

Figure 16--More entomologists, several of whom worked at Blacks Mountain. Back row, left to right: Galen T Frostle, Robert Lyon, Robert Stevens, Charles Eaton, B. Ruckes, Richard H. Smith. Front row: George Struble, Ralph Hall, William Bedard, Boyd Wickman, Arthur Moore, Roy Endo. Photo by G. Frostle

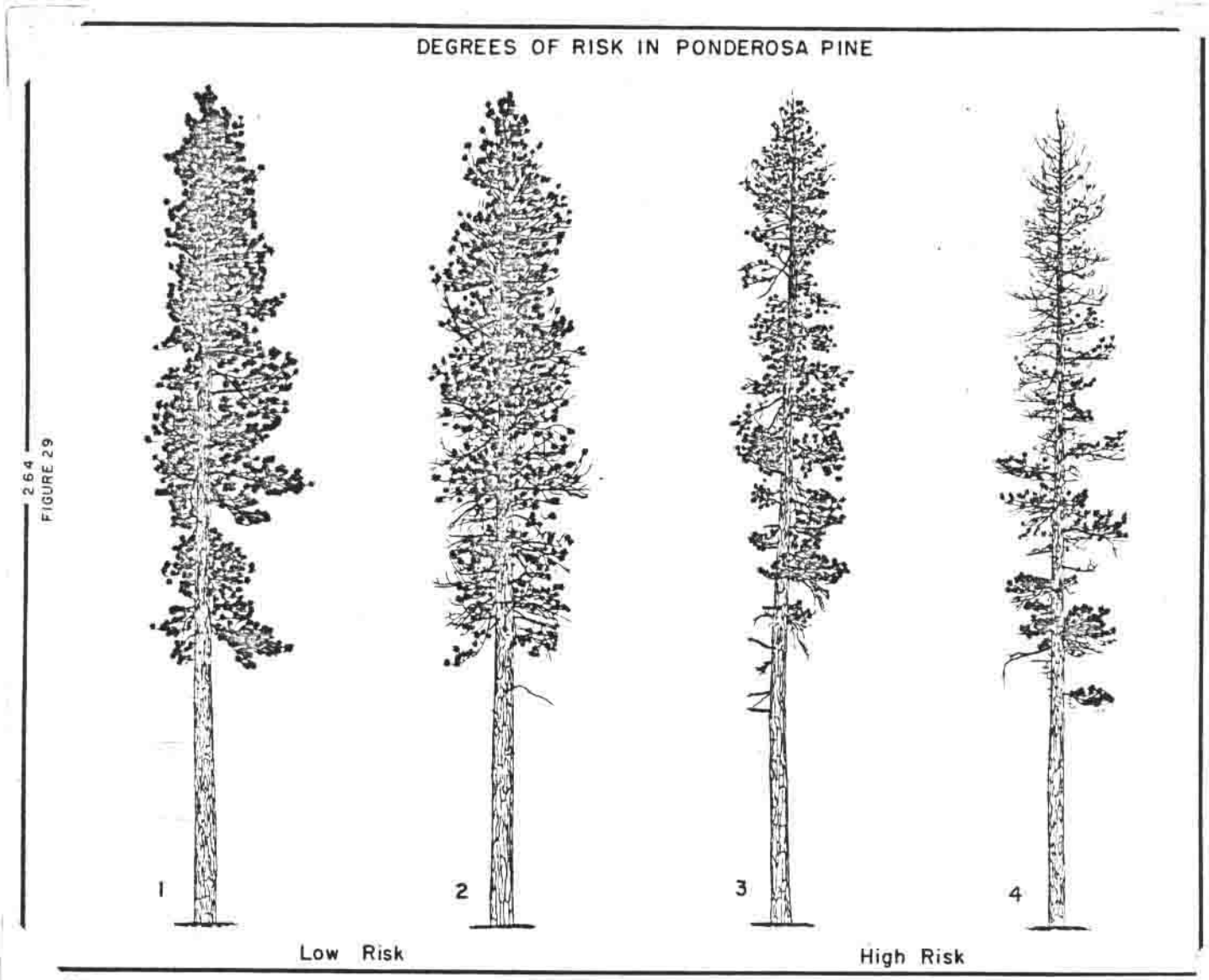


Figure 17--Degrees of risk in ponderosa pine.

Figure 18 --Civilian Conservation Corps enrollees felling with handsaw, limbing with an axe, and bucking with bucksaw (they later worked with 1 man per bucksaw). Photos by Hasel.

Figure 19 --Loading logs on railroad cars at Fruit Growers Supply Company landing at Feather Lake. Here, the RD-7 Caterpillar furnishes motive power for the cable system. Photo by Hasel

Figure 20--(Top) LeTourneau industrial crane loader, with RD-7 motive power; also RD-8 and Hyster arch. Photo by Hasel. (Bottom) Ford logging truck waiting for logs at landing. Photo by John Miller.

Figure 21--A bucking landing used in 1941. Photo by Gordon

Figure 2.2--International logging truck and CCC enrollee driver. Photo by Hasel.

Figure 23--Two views of Le Tourneau crane attached to log sled with double-drum Silent hoist and diesel engine: an intermediate stage in log loader development. Photos by Gordon, 1940 or 1941.

Figure 24--The woods service station. Photo by Hasel.

Figure 25--(Upper) The Blacks Mountain Portable Log Loader with Berger double-drum hoist; boom was lowered when loader was towed. (Lower) Method of moving loader with tractor and arch. Photos by Hasel.

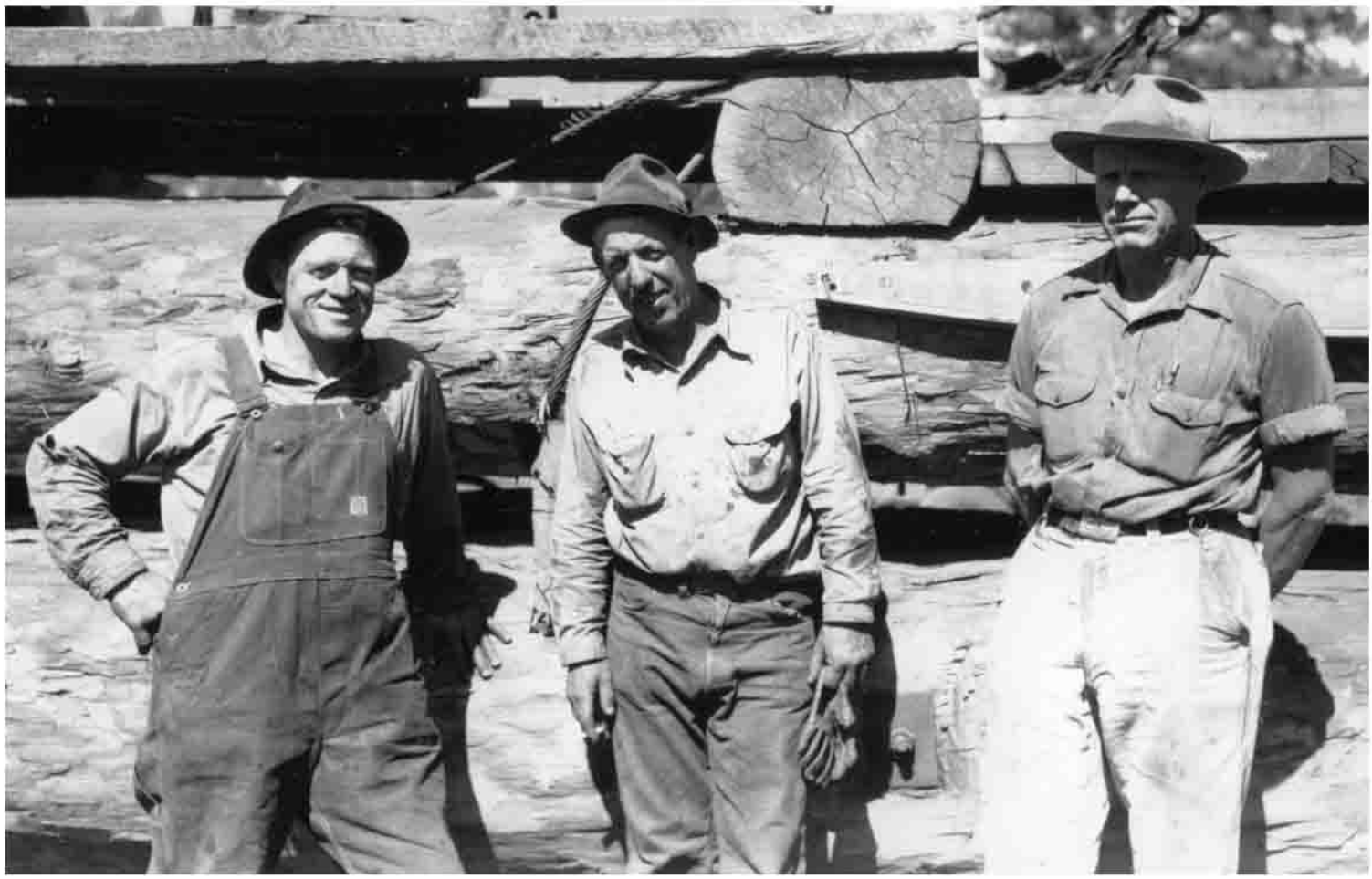


Figure 26--Builders of the Blacks Mountain Portable Log Loader. (Left to Right) Marvin P. "Peg" Hail, mechanic from Forest Service's Redding Shop; Davis S. "Buster" Carleton, logging superintendent; and Earl A. Morrow, superintendent of the Experiment Station's Feather River Branch Station near Quincy. Photo by Hasel.

Figure 27--(Left) Joe Perini, for many years hoist operator on the log loader, heavy equipment operator, mechanic. (Right) Kenneth B. "Buck" Shuman, bucker, feller, hooker, and finally camp cook. Photos by Hormay.

Figure 28--Inspection group at Blacks Mountain Experimental Forest. Front row, left to right: August Hormay, CF&RES; J. G. Kaiser, Lassen N.F.: DeWitt Nelson, California State Forester; Daniel Gellerman, Lassen N.F.; Clark Gleason, CF&RES; Philip Johnson, BE&PQ; standing, left to right: Robert Nelson, CF&RES; William S. Rosecrans, State Forestry Board; Lee and M. W. Talbot, CF&RES; Mrs. Rosecrans; James W. Girard, WO, USFS; Mr. J. J. Prendergast, State Forestry Board; Marius DeMeyer, CF&RES; Harold Coons, RO, USFS; John Patterson, BE&PQ. 7/18/45. Photo by Johnson.

Figure 29--An early Mall power saw used for felling. "Buck" Shuman, left, and Clay _____. Photo by Gordon.

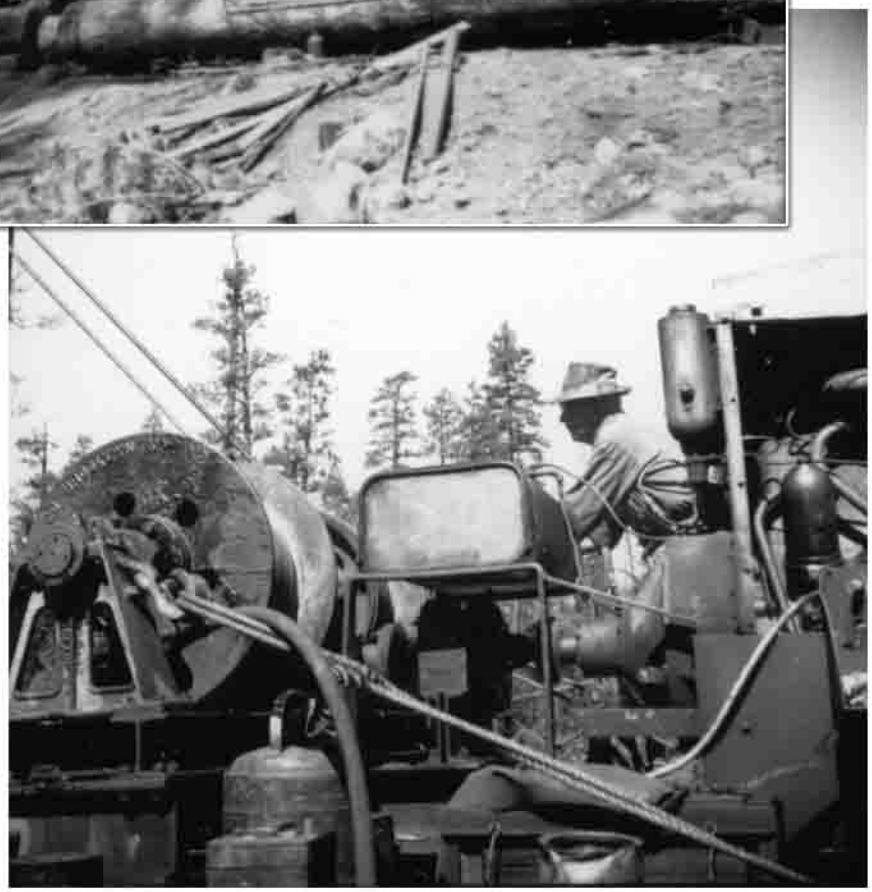


Figure 30. Railroad landing at Archie Spur, 1946. Empty cars passed beneath hoist platform, at left; Bill Hallin on platform. At right, Lloyd "Curly" Granstaff, at controls of the Silent Hoist. Photos by Gordon.

Figure 3/--W. E. Hallin, forester in charge of work at Blacks Mountain Experimental Forest 1946-1956. Photo by Hallin.

Figure 32--Forest Management Research Division Meeting, Yurok Redwood Experimental Forest, Klamath, California, June 12, 1959. From left to right: back row: Gilbert Schubert; Robert Stevens (Insect Research); Willard Jackson, Director Keith Arnold; Joseph Bicho; Ronald Lanner; David Maul; Merton Reed (Range Research). Front row: Kenneth Boe; Donald Gordon; Douglass Roy; Frank Baron; Division Chief Russell LeBarron; Henry Hellmers. A part of eastside history shows in the boots of Gordon and Roy: custom-made by Keller of Susanville, suppliers to loggers for many years.

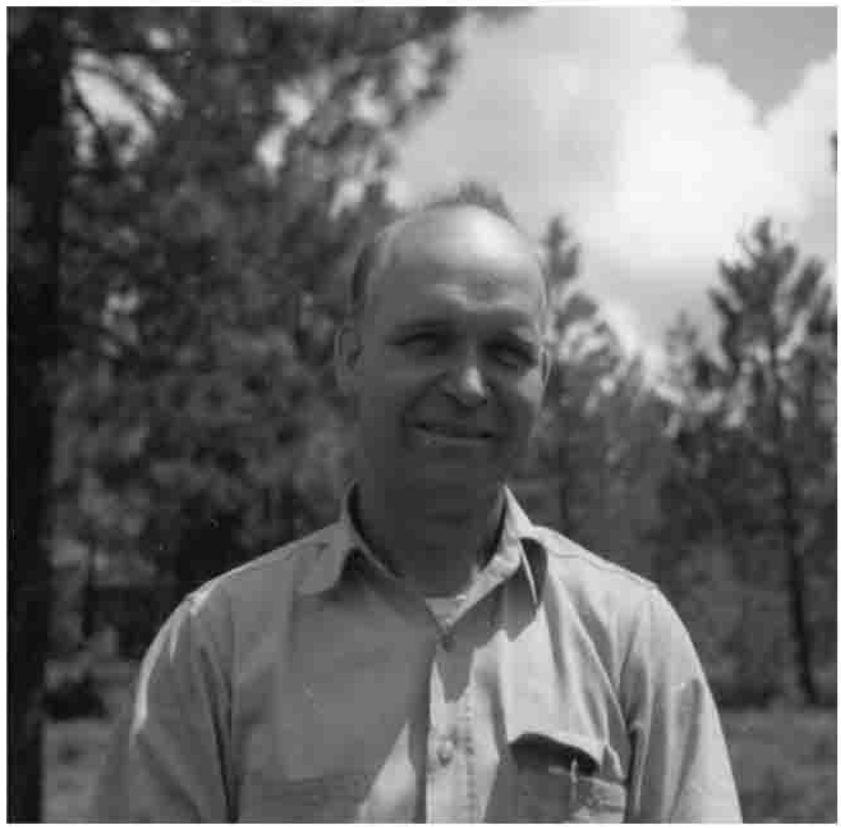


Figure 33--Oscar E. Stark, logging superintendent during last few years of the logging project. Photo by Herman.

Figure 34--A 1958 view of one of the natural regeneration areas dating from seed crop of 1948. Notice lack of seedlings near tree at left, and seedling height increasing with distance from the tree. Photo by Gordon.

Figure 35--TD-18 tractor towing arch and portable log loader. Photo by W. E. Hallin.

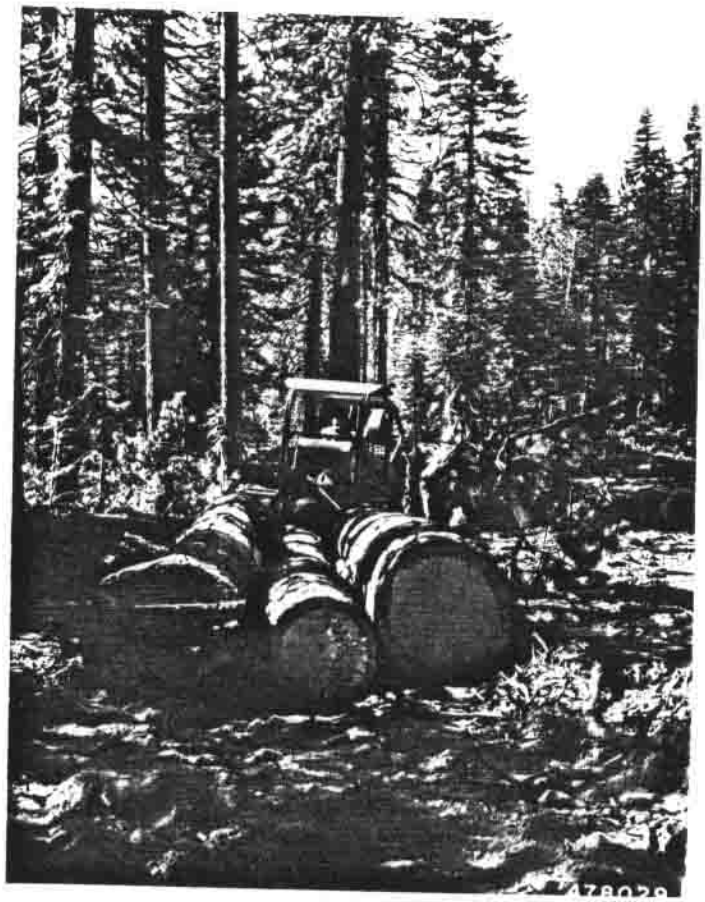


Figure 36. Ground skidding logs with TD-18 tractor.

Figure 37--In the background, the business end of the 20-ton Link Belt Speeder, loading a type of logging truck still in use. Photo by Gordon.

Figure 38--Wagner LG-14 Logger, which replaced a D-8 tractor in 1957. Shown here in road right-of-way timber at Swain Mountain Experimental Forest. Photo by Gordon.

A

B

C

D

Figure 39--Fuel break scenes: A, after logging, 1960; B, after thinning and slash disposal, 1961; C, tree growth to 1967; D, tree growth to 1981. Photos by Gordon.

A

B

C

D

Figure 10--A regeneration area in compartment P 15-33: A, after felling in 1953; planted 1954; seedlings after 5 growing seasons, B; after 8 seasons, C; after 17 seasons, D. Photos by Gordon.

Figure 41--Oscar Stark demonstrating a type of chainsaw first used in a 1955 thinning operation. Photo by Hallin.

Figure 42--Sapling stand 5 years after being thinned to 9 by 9 foot spacing. Trees already responding to release: longer, more dense foliage, and longer leaders than formerly. D. E. Teeguarden in photo by Gordon, 1962 1960.

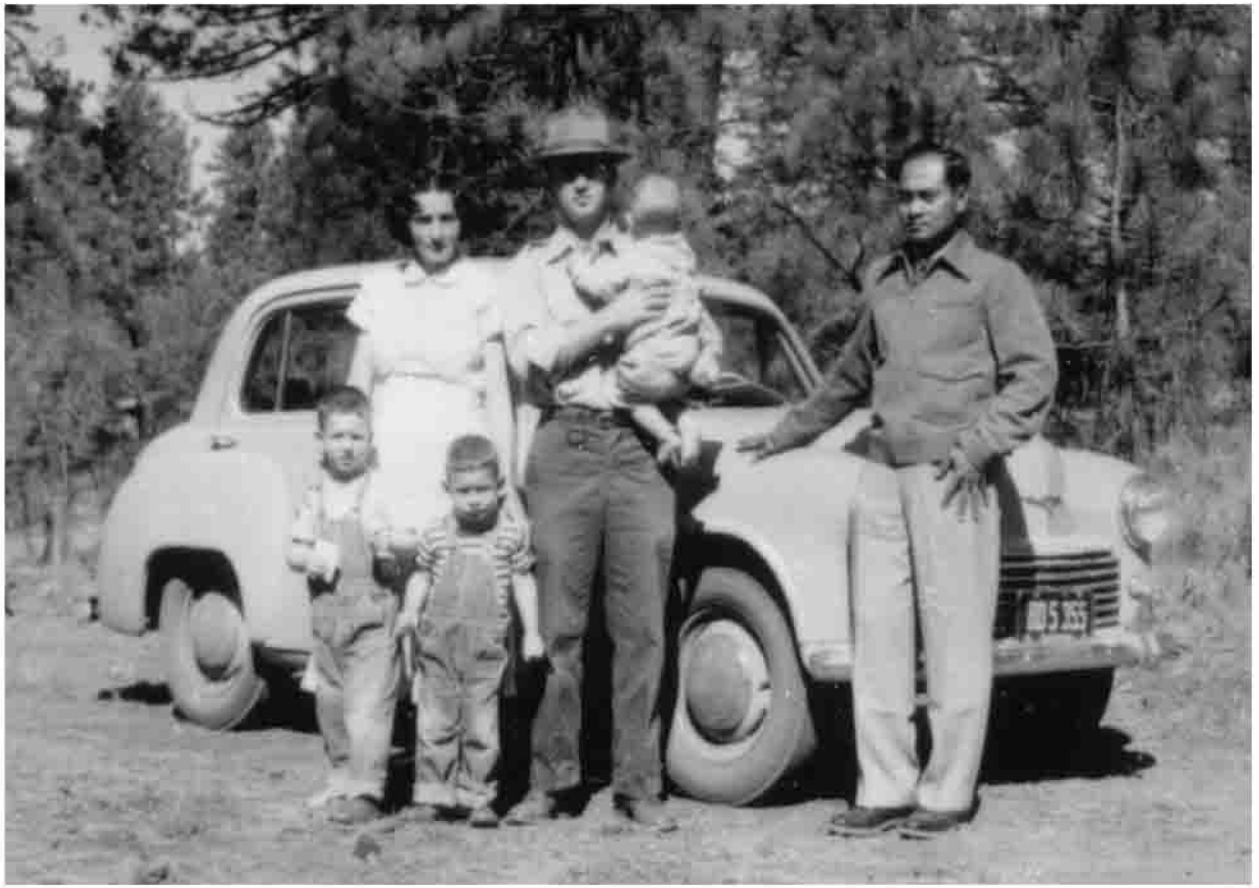


Figure 43--Upper, R. Hardono Narioadiredjo, Indonesian forester, with Don and Lydia Gordon and sons Bruce, Andrew, and Stephen; car is 1950 Hillman Minx. Left, family of Dr. Pao-chang Kuo, Department of Forestry, National Taiwan University, Taipei. Upper photo by Hardono.