HISTORY OF THE STANISLAUS-TUOLUMNE EXPERIMENTAL FOREST

(The Stanislaus Branch)

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Very soon after the establishment of the National Forests, forest personnel started "investigative studies" in an effort to find out how best to manage the timber stands. In terms of today's (1978) refined sampling and statistical techniques and of computer technology, these studies were certainly crude. But they were a beginning. One place of such a beginning was the Stanislaus National Forest in the drainages of the Middle and South Forks of the Stanislaus River and of the North Fork of the Tuolumne River.

Here, as early as 1906-1909, Stanislaus National Forest and Regional Office personnel established plots to study growth of residual stands, establishment and growth of regeneration, and decay of logging slash. Among the early participaints in these studies were S. B. Show, later Regional Forester (R-5), and E. N. Munns, later in charge of Silvicultural Research (Timber Management) in the Washington Office.

Although the Stanislaus Branch of the California Forest and Range Experiment Station was not formally designated as early as Priest River in Idaho, Wind River in Washington, Feather River in northern California, and Fort Valley in Arizona, studies were contemporary with those at these better known field stations.

The Forest Experiment Station

Most of these investigative studies were transferred to the newly formed California Forest Experiment Station July 1, 1926. The name of the Station was changed years later to the Pacific Southwest Forest and Range Experiment Station. Its first Director was E. I. Kotok, whose staff was Duncan Dunning, A. E. Wieslander, and H. W. Siggins. Dagmar Vinther was chief clerk and L. O. Baxter, secretary. Roscoe Weaver was assigned to the Devil's Canyon nursery in southern California. The first annual budget was $32,412.50 of federal funds and $8,000 in cooperative funds.

In the central Sierra Nevada of California, at elevations ranging from about 3,500 to 6,500 feet, lies a belt of high site and quality mixed-conifer timber. Ponderosa pine, sugar pine, Jeffrey pine, white fir, and incense cedar are the principal tree species. In the northern part, Douglas-fir is a stand component; in the southern part giant sequoia, or big tree, occurs in scattered stands.

Dunning, who became chief of pine management, was deeply interested in the Stanislaus area. He continually pushed for more research on the management of this high-site belt of timber in the central Sierra Nevada of California. The Station's Investigative Committee in 1926 recommended the establishment of the Stanislaus (Cow Creek) experimental forest.

Again in 1930-1931, the Committee recommended the establishment of an experimental forest in the Stanislaus National Forest. In 1931 Dunning asked T. D. Woodberry, Assistant Regional Forester for Timber Management, to try to set aside the remaining uncut areas on Dodge Ridge (North Fork of Tuolumne drainage) as a reserve for the Station. In August of 1931, Earl Clapp, Assistant Chief for Research, met with E. I. Kotok, T. D. Woodberry, Paul Roberts, Lands, and Nick Carter, Timber Management--all of the Washington Office--and Dunning and Region and Forest personnel to discuss future plans for the Stanislaus Center.

In 1935, Dunning proposed the development of an experimental forest on which to apply the theories emerging from detailed research on experimental plots. But the Stanislaus-Tuolumne Experimental Forest was not approved until December 6, 1943.

For brevity and because many of the study plots were not on the Forest as withdrawn, the Forest and the other study plots are referred to as the "Stanislaus Branch" in this report.

The Experimental Forest

As approved, the Experimental Forest consisted of two tracts, the headquarters tract on which the facilities were located, and the Tuolumne Tract. The headquarters tract was located in Section 20, T4N, R18E, MDM, on each side of the South Fork of the Stanislaus River, elevation 5,180 feet. It is about 32 miles northeast of Sonora, off State Highway 108, and downriver from Pinecrest and Strawberry. The tract contained about 200 acres, 60 of which supported a mixed-conifer stand, mature and immature, of 1.832 million board feet (1943 basis). The other 140 acres had been cutover in 1927 in a Forest Service sale by the Pickering Lumber Company.

The Tuloumne tract lay on the lower slope of Dodge Ridge on the south side of the North Fork, Tuolumne River, including parts of Sections 26, 27, 28, and 35, T4N, R18E. Elevations ranged around 6,000 feet. This tract contained about 1,300 acres; of these, 450 acres had been cutover before 1929; 221 acres were barren, and 629 acres supported mixed-conifer virgin timber of 31.665 million board feet (1943 basis).

Site

Site quality generally has been estimated to be site I-175; small areas no doubt would have rated site A-200. Some mature dominant trees exceeded 200 feet in height. Annual growth rates of 700 board feet per acre had been measured.

Climate

Annual precipitation averaged about 37 inches per year during the period 1936 to 1955. However, much of this fell as snow, and it is probable that the water equivalent may not have been estimated correctly. Snow accumulated to depths of 10 feet or more in some years

and drifts remained at the headquarters site until mid-May. Little precipitation fell in the period June through September; July and August seldom had rainfall.

Temperatures ranged from highs in the upper 90's (°F) to lows below zero. Maximum temperatures in the summer months often exceeded 80°F, and the minimums usually ranged from 40°F to 50°F. The clear, dry, moderately warm summer days and cool nights contributed to the recreational appeal of the general area.

Soils

Moderately deep, sandy to fine sandy loams of the Holland series were general in the Experimental Forest. They were residual, derived from granite or diorite. Field capacity and wilting point were estimated to range between 17 and 20 percent and 6 to 9 percent, respectively. On the higher slopes and ridges, soils from the lava caps were shallow and supported poor tree growth.

Minor vegetation

Some of the problems of managing this high-site forest, particularly those associated with obtaining regeneration, were related to the aggressive brush species. These included bear clover (Chamaebatia foliolosa), especially common on south-facing slopes of the lower elevations; manzanita (Arctostaphylos patula); whitethorn (Ceanothus cordulatus); deerbrush (C. intergerrimus); mountain lilac (C. parvifolius); and chinquapin (Castanopsis sempervirens). Ribes were generally eradicated during blister rust control programs in the mid-1930's. After logging or fire, brush may quickly dominate the area, severely restricting natural regeneration or planting. Brush seeds may lie dormant in the forest floor for decades and then germinate following a fire, logging, or other disturbance.

Facilities

The first buildings, constructed during the period 1927-1929, consisted of a 3-room living quarters, a 2-room office-laboratory, and a garage-storage building. Water was piped from a spring above the buildings and sewage was pumped away from the river up hill to a septic tank. The pump also forced water from the river into the fire system; turning the wrong valves was disastrous. "Flamo" bottled gas was used for lighting and supplemented the wood stove for cooking.

With the advent of various emergency programs in the early 1930's (Emergency Conservation Program, Public Works Administration, Civil Works Administration), funds and labor became available to increase facilities. During the period 1933-1937, a staff house, an office-laboratory, a dormitory, and a large garage-warehouse were constructed. Electricity was brought in, replacing the gasoline-electric generators, which earlier had replaced the Flamo system, for lights. Later the sewage disposal and fire systems were physically separated, thereby eliminating odorous misshaps in fire drills.

Figure 1--The swing bridge across the South Fork of the Stanislaus River. A clear head and steady feet were essential to cross. Photo by Fowells.

Program

The central theme of the research program was the development of harvesting methods for old-growth stands which would lead to adequate regeneration of the desirable pines. Following cutting of various degrees, ranging from clearcutting to removal of only the overmature stand, the staff and field assistants mapped all residual trees and brush on the study plots, and tallied and located all plant species on milacre quadrats. They remeasured and recharted the plots periodically--every five years was the objective. Although 12 harvest cutting plots were established over the years up to 1930, vegetation was charted intensively on only 6 plots, totalling about 56 acres.

On these same plots the staff counted all cones on pines and firs for 28 years. They also set out seed traps, 2.86 by 2.86 feet square, to estimate the seed fall. On 3 plots, Mc9-10-11, a total of 624 traps were distributed. Recovering them and counting the seed, especially when the traps were full of an early snow, was an arduous task.

To try to find out why cone crops were so periodic, the staff constructed wooden ladders reaching up into the crowns of each of four trees--a sugar pine, a ponderosa pine, a Jeffrey pine, and a white fir. Conelets were collected periodically to study their development. And, on the Jeffrey pine, maximum and minimum temperatures were observed daily at heights of 30, 60, and 120 feet above ground. Ladders on the other trees were 80-100 feet tall.

Figure 2--The tree ladder, 120 feet high in the Jeffrey pine site factor station 4. During the field season, Powells or one of the staff climbed this ladder every morning. For those who can't visualize 120 feet, consider climbing up the side of a 10-story building. Photo by George Craig, 1936.

To determine the factors influencing the mortality and survival of seedlings, five site factor stations were constructed during the period 1931 to 1934. Two stations were on a south-facing slope, in a partially cutover area, and in a virgin stand. Three stations were on a north slope--in a clearcut area, in partial cut, and in a virgin stand. The staff made daily visits to these stations to record air and soil temperatures and rainfall and to follow the progress and survival of seedlings. Soil moisture was determined at 10-day intervals at several soil depths at each Station. During the frost-free season, evaporation from Livingston atmometers was measured.

Figure 3--Site Factor Station No. 3, on a south-facing slope. Photo by George Craig, 1936.

Over the years the staff conducted a number of studies on controlling brush. Early studies involved mechanical treatments; later various herbicides were used.

In addition, over the years the staff conducted many small studies on seed tree fertilization, seasonal growth, root development, choice of planting stock, survival and growth of pine hybrids, and establishment of giant sequoia.

With the establishment of the Experimental Forest in 1943, Dunning's proposal of 1935 could become a reality (once manpower and funds were available after World War II). Putting together all the bits and pieces of information from the plot studies, he formulated a silvicultural procedure which he termed "Unit Area Control." Simply, it meant doing all the things necessary in managing any piece of forest (stand condition class in his terminology) and in the follow-up treatments to keep the desired species, usually pine, in control of that piece of land.

In 1948 and 1949 Experimental Forest logging crews harvested about 8 million board feet from 200 acres in the Tuolumne tract. The objectives of this study (or demonstration) appear to have been met.

With a change in leadership of the Pine Management Division and a change in program emphasis, research activity at the Stanislaus Branch slowly declined. Finally, on April 17, 1969, the headquarters facilities were turned over to the Stanislaus National Forest.

Cooperative Research at the Experimental Forest

Very early in the life of the Branch Station, the facilities had been made available to cooperators. In 1929, Professor M. E. Krueger and others at the UC Forestry School cooperated in a large logging and milling study. In 1931, Professor G. B. Bodman, UC Soils Department, began a series of studies on forest soils in the area. During the early Thirties, Professor J. Kittridge, UC Forestry School, had an assistant at the Station during the winter to measure snow depths and snow water content. Later, staff of the Forestry School studied mistletoe and seed and cone insects at the Station.

As early as the early Twenties, USDA's Office of Forest Pathology (not part of the Forest Service until 1953) began studies on slash decay in the area.

The Berkeley Blister Rust Control Office (at that time a unit of the Bureau of Entomology and Plant Quarantine) conducted studies on Ribes ecology on some of the plots. This office was deeply interested in measures to increase the sugar pine components of stands and were very helpful (and generous) in the construction of the camp to house the loggers for the 1948-1949 area cutting and in the development of a small nursery to grow sugar pine seedlings.

To control rodents on the regeneration study areas, Joyce Keyes, Fish & Wildlife Service, supplied much know-how and material.

Finally, the Stanislaus National Forest provided much support service to the Station, in addition to setting aside areas for research purposes. Especially helpful in the development of the Station facilities was the assignment, in the mid-Thirties, of a spike camp of CCC enrollees. The camp stayed until the CCC was abolished in June 1942.

The People at the Experimental Forest

Although the physical facilities provided the environment for productive research, the people made it go. It is worthwhile, then, to list those who participated in the research effort. Some undoubtedly have been omitted through the loss of memory or available records, but not intentionally. Dates may not be exact.

Duncan Dunning was intimately associated with the development of the Stanislaus Branch. Dunning, raised in the Sierra Nevada and educated in California, was no doubt the keenest observer and best naturalist in the Station. Unfortunately, there appeared to be a deep-seated friction between him and Director Kotok. Dunning retired in 1951, bitter and frustrated with what he believed was lack of support for the whole timber management research program in California.

The following people, who worked at the Stanislaus Branch, are listed alphabetically; no relative importance of their contributions is associated with being listed first or last.

R. Keith Arnold helped with site factor Station studies, seed production studies, and root studies in 1938.

Frank Baron worked with Gilbert Schubert on regenerative studies in the early 1960's.

William Bullard assisted Fowells in 1937 at Stanislaus Branch.

Buster Carlton was the logging superintendent in 1948-1949.

Robert Chandler started the study of flower and cone development in 1935. He helped build the tree ladders.

Victor Clements, who joined the Station about 1930, was in charge of growth studies on the methods-of-cutting plots.

Donald Cosens participated in the lay-out and record-taking in the 1948-1949 Unit Area Control study.

George Craig was a Junior Assistant Technician (special CCC appointment) at the Stanislaus in 1936.

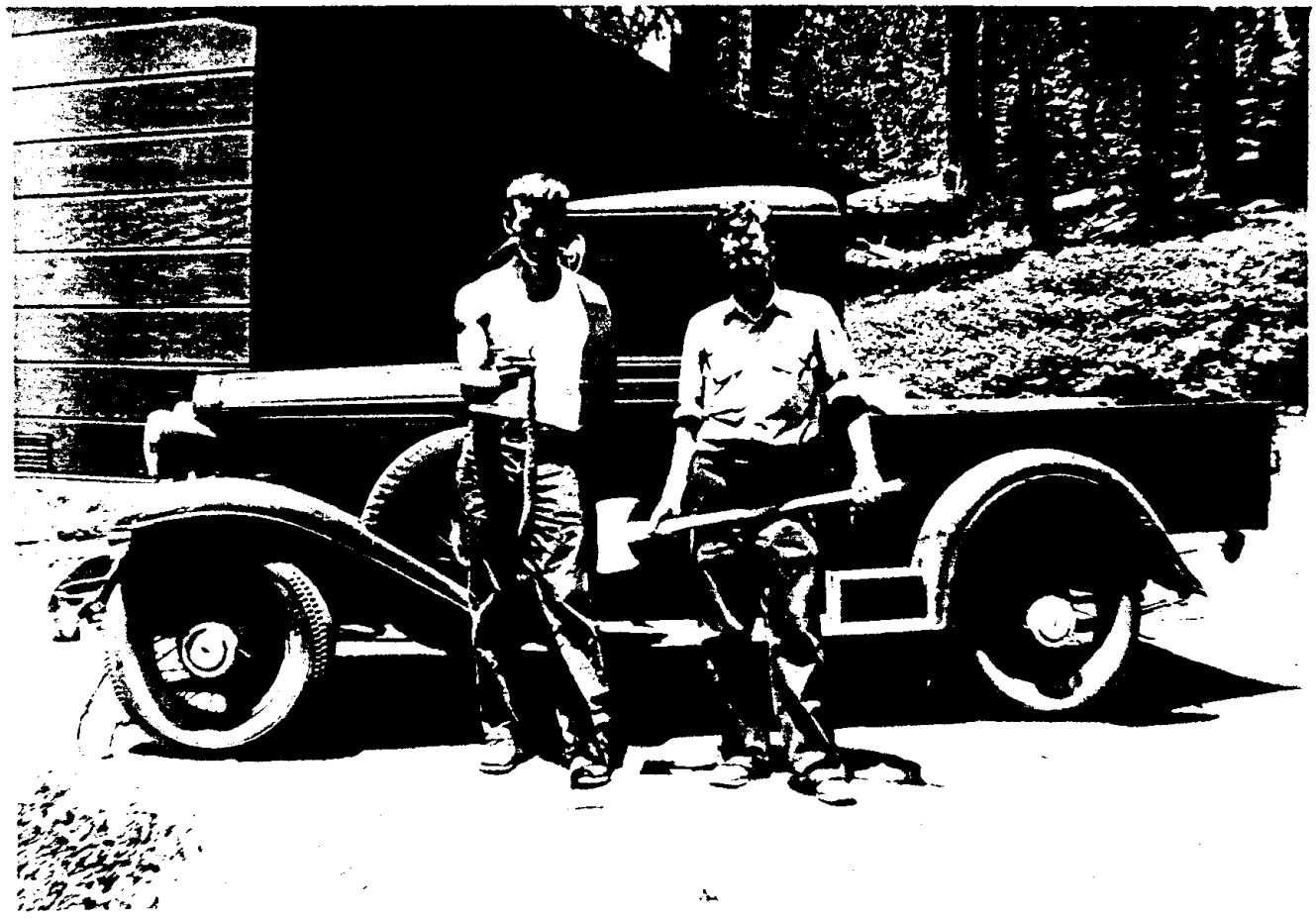

Figure 4--George Craig holding an unwelcome visitor at the Stanislaus Branch. The rattlesnake was decapitated by Fowells. Photo by George Craig, 1936.

Reginald Drew supervised the contruction of the buildings in 1936-1937.

Harry Fowells was in residence or nominally in charge of the Stanislaus Branch, 1936-1953.

Philip Haddock was in residence in 1942.

Austin Hasel, who joined the Station about 1929, worked with Dunning on plot remeasurements during the early years.

August Hormay helped remeasure plots about 1931.

Ray Horsley was a caretaker for a number of years, starting about 1945.

William Hallin supervised the 1948-1949 Unit Area Control study.

Irving Isenberg helped with plots in 1934.

Harry Keenan was a winter caretaker during the war years.

Robert Keniston helped measure plots in 1936 or 1937.

Bernard Kirk assisted Fowells periodically before 1942.

Russell LeBarron replaced Dunning in 1951.

Lester Lloyd was the first field assistant, in 1929, and later the first full-time resident in field season.

David Maul worked on the Unit Area Control cutting in 1948-1949.

William Partington was a handyman and caretaker for several years starting in 1935.

Nicholas Mirov checked quadrats about 1930.

Earl Morrow came down from the Feather River Branch on a number of occasions to help out.

William Partington was a handyman and caretaker for several years starting in 1935.

Henry Payne was a Junior Assistant Technician in 1936.

Lee Prater helped measure plots, 1934-1935.

Douglass Roy helped in the preparation ofx the 1948-1949 Unit Area Control study and measurement of residual stands.

Gilbert Schubert assisted Fowells in silvics and regeneration studies, 1947-1953, and was in charge of the Stanislaus Branch after Fowells left.

Howard Siggins, one of the original staff of the California Station, worked with Dunning until 1929. Siggins died after an automobile accident near Longbarn in the fall of 1929. There was a suspicion that the attending physician at the emergency hospital in Sonora was intoxicated when Siggins was brought in, but no malpractice suit was instituted because of lack of evidence.

Nellie Beetham Stark was in residence in the early 1960's working on silvical studies. She married Oscar Stark while they were at the Stanislaus Branch.

Oscar Stark was a scaler on the Unit Area Control logging and later was the caretaker at Stanislaus Branch.

Clarence Stevens participated in the early phases of field trials in the Unit Area Control study.

Edward Stone was resident at the Stanislaus Branch in 1939.

Dean Stowell remeasured plots 1934-1935.

Kenneth Taber remeasured plots in 1935.

David Tackle helped with the Unit Area Control study, 1948-1949.

Willard Tallman remeasured plots in 1935.

Ernest Wohletz remeasured plots in 1934-1935.

Eugene Zumwalt remeasured plots in 1935.

Accomplishments

It would be with much pride if one could say that research at the Stanislaus Branch resulted in a giant step forward in forestry. But in forest research, as in other research, the bits of information often must be combined with other facts to achieve even a small step forward. Aristotle once said, "from all the facts assembled there arises a certain grandeur." Hopefully, facts from the Stanislaus will contribute to some grandeur in forestry.

To the extent that Dunning used data from the Branch plots, his exposition of tree classes was a major accomplishment from the Stanislaus. Later, data from some of the same plots led to a model for predicting growth in cutover stands.

The years of observations in seed crops certainly should have provided guidelines for reserving seed trees in harvest cuttings.

Also, the intensive studies on the relationships between seedling establishment and site factors should have dispelled any doubts about the ability of pines to regenerate.

Observations from the Stanislaus Branch were significant in Dunning's development of the Unit Area Control concept for managing forests.

If accomplishments are equated to publications of research results, some 40 to 50 publications resulted from the Stanislaus studies. Among these may be noted the following:

Brundage, M. R., M. E. Krueger, and Duncan Dunning.
1933. The economic significance of tree size in western Sierra Nevada lumbering. Calif. Agr. Exp. Stn. Bull. No. 549, 61 p.
A coordinated logging and milling study was conducted in order to determine costs and values for each species, size and grade of logs and trees.

Dunning, Duncan.
1928. A tree classification for the selection forests of the Sierra Nevada. J. Agric. Res. 36(9):755-771.
Proposes a new classification system and then compares seven classes of Pinus ponderosa based on age, degree of dominance, crown development, and vigor.

Fowells, Harry A.
1941. The period of seasonal growth of ponderosa pine and associated species. J. Forestry 39(7):601-608.
A comparison of the seasonal height and radial growth of ponderosa pine and six other conifers reveals significant differences in time of start of growth and length of growing period.

Fowells, Harry A.
1944. Site preparation as an aid to sugar pine regeneration. U.S. Forest Serv. Calif. Forest and Range Exp. Stn. Res. Note 28, 21 p., Berkeley, CA.
Brush cover was removed in cut-over stands of sugar pine in anticipation of a good seed crop, but natural reproduction was less successful than seed spotting and planting on the cleared areas.

Fowells, Harry A., and Gilbert H. Schubert.
1951. Natural reproduction in certain cutover pine-fir stands in California. J. Forestry 49(3):192-196.
Reports that despite a predominance of pine seed trees before logging, natural regeneration of cutover lands favors firs and cedars.

Fowells, Harry A., and Gilbert H. Schubert.
1956. Seed crops of forest trees in the pine region of California. U.S. Dep. Agric. Tech. Bull. 1150, 48 p., illus.
Summarizes 28 years of seed production of sugar pine, ponderosa pine, and white fir, and interprets this information for application to cutting practices and seed collection.

Fowells, Harry A., and N. B. Stark.
1966. Natural regeneration in relation to the environment in the mixed conifer forest type of California. U.S. Forest Serv. Res. Paper PSW-24, 14 p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.
The germination, survival, and growth of ponderosa pine, sugar pine, white fir, and incense-cedar were studied in relation to environmental factors in the central Sierra Nevada, California.

Stark, N. B.
1963. Thirty-year summary of climatological measurements from the central Sierra Nevada. U.S. Forest Serv. Res. Note PSW-36, 15 p., illus. Pacific Southwest Forest and Range Exp. Stn., Berkeley, CA.
Presents data showing how five areas of different aspect, elevation, past history, shade, and litter-cover differ in air and soil temperatures, relative humidity, wind velocity, and precipitation.

Some Sidelights and Whimsy

Because of the picturesque setting and comfortable facilities of the Stanislaus Branch, Director Kotok often offered the use of the buildings to University of California staff. This was, no doubt, part of the cooperative arrangements with the University; for years, the Station was quartered in Hilgard and Giannini Halls and later in Mulford Hall. Among these visitors were the following:

Dean C. B. Hutchison, College of Agriculture, spent at least one vacation at the Station during the middle Thirties. Mrs. Hutchison fell in love with Bill Partington's biscuits.

Professor Ciriacy-Wantrup was offered the opportunity of using the Branch facilities as a hunting base about 1939. Accustomed to hunting in his native Germany, he expected to be put on a stand and have the deer driven to him. Fowells straightened him out and the professor was a good sport about it. Wantrup had a beautiful Sauer drilling, a double-barrelled shotgun with a single-shot rifle barrel. He said he had seen a buck several mornings in the place, but, having only one shot, he hesitated to shoot until he could get closer. Finally on the last day of the season, he shot and killed a doe. Upset at his mistake, he asked Fowells what he should do and was advised to dress-out the deer and turn it in to the game warden. Wantrup did and was given a minimum fine which was later remitted because he was so honest about the offense.

Professor Jerzy Neyman, a world famous mathematical statistician, and family were at the Stanislaus Branch about 1939, having left Poland before the country fell during World War II.

Numerous Washington Office staff stopped at the Stanislaus Branch during various inspections. Among these were Earle Clapp, I. T. Haig, Edward Munns, Nicholas Carter, Earl Loveridge, F. H. Eyre, and Leonard Barrett, all before 1953, and later, C. E. Ostrom.

Probably the most famous forester to visit the Station was Gifford Pinchot (probably in 1937). With him were Dean Henry S. Graves, of Yale University, and H. A. Smith, an early Forest Service employee.

Foresters from a number of foreign countries also visited the Station, including some from Greece, France, Italy, Germany, England, Australia, Finland, and Sweden. Among these were: Professor Sarvas, Finland; Professor Moulopolos, Greece; Mr. Faulkner, Great Britain; Mr. Xavier Le Chatelier, France; and a high-ranking Italian forester resplendent in his para-military officer's uniform.

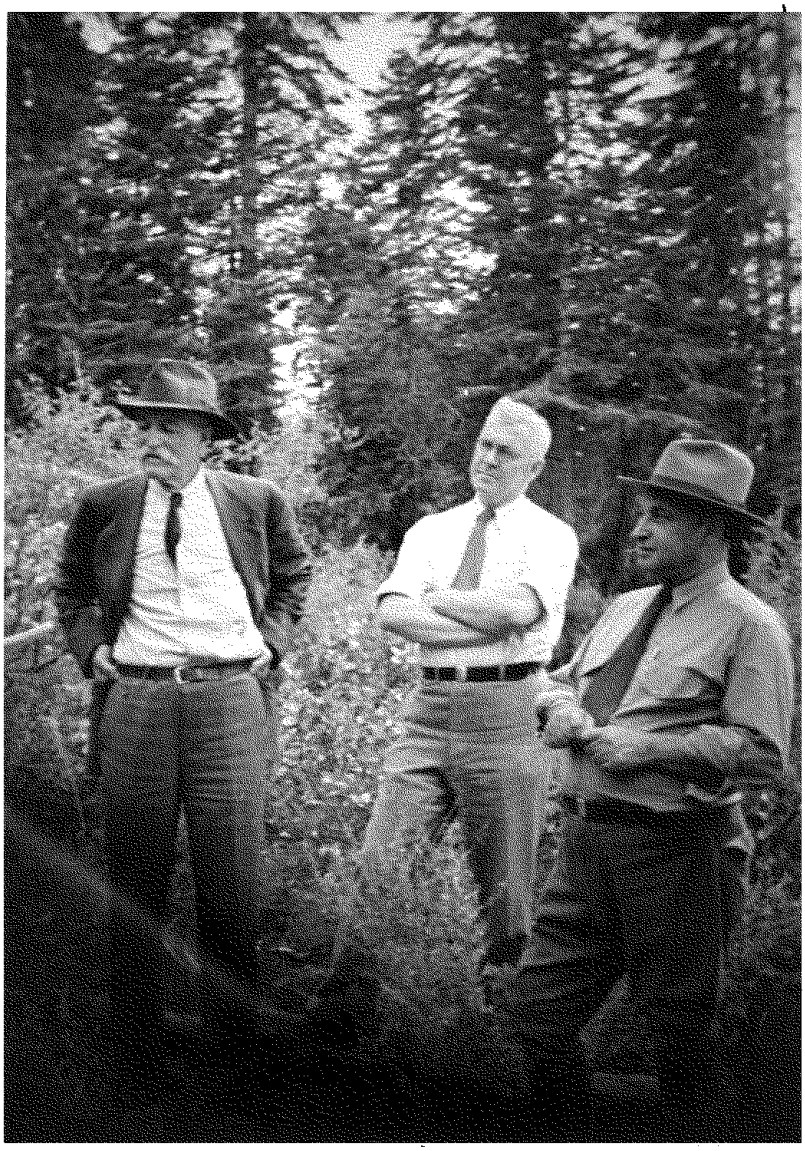

Figure 5--Gifford Pinchot, the first Chief of the Forest Service, with Dean C. B. Hutchison and Director E. I. Kotok at the Stanislaus Branch in 1937. Photo by Fowells.

As in all early Forest Service establishments, the staff at Stanislaus Branch had to be more than foresters. Plumbers, electricians, and carpenters were not available with a telephone call. So, all too often the staff spent as much time installing and repairing as it did on the assigned forestry projects. And of course, they did their own cooking and housekeeping. In 1934-1935 the crew took turns cooking in the government mess. Later, Bill Partington, who practiced on himself during the winter, did most of the cooking. Bill, an electrical engineer who lost his job on the East Coast during the Depression, was extremely precise. So, recipes in the White House cookbook were recalculated from a pinch of salt or a piece of butter the size of a walnut to grams of salt or butter. The laboratory balance was well used during the winter.

In these days (1978) of dollar and a half hamburgers, it seems impossible that the meal-cost-per-man day never exceeded 90 cents. And the crew demanded the fanciest cuts of meat and the best canned products.

Keeping guest rooms clean and beds made for all the visitors took too much time also, but maid service was not available.

A few incidents in those early years probably will never be forgotten by those involved. When Keith Arnold first climbed the tree ladder, there was not enough space for a sheet of paper between him and the ladder at the 100-foot level. Was it good training for the heights he later attained?

Bill Partington shovelled six to eight feet of snow off the road to the Pinecrest juntion, about two miles from the Station. He then drove his Model A to Sonora, got a haircut and a sack of oranges, and drove back to the Station.

Figure 6--Henry Payne with a pile of pine cones and the seed spot cones. Photo by George Craig, 1936.

Lee Prater and Les Lloyd hauled Lee's red piano from San Francisco to the Station (in a government pickup). Dunning virtually exploded when he saw it in the bunkhouse and ordered it out. For years it was in the old Pinecrest Hotel.

Bill Bullard, an avid and expert photographer, stealthily crept up and photographed a yellow butterfly on a red snow plant (Sarcodes). When the butterfly didn't fly, Bill found someone had pinned the insect to the plant, where Bill would be certain to see it.

Ray Horsley, who lost parts of several fingers on a ship in World War I, tied perfect flies and rolled cigarettes despite his disability (for which he collected a pension).

Needing some rails for the entrance cattle-guard, Fowells took a CCC crew and removed a few rails from the Pickering Line, abandoned in 1929 on National Forest land. In 1942 a work train, salvaging the old steel, had to stop at the break in the tracks until the missing rails were replaced.

Phil Haddock brought his lovely bride to live at the Stanislaus Branch. On meeting them at the Branch, Professor Woodbridge Metcalf (UC) remarked, "All this and heaven, too."

George Craig was asked to pick up seed cones, with help of a couple of CCC enrollees, on one of the plots. After two days when the job was not finished, Fowells went out to investigate and found they had picked up and piled all the pine cones on a 10-acre plot. Fowells had meant the conical screens used to cover about 1,000 seed spots on the plot.

Alumni of the Stanislaus Branch have made their mark in forestry or the scientific world: a deputy chief of the Forest Service, a university president, a forestry dean, several university professors, a leader in industrial forestry, a director in the Bureau of Land Management, and a Washington Office staff man. For these and the others who worked there, the Stanislaus Branch will always be a pleasant memory.

Harry A. Fowells

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