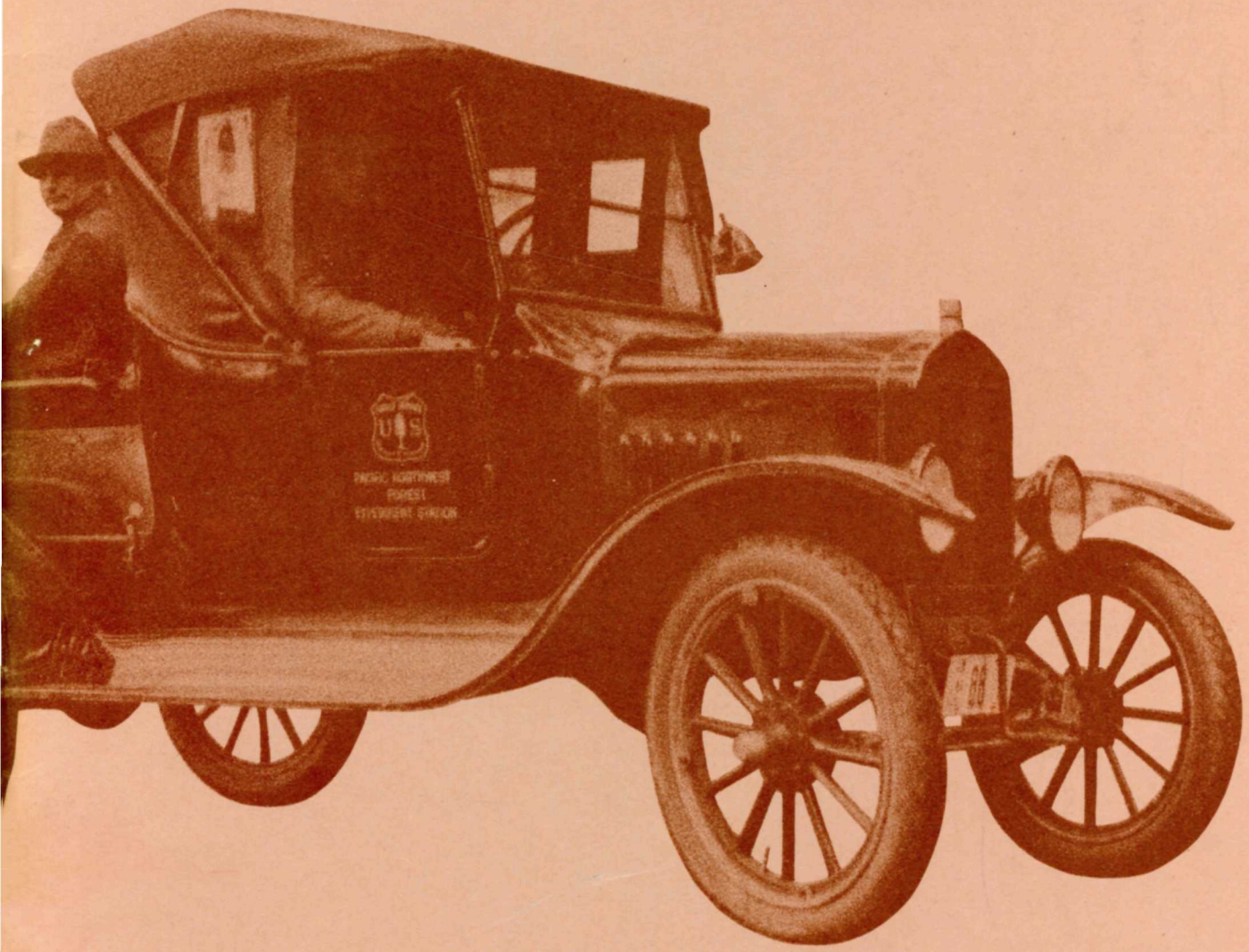
Early Forestry Research



a history of the Pacific Northwest Forest & Range Experiment Station

1925-1975

a history of the Pacific Northwest Forest & Range Experiment Station 1925–1975

by Ivan Doig

FIFTY YEARS OF FORESTRY RESEARCH

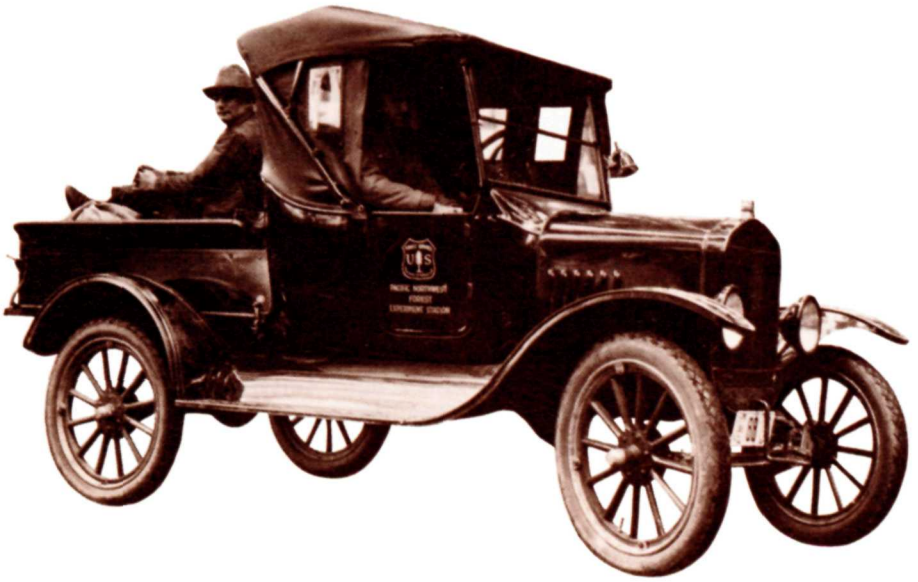
This is a year of celebration! Across our land citizens will gather to observe the 200th birthday of our great nation. Along with the celebration of national birth, the Forest Service is also commemorating the first 50 years of forestry research in the Pacific Northwest.

Fifty years ago the Pacific Northwest witnessed a new breed of woodsmen—men armed with the instruments and tools of science. In the years which have passed, scientists from the Pacific Northwest Forest and Range Experiment Station have worked to gain an understanding of the complex ecosystems of the forest lands of Oregon, Washington, and Alaska. The contributions of these men of science have helped to insure continued forest productivity and environmental harmony in the years ahead.

To mark this occasion, we commissioned freelance writer Ivan Doig to do a history of the Experiment Station. Ivan drew heavily from a lengthy manuscript on that subject by former director Robert Cowlin. In addition, he had access to our historical files and conducted extensive interviews with five of the Station's directors. The result, we believe, is an entertaining summary of the early years of forestry research in one of the world's most important forest regions. We hope you will read it with enjoyment, and at the same time learn a little more about Forest Service research in the Pacific Northwest.

Robert F. Tarrant

Robert F. Tarrant
Director



A Beginning

One caller, name unknown, who evidently saw the name on the door, came in to ask what we were experimenting with, saying that he too was a professional experimenter and worked with everything from juniper to gooseberry bushes—he had once persuaded one of the latter to be a tree.

—Thornton T. Munger, Director, January 1925

That early visitor to the Pacific Northwest Forest Experiment Station must have hoped he had stumbled onto a brotherhood of wildwood magicians there in a downtown Portland office building. But he more than likely departed shaking his head that these Forest Service fellows weren't even equal to his own sorcery with the gooseberry bush.

He would have found a staff of eight persons tucked into four small rooms, and still waiting for most of their office furniture to arrive. Since it was winter, the staff members had long since left the rainy woods to come in and catch up on paperwork. Young Leo A. Isaac was preparing a report about seed storage tests he had run on stands of noble and silver fir. Another young forester named Richard E. McArdle was compiling data on Douglas-fir growth. Staff meetings were held once or twice a week, presided over by Thornton T. Munger, a crisp New Englander.

Today, a half century later, the doorways of the Pacific Northwest Forest and Range Experiment Station are scattered from Fairbanks, Alaska, to Bend, Oregon. Laboratories and field offices are located at nine sites in the Pacific Northwest and Alaska; the largest, the Forestry Sciences Laboratory on the campus of Oregon State University at Corvallis, has some 45 scientists. The Portland office has grown from four rooms into a four-story building, headquarters for a total Station staff of about 300 persons. All in all, this research facility at any one time has some two dozen teams at work on forest and rangeland problems—reforestation, watershed management, wildlife habitats, and forest diseases and insects, to name a few.

In all of this, there is a lineage of effort and achievement from that modest office scene of 1925. Leo Isaac later became renowned as a silviculturist and a storied figure in forestry science for his imaginative experiments. Mac McArdle later became Chief of the U.S. Forest Service. Thornton Munger directed studies of selected Douglas-fir stocks which have yielded valuable reforestation information ever since.

Just so do yesterdays add up to today. Just so does the story which opens with a single curious passerby flex itself into a history of Forest Service research on the timber and range resources of the Pacific Northwest.

The Skein of Research

. . . America had the virgin West for Science to open, and in Washington forged keys to open it with.
–Wallace Stegner, Beyond the Hundredth Meridian

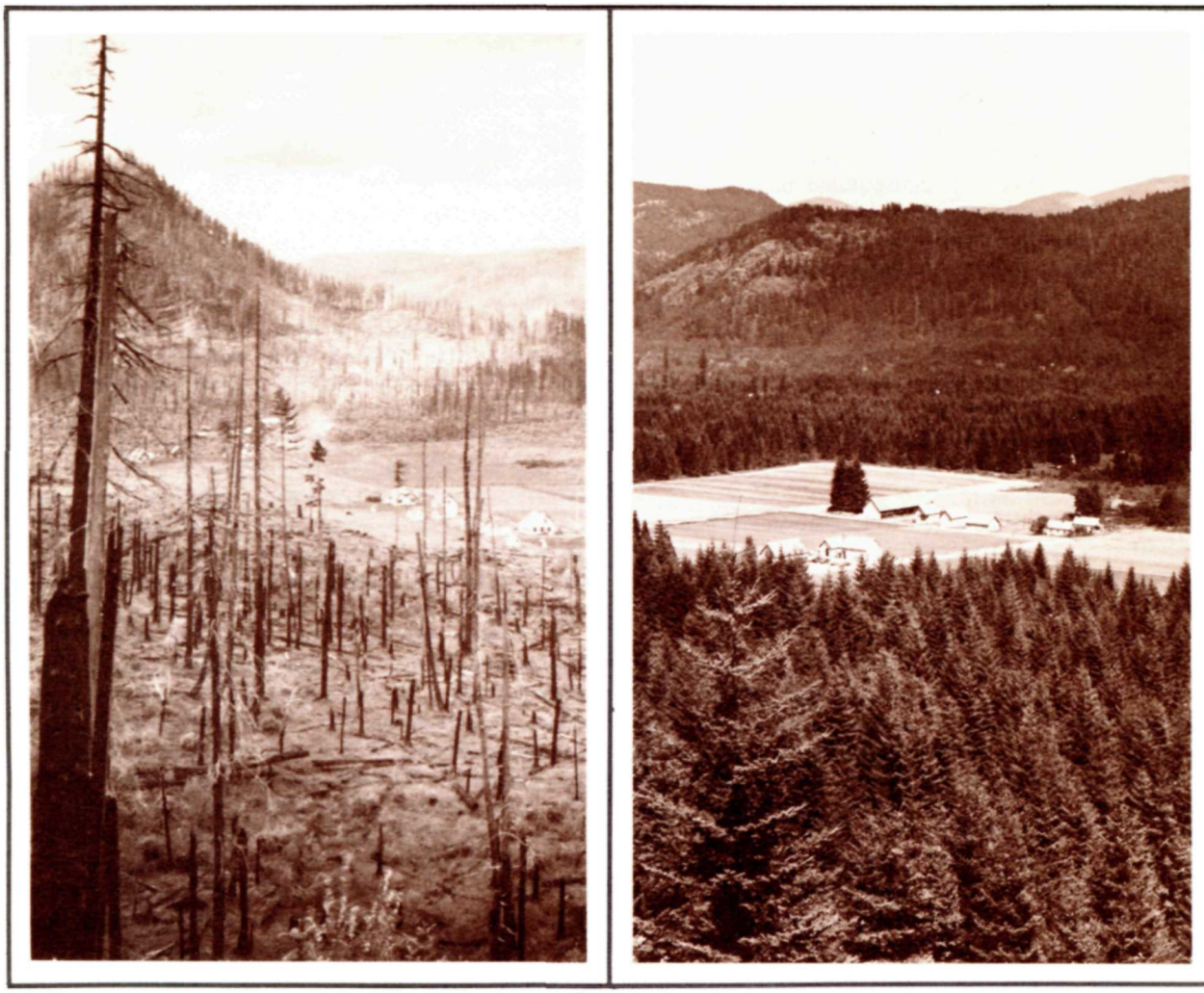
The storms track in from the Pacific on collision course first with the Olympic Mountains and the Coast Ranges, and then with the longer and loftier jut of the Cascade Range north to south through the states of Oregon and Washington. We can't say for sure what at least one writer has alleged: "The first thing reported about the Northwest Coast was rain." But we do know how impressed the earliest explorers were with the vast growth fed by this damp North Pacific weather–the dark green forests which bristled from horizon to horizon, mighty trees often a height of 200 feet or more.

This region's forestry research in a sense began with the voyage of Commander Vancouver in 1792. Vancouver's surgeon, a Scottish naturalist named Archibald Menzies, went up the Columbia River 100 miles by longboat and collected twigs, needles, and cones along the way. His harvest included specimens from the Douglas-fir, Sitka spruce, western hemlock, and western redcedar–the four great timber species west of the Cascades.

Then in the winter of 1805-1806, the Lewis and Clark expedition came down the Columbia River to ocean's edge. Captain Meriwether Lewis was the first American naturalist to record much of the flora and fauna along that route, and the big timber impressed the explorers. ". . . species which grows to immence size," Lewis wrote of the forest goliath now called Sitka spruce. ". . . [T]hey frequently rise to a hight of 230 feet, and one hundred and twenty or 30 of that hight without a limb . . ."

Another species, one which became the mainstay of generations of Northwest logging, took its name from a visitor two decades after Lewis and Clark. In 1825, David Douglas was sent by the Royal Horticultural Society in London to study the forests of the Pacific Northwest. Of the dominant tree he found in the coastal region, a huge straight-boled species armored with thick furrowed bark, the naturalist ventured a mild prophecy: "The wood may be found very useful for a variety of domestic purposes."

The Douglas-fir did indeed prove useful, with billions of board feet logged from those original lofty groves. As the course of American settlement swung into the Pacific Northwest and divided it into the State of Oregon and the Territory of Washington, the lumber trade grew rapidly. As early as 1847, a water-powered sawmill was clattering on the shores of Puget Sound, near the present site of Olympia. In 1853, more sizable sawmills were set up at Seattle, Port Ludlow, and Port Gamble. Oregon by then had at least three dozen sawmills, including big ones at



In the early years of forestry, fire was one of the most serious problems. The first research programs were conducted at Wind River, Washington, to develop better nursery practices and forest planting techniques. Photographs taken in 1912 (left) and 1954.

Oregon City, Milwaukie, and Portland. The boom was beginning. The 1860 census showed 32 lumber mills in Washington Territory, 126 in Oregon.

By the outbreak of the Civil War, then, the Pacific Northwest lumber industry was cutting hard at the stands of big trees. The ax-work and sawyering went on with little heed or forethought for the next half century. Lumbermen who had logged in New England were pioneering on this far side of the continent. As forests dwindled in the upper Midwest and the South, other logging entrepreneurs followed the Maine men into the forests beside the Pacific. Cargo fleets breasted the waters of Grays Harbor, Puget Sound and the Columbia to carry the lumber away along Pacific routes. Railroads trundled in to freight lumber off to the markets of the Midwest and the Atlantic seaboard. A mining phrase can be borrowed to tell best what was happening: lumbermen had hit the timber equivalent of a mother lode.

But the very size and abundance of Pacific Northwest timber was deceptive. Such forests were thought to be inexhaustible. The notion prompted logging practices which we can look back on today as a carnival of horrors. In the Okanogan country of north-central Washington, top quality knotless ponderosa pine was sliced up for fruit boxes and irrigation flumes when lesser grades of lumber would have served just as well. Western hemlock and Sitka spruce were generally scorned until at last they were found valuable for the pulp industry. Prime Douglas-fir and redcedar close to waterways, on the other hand, went down all too promptly; as early as 1881, a Seattle newspaper remarked that the best timber along the entire length of Hood Canal had been cut in a swath which now reached a mile and a half back from the shoreline. Whatever the species or locale,

the customary logging practice was "cut out and get out," with no thought of replanting, no concern about the slash and waste left strewn behind.

Yet, in the lumbermen's march westward across America, the Pacific Northwest clearly was the final frontier. An indisputable boundary said so—the Pacific waters which lapped at the forested shores. There were limits of public mood, too. As Oregon author Stewart Holbrook, himself a veteran of the woods, once put it: "Boss loggers and lumbermen were surprised one day to find themselves public ogres who fairly sweated destruction from every pore and who ate up everything but the sawdust, which they left in unsightly piles." The boundless forests which had intrigued the earliest naturalists now were being eyed nervously as a dwindling resource.

While the trees toppled, legislation and administration on behalf of forestry research were inching along. The U.S. Forest Service, which began in 1881 as the Division of Forestry in the Department of Agriculture, listed research among its official functions from the very start. But the first three decades of federal forestry saw time, energy, and budget spent elsewhere.

What has become the present system of National Forests was being pieced together from the timber and range portions of the public domain. As National Forests were created, they had to be administered. From 1898 to 1910, Gifford Pinchot's era as Chief, the Forest Service was an agency kept busy putting itself together out in the new Ranger Stations and in the headquarters in Washington, D.C. Research was mostly on a project basis.

Not until 1915 did the full-fledged Branch of Research emerge within the Forest Service—an administrative unit to direct all Federal forestry research.

After forest research came into its own on the organization chart, it took another decade for the present system of regional Experiment Stations to evolve. As early as 1913, the Pacific Northwest had established the Wind River Experiment Station, south of Mount St. Helens in the Gifford Pinchot National Forest. A Forest Service tree nursery already existed at Wind River, and the diversity of the site—virgin forest, second growth, cut-over land, and a large burn scar from the Yacolt fire of 1902—made possible a variety of planting experiments. But all in all, the Wind River Station and its works were modest. Leo Isaac recalled that when he transferred there in 1924, "it was then a sad affair," with languishing tree plantations and with most of the Station files "piled two feet high on one big open table."

Within the next few years, however, two long-awaited legislative moves bolstered the research concept and a national system of regional Forest Experiment Stations. The Federal Appropriation Act for the fiscal year 1925 allotted $26,060 to establish the Pacific Northwest Forest Experiment Station in Portland, Oregon. Next came a vital piece of legislation by Senator Charles L. McNary of Oregon, the McSweeney-McNary Act of 1928. The lines of that Act blueprinted the regional Experiment Stations as they exist today, and went on to direct the areas of study the facilities were to delve into: forest diseases and insects, wildlife, fire, range and watershed, forest products, timber survey, reforestation, and economic analysis.

Getting Underway in Portland

We had . . . a bicycle tire valve soldered to the gas tank under the seat so we could forcefeed the gas when we had to go up steep hills—the only other way was to drive backwards up the hills.

—Richard E. McArdle, recalling the Station's first truck

Down from Wind River in two truckloads came the makings of the new Experiment Station headquarters in Portland—files, library, and some odds and ends of furniture. Four rooms were leased in the Lewis Building at Fourth and Oak. June H. Wertz transferred from the Forest Service's District Six office several blocks away and started "the big task of going through the 10 years of Wind River files, throwing away the inconsequential stuff and retaining the remainder, and then supplementing that with whatever the Experiment Station files should have from the District files."

The staff, assembled by late 1924, was both new and young. The Wind River personnel, Leo A. Isaac and Gael Simson, were transferred to the Station. Richard E. McArdle was appointed as a Junior Forester from the Civil Service list of eligibles. Four young field assistants were hired: Leonard I. Barrett, later an Experiment Station Director and a Division Chief in the national office of the Forest Service; John McGinn, who later became a successful lumber merchant; Robert Marshall, who in later years became a nationally known writer and eloquent advocate of wilderness areas; and Edwin L. Mowat, a meticulous researcher who completed a career in ponderosa pine research at the Station.

All in all, it was a staff of remarkable promise. They had a field of research where nearly everything needed to be done. American forestry was just coming into its second generation of university-trained forest scientists, and the Federal funding and administrative scaffolding for extensive work had just arrived. The Station's territory then—the forests of Oregon, Washington, and Alaska—provided a colossal variety of tree species, grazing lands, climate, and topography. The vast cuts of lumber which had continued for more than six decades insured the need for all manner of research into the region's timber resources.

To this set of circumstances, Thornton T. Munger, the man in charge of the new Experiment Station, added his own utilitarian guidelines. As Munger later summed it up, "From the start, I was not interested in research for research's sake, but wanted to see research put into use . . ."

The Douglas-fir tree dominated the early forestry research efforts in the Pacific Northwest. The Station's first director, Thornton Munger, tags trees in the Cascade National Forest (middle row, left). Experiments were conducted to test the effect of fertilization on Douglas-fir seedlings at Wind River about 1918 (middle row, right), and in 1922 (top row, middle).

Munger might have had his own early career in mind when he insisted on carefully plotted expenditure of time and effort. In 1908, not quite 25 years old, he was sent from Forest Service headquarters in Washington, D.C., to study the encroachment of lodgepole pine on ponderosa pine in the Pacific Northwest. Since Munger's Forest Service career at the time amounted to 2 months and he had never laid eyes on either species of pine, the assignment was, as Munger later said, "rather presumptuous."

By 1924, when the Experiment Station was established, Munger had had considerable research experience in the Pacific Northwest and knew many of the early leaders in forestry in the United States. Trained at Yale, the hub of American forestry studies at the time, Munger had an academic kinship with the New Haven men who ran the Forest Service during the first quarter of this century. Henry S. Graves, Chief from 1910 to 1920, had been one of his professors in graduate school. William B. Greeley, who headed the agency from 1920 to 1928, earned his master's degree in the Yale forestry program a few years before Munger. And Munger not only knew Gifford Pinchot, the storied and flamboyant first Chief of the modern Forest Service, but was on hand the night Pinchot was fired by President Taft. A public vendetta had erupted between Pinchot and Secretary of the Interior Richard A. Ballinger about Interior's plans to lease out coal and timber lands in Alaska. On the evening of January 7, 1910, Munger was at the Washington home of his brother-in-law, a Yale classmate of Pinchot. Pinchot, who had been invited for dinner, came in a bit late, but with the apology that a White House messenger had handed him a letter just before he left home. As the party sat down to dinner, Pinchot coolly read aloud his dismissal for taking the Alaskan lands argument to the public. Munger remembered the "awful blow" that "our leader and really our hero was gone."

During his first several years in the Pacific Northwest, Munger was in charge of the one-man Section of Silvics at the District Office in Portland. He served as "sort of a roustabout" in the job. Research ventures into the field were hit-and-miss. Once when directed to establish some test plantings of trees from the American east coast and Europe, a favorite project of then-Secretary of Agriculture James Wilson, Munger found himself on the western slope of Mount Hood with two companions, five horses, and a snowstorm. As the snow piled up, Munger and company quickly flung the tree seeds onto the snow and scurried for lower climes.

"People who have gone through that area since then have been surprised to discover an occasional eastern oak or a European pine, and have wondered how in the world it got there," Munger mused later.

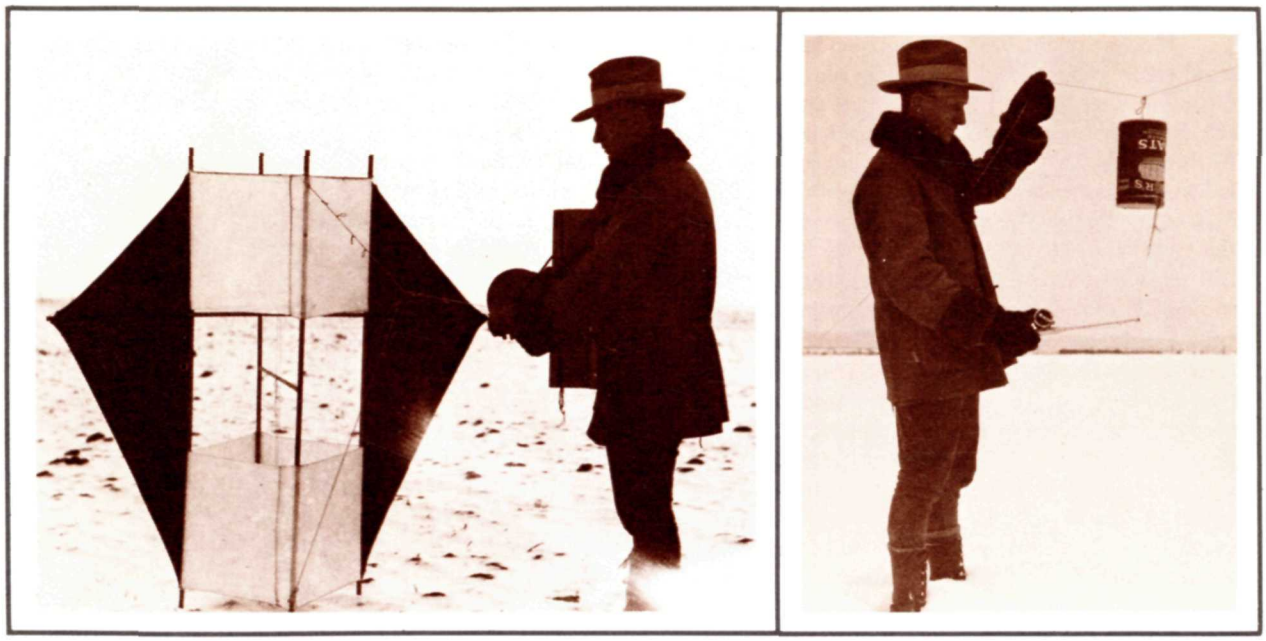
Other projects were tidier and more productive. Munger did some tree planting to slow the drifting of sand dunes along the southern Oregon coast. He made reconnaissance trips into avalanche areas of the North Cascades to study the effects of deforestation. And in 1912, Munger and a crew gathered the seed from some 120 Douglas-fir trees and, over the next few years, planted them at six diverse sites throughout western Oregon and Washington. This pioneering effort in tree genetics by now has yielded decades of information about the effect of elevation and latitude on tree growth.

In 1915, Munger became assistant chief of the Division of Silviculture in the District Office. Technically he remained in charge of the Wind River Experiment Station, but most of his work for the next several years was on timber survey and timber sales in the National Forests. Then in July 1924, funding became available for the new regional Experiment Station, and Munger was drawn into research again. ". . . As a surprise to me, District Forester Cecil wanted to know if I would care for the job as Director and I thought I would." Munger held the job for the next 14 years.

The research of the new Station was conducted in cooperation with an advisory committee drawn from other agencies, forestry schools, and the lumber industry in early February 1925. Later that year, Munger's monthly reports showed that general goals were being translated into specific research. For the month of October 1925, he included this list of Station activities:

"October has been divided about equally between field and office work, though the weather has been perfect for the former throughout the region. In anticipation of a full house during the winter another small room was engaged . . . McArdle has spent practically the entire month supervising and helping with the computations for the Douglas-fir yield study . . . Westveld was on the Whitman Forest all the month studying brush disposal practices on private lands and on government sales . . . Isaac spent practically the entire month in the field. The measurement of a series of Snoqualmie plots completed the biennial examination of the Douglas-fir seed study plantations . . . Simson has been at Wind River throughout the month engaged chiefly in experimenting with meteorological instruments, taking static observations, and in various maintenance jobs . . . Munger spent most of a week at Wind River helping on final jobs to close up the season there . . ."

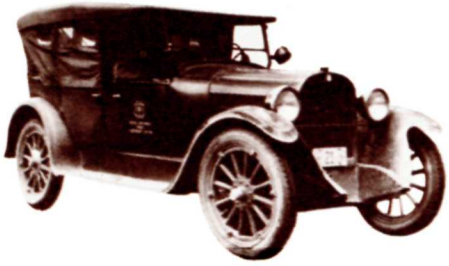
If the research projects strode ahead purposefully in such accounts, so did Munger's distinctive style of administration in the day-by-day life of the Station. A jar always near at hand held the tiny



Leo Isaac, pioneer forest researcher, prepares to fly his kite to measure the flight of Douglas-fir seeds on the wind. Oatmeal carton held the seeds.

pencil stubs he used to jot directives on scraps of paper. His mystifying scrawl became an office legend, yet he was an exacting man with the language. Correspondence not up to standard was fired back to the unfortunate staffer for rewriting.

Munger put money into expensive items which were essential–a $500 "electrically driven calculating machine" and the little fleet of cars and trucks needed for Station work–but preached Yankee frugality in operating them. McArdle recalled that Munger had the front seat of the Station's first car "remodeled with hinges so it could be folded back and make a bed. I was supposed to drive off into the bushes and use this instead of hotels," he said.



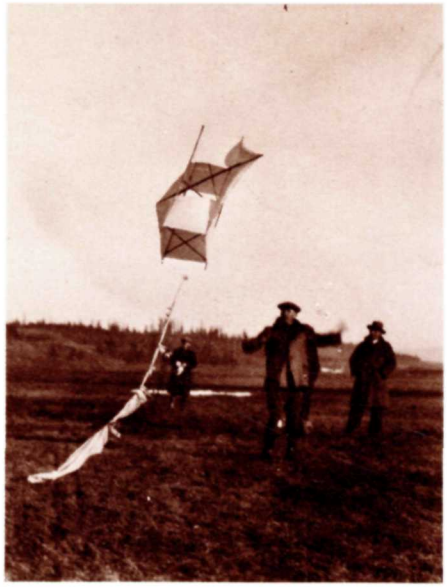
Munger is remembered as the sharp-eyed administrator who ran the Experiment Station in its earliest era. Another figure from that time is remembered for a different brand of keenness–Leo Isaac, the Douglas-fir scientist.

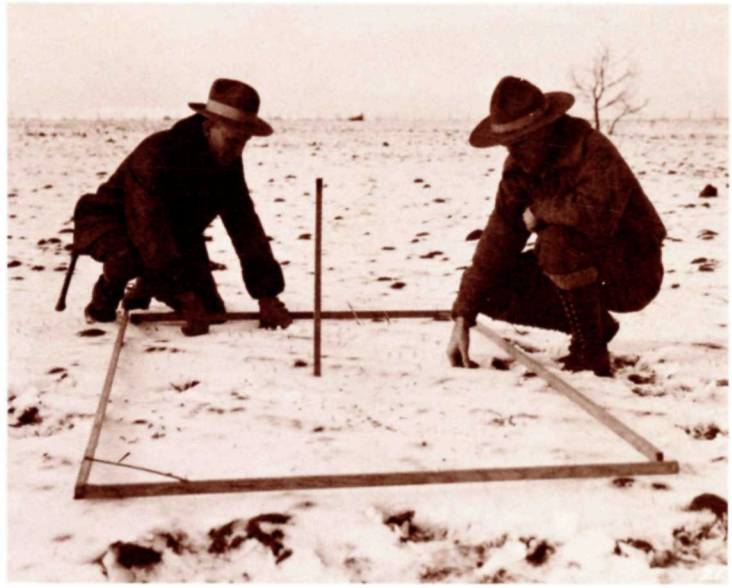
Isaac was born in 1892 on a farm near Fond du Lac, Wisconsin. As a schoolboy, he trapped fur animals to earn spending money. Then, just after Isaac graduated from high school, his older brother was injured so severely in a train wreck that he needed absolute rest and quiet. Young Leo took over his care, and the Isaac brothers withdrew to upper Michigan to a cabin which could be reached only by boat. For nearly 2 years they roughed it there, canoeing and hunting and fishing as the brother's health gradually improved.

Such a young manhood may have sharpened Leo Isaac's perceptive powers. Thornton Munger, himself a veteran woodsman, noticed that Isaac "was an exceedingly sharp observer. He could see little one year old seedlings when the ordinary person would pass them by. . ."

After the stint in the north woods, Isaac went to the University of Minnesota to study forestry. World War I intervened, and he was shipped with a number of other forestry students to Fort Vancouver, Wash., where they learned to inspect the spruce wingbeams then used in military planes. After the war, Isaac finished up his college work and returned to the State of Washington with the Forest Service in the Okanogan National Forest. After 4 years, Isaac transferred to the Wind River Experiment Station. He arrived on the job in early May 1924.

One of Isaac's first assignments was to test the seed storage theory of his predecessor at Wind River, J. V. Hofmann. Several years earlier, Hofmann had concluded that Douglas-fir seed lived in the duff, the decaying organic material of the forest floor, for a number of years before it began sprouting. He cited





Up goes the kite! At right, Isaac and co-worker check the snow-covered ground for seeds. By the kite experiments, Isaac eventually helped disprove the theory that Douglas-fir seeds are stored in the duff, and learned that seeds usually don't fall more than a quarter mile from their source.

as evidence the appearance of seedlings nearly a decade after the Yacolt fire swept over an area near Wind River.

If Hofmann's theory was correct, the forests of the Northwest should regenerate themselves after fire or logging. But Munger and other skeptics pointed out vast cutover areas in the Douglas-fir region which remained treeless year after year.

Isaac set to work. He began germination tests on seeds in forest soil, eventually proving that Hofmann's theory did not hold up. But such meticulously repeated tests took years, and Isaac meanwhile had his own notion of what accounted for the "spontaneous" growth of seedlings in clear-cut or burned areas. He set out to measure the flight of tree seeds on the wind.

Early in 1926, the inventive researcher hit on a method to measure the distance and patterns of seed flight. He turned kite-flyer. From that World War I job of inspecting airplane wingbeams, Isaac remembered the strength and lightness of Sitka spruce wood. "I got a piece of spruce and made my struts and frame . . . I got light balloon silk sailcloth and stabilized and covered it . . . I attached an oatmeal carton (I saved them from the kitchen) bottom-side-up and tied the cover on with a thin, light thread."

The result was a 6-foot box kite with black bat wings, trailing an oatmeal carton below as a bomb bay. "I haven't seen a kite like it before or since," Isaac recalled with supreme satisfaction.

Next, the inventor needed a field of fresh snow. With a few helpers, Isaac packed up the box-bat kite, skis and snowshoes and headed across the Cascade Range for the wintry Maupin Flats of eastern Oregon. There, the fledgling kite corps found a remote ranch to lodge at while they ran several days of seed-flight tests. ". . . one of us had to sit up all night to keep the fire going to keep from freezing to death," Isaac remembered.

Isaac would play the kite up to a simulated tree height measured on the string—sometimes as high as 200 feet—pull a trip line which opened the oatmeal carton bomb bay, and out would waft a tiny cloud of Douglas-fir seeds. Isaac and helpers then would follow the seed downwind, put measuring frames on the snow-covered ground, and measure the density and pattern of the seed fall. "It checked out with amazing accuracy, the density of seed fall in the frame in comparison to the total number of seed that was released. I got a regular survey, a pattern of seed fall on the snow."

The results of the kite flights showed that a quarter mile was generally the greatest distance the seeds would glide, but if they wafted into a rising air current, a few might sail several times that distance. Isaac had new and fundamental information about Douglas-fir regeneration—the "spontaneous" seedlings on deforested areas could have come from wind-borne seeds rather than the duff.

The kite experiment and Isaac's many subsequent studies into Douglas-fir growth add up to a remarkable pattern of research—an entire new body of knowledge about the growth and management of the Douglas-fir tree, the Northwest's most valuable timber resource.

Counting the Trees

The Arkansas day of 'can see to cain't see' was in effect much of the time.

–Thornton T. Munger, June 1931, describing field work during the Lewis County phase of the Forest Survey

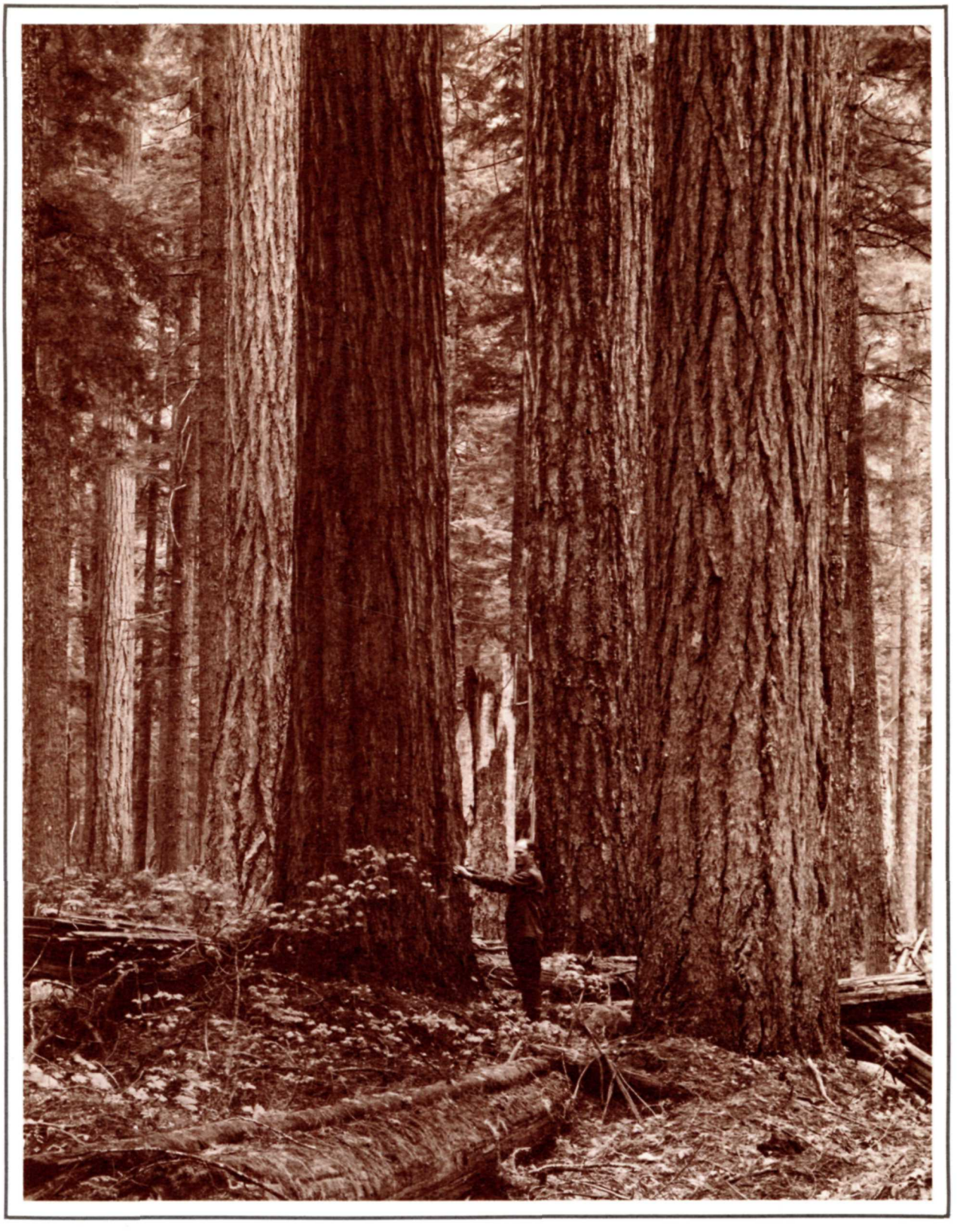
Early in 1929, Munger went to Washington, D.C., to discuss an ambitious new project prescribed in Section 9 of the McSweeney-McNary Act. This was to conduct a long-needed inventory of American timber resources–both private and public–an accounting of the timber stands left after many generations of logging. The nationwide Forest Survey began with the Douglas-fir region west of the Cascade Range in Oregon and Washington.

The Douglas-fir country was no capricious choice. Although totaling only about 30 million acres of forest land, a fraction of the national total, the region was known to have a major share of the nation's remaining volume of sawable timber. Much of it was in old-growth stands, and many of those were within the boundaries of National Forests.

Even as plans for the Forest Survey were being shaped, the Pacific Northwest lumber industry was suffering economic heaves and staggers. The slackening of the postwar boom of the Twenties meant a decline in lumber sales and a sag in lumber prices. Now, with the onset of the Depression, lumber production plummeted. In the Douglas-fir region which was the focus of the Forest Survey, lumber production dropped from about 10 billion board feet in 1929 to 7.5 billion board feet the next year.

Economic woes threatened the cooperation which the Station needed to conduct the Forest Survey. Hard-pressed timberland owners were leery that making public the timber volume data on their holdings would inspire tax officials to boost assessed valuations. Eventually, the Station agreed that all private timber cruise data would be kept confidential and compilations would not be released in any form that would disclose the timber holdings of any single private owner.

Once that rift with the lumbermen had been smoothed over, plans for the Forest Survey forged ahead. Early in January 1930, Horace J. "Hoss" Andrews, a forester who had directed a forest land and economic survey for the state of Michigan, was brought in as senior forest economist and director of the project. The same week, Christopher M. Granger, who had been District Forester, was appointed national director of the Forest Survey and moved his office to the Station. Walter H. Meyer was the Station's resident authority on statistical methods, and he was given responsibility for the methods of predicting forest growth. Donald N. Matthews came from the Umpqua National Forest to head the teams gathering field information on National Forest lands. Robert W. Cowlin, a young forest economist with a



A beautiful stand of Douglas-fir in Skamania County, Washington (1936).

background in the California redwood country, was put in charge of assembling data on timberlands outside the National Forests. Foresters were added to take the measurements in the woods. Among them was Jim Girard, a lanky woodsman out of Appalachia, who had the knack of glancing at a stand of trees and estimating its timber volume with uncanny accuracy.

The Forest Survey was well underway in 1930. Munger reported that private timber cruise records "continue to be gathered in at the rate of about one-half million acres a month," while the estimable Girard coached survey teams in his skills of "ocular estimation."

But if the Station's major project was prospering, its personnel were not. The effects of the Depression began to wash over the Station early in 1931. Munger was instructed to hold up the expenditure of a portion of appropriated funds during the next 2 fiscal years. Promotions, hirings, and travel were restricted. Salaries, never very substantial in the Forest Service (junior foresters with college degrees were being hired for about $2000 a year), now stood frozen year after year. Then in July 1932, annual vacations were scrapped and the "Hoover holiday" was instituted—2 days off each month without pay.

For all that, a belt-tightened job was better than no job. Philip A. Briegleb, a researcher who joined the staff just before the rapid slide into the Depression in late 1929, recalled the reassurance of even a diminished paycheck: "In those years, an assignment in the Forest Service was a pretty good looking asset."

While the Depression years meant lean pay, they also proved to be an era of expansion for Federal forestry. Out of the New Deal flowed funds and personnel made available by the new emergency agencies. The CCC (Civilian Conservation Corps) channeled plentiful manpower into the forests. Munger remembered the labors of the CCC youths: "They did a lot of development work, including building residences and office buildings at several places," plus "a substantial amount" of work at the five new Experimental Forests under the Station's administration. ECW (Emergency Civil Works) funds financed the rehiring of temporary workers who had been laid off in the budget crunch and the hiring of field assistants and scientific aides to help with the Forest Survey and other Station projects.

Even before that transfusion, a study of fire loss was carried out by experienced timber cruisers and graduate foresters left short of employment by the Depression. Late in 1933, more funds and people were made available to the Station from the NIRA (National Industrial Recovery Agency) and CWA (Civil Works Administration). By the new year, these accounted for some 50 more people on the Station work force.

In the midst of the hectic year of growth, the Station moved to new quarters in the Federal Courthouse in Portland. It was the Wind River exodus of 1924 writ much larger—workers grappling furniture, scientific equipment, and shelves of books into panel sedans. As promptly as the move was made, the new quarters were outgrown by the influx of staffers. Two large jury rooms of the U.S. Circuit Court of Appeals were borrowed for the overflow—only to be promptly taken back by an irate judge

These CCC boys, with the foreman and cook, spent the summer of 1934 thinning plots at the Pringle Falls Experimental Forest near Bend, Oregon.

who discovered a fresh cigarette burn on an oak desk.

While the Station headquarters crammed in its new personnel and projects, the field work on its biggest research program—the Forest Survey of the Douglas-fir region—was nearing completion. The survey had taken an unexpected turn in late 1930, when Forest Service headquarters in Washington, D.C., decided that the estimate-and-compile method being used by the Station crews should be tested against what was called the line-plot method. Lewis County, Washington, one of the larger units of the Douglas-fir region, was chosen as a test area. Across some 1 million acres, linear swaths of timber were singled out at 3-mile intervals. Crews then measured timber volume on quarter-acre plots at regular intervals within the forested strips.

Cowlin, who had charge of the line-plot survey experiment, calculated that 960 man-days were spent in the woods. "The 8-hour day was unheard of," he recalled, "for in some instances it would take several hours or more to reach the line in the morning and a like amount of time or more to reach the camp, night lodging place, or automobile at the end of the day." He remembered rewarding moments out in the big trees. Francis X. Schumacher, a visiting scientist from the Washington, D.C., headquarters, profited nicely from the Survey crew in a weekend poker game at Chehalis. But on Monday, Cowlin and a cohort evened the score with bets on tree diameters before they were measured. "Schu had a tendency to underestimate the large old-growth Douglas-fir," Cowlin reported.

The Lewis County measurements were finished in June 1931, and computations were begun to compare the two methods of survey. They were found to be fairly close in results, with the line-plot method proving a bit more precise in revealing small stands of hardwood within the coniferous forests, the compilation method more flexible for use in varied terrains and expanses. The decision was made to continue the compilation method, not only for the Douglas-fir region but also for the ponderosa pine survey to be carried out east of the Cascades.

By the end of 1932, the inventory of National Forest lands in the Douglas-fir country was completed. What remained to be done on the privately held timber stands and in compilation and evaluation was hastened by the supervisory abilities of "Hoss" Andrews, something of an artist at evading red tape. In 1934, the compilations and measurements of timber stands were translated into color-coded maps. Late in 1935, fieldwork was completed in the ponderosa pine region. Within about another year, the final Forest Survey report for the Douglas-fir region was completed.

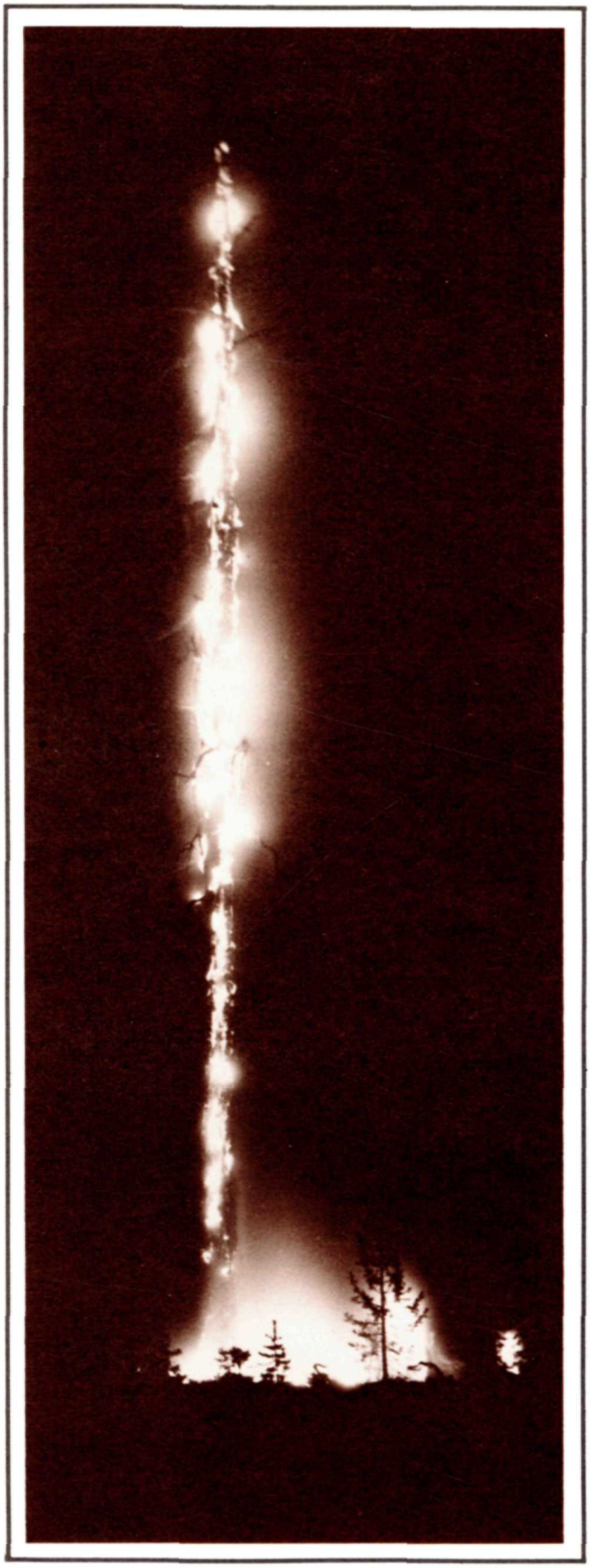
The Forest Survey was the Station's major research achievement in this era, but other milestones can be counted as well:

- This was the period when Experimental Forests were authorized and established, one in the Douglas-fir groves of the Wind River Valley, another in the western yellow pine country near Pringle Falls on the upper Deschutes River. The Experimental Forests made it possible to study various forest types in their natural state and to document their response to resource management practices.
- Aerial photography was contracted for by the Forest Survey staff, chiefly to see whether it could be used on the most inaccessible backcountry of the Siuslaw National Forest in southwestern Oregon. The results were promising, but the method too costly. The extensive use of aerial photography awaited more sophisticated equipment and film.
- When the Tillamook fire destroyed a vast swath of old-growth timber in northwestern Oregon in August 1933, Leo Isaac and fellow researcher George Meagher followed up with a study of regeneration in burned-over areas. Their findings, which pointed out erosion hazards in the steep Pacific Coast area, made front-page headlines in the Portland newspapers. The Isaac-Meagher report was perhaps the most widely noticed of the many publications which came from the Station in these years.

Points of conflict between researchers also began to show up in the Depression era. In March 1934, researcher Axel J. F. Brandstrom presented findings on a system called economic selective logging. The Brandstrom formula called for cutting the highest value trees and leaving the rest to grow into a future timber crop—a sharp break with the prevalent practice of clearcutting entire areas. Brandstrom's idea set off a dispute within the Station that went to the highest echelons of the Forest Service.

In 1936, Brandstrom and Burt P. Kirkland, a well-known Northwest forester then serving in the Washington, D.C., office of the Forest Service, prepared a report titled "Selective Timber Management in the Douglas Fir Region." Munger and Isaac objected to many points in the manuscript, particularly what they saw as wholesale conversion to partial cutting in the old-growth Douglas-fir forests. This, they argued, would lead to timber stands of uneven age, which would favor shade-tolerant species of less commercial value than Douglas-fir. Kirkland and Brandstrom held the view that selective logging was efficient and economical, particularly with the advent of logging tractors and trucks which they said were more flexible than the old system of railroad spur and cable logging.

This was an early round in the complex battle over clearcutting. Munger was especially perturbed—



although he termed it merely "muffled disapproval" —that Regional Forester C. J. Buck was determined to make selective cutting the policy on National Forest timberlands in the Northwest. Over Munger's protests, the disputed report was published with a foreword by Chief Forester Ferdinand A. Silcox which called the Brandstrom-Kirkland proposals "thought provoking, original, and constructive." Selective cutting did become the regional policy for several years, until the pendulum of economics swung in favor of clearcutting once again.

One achievement of these years was long overdue—the Station's first laboratory. A small building was rented in southeast Portland, renovated, and some basic equipment installed. It was at best a modest start: a staff member of the time points out that the miniature laboratory, "if it could be so dignified," was shared with other federal scientists doing research on forest insects.

This era has a selection of endings. One was the waning, by early 1938, of New Deal programs and money which had fueled much of the Station's research. Another was the completion of the Douglas-fir Forest Survey, a landmark effort in evaluating our timber resources. Another occurred on July 1, 1938, when Thornton Munger stepped down as Director and took on the job of heading up forest management research at the Station.

When Forestry Went to War

Cry, 'Havoc!' and let slip the dogs of war.
–William Shakespeare, Julius Caesar

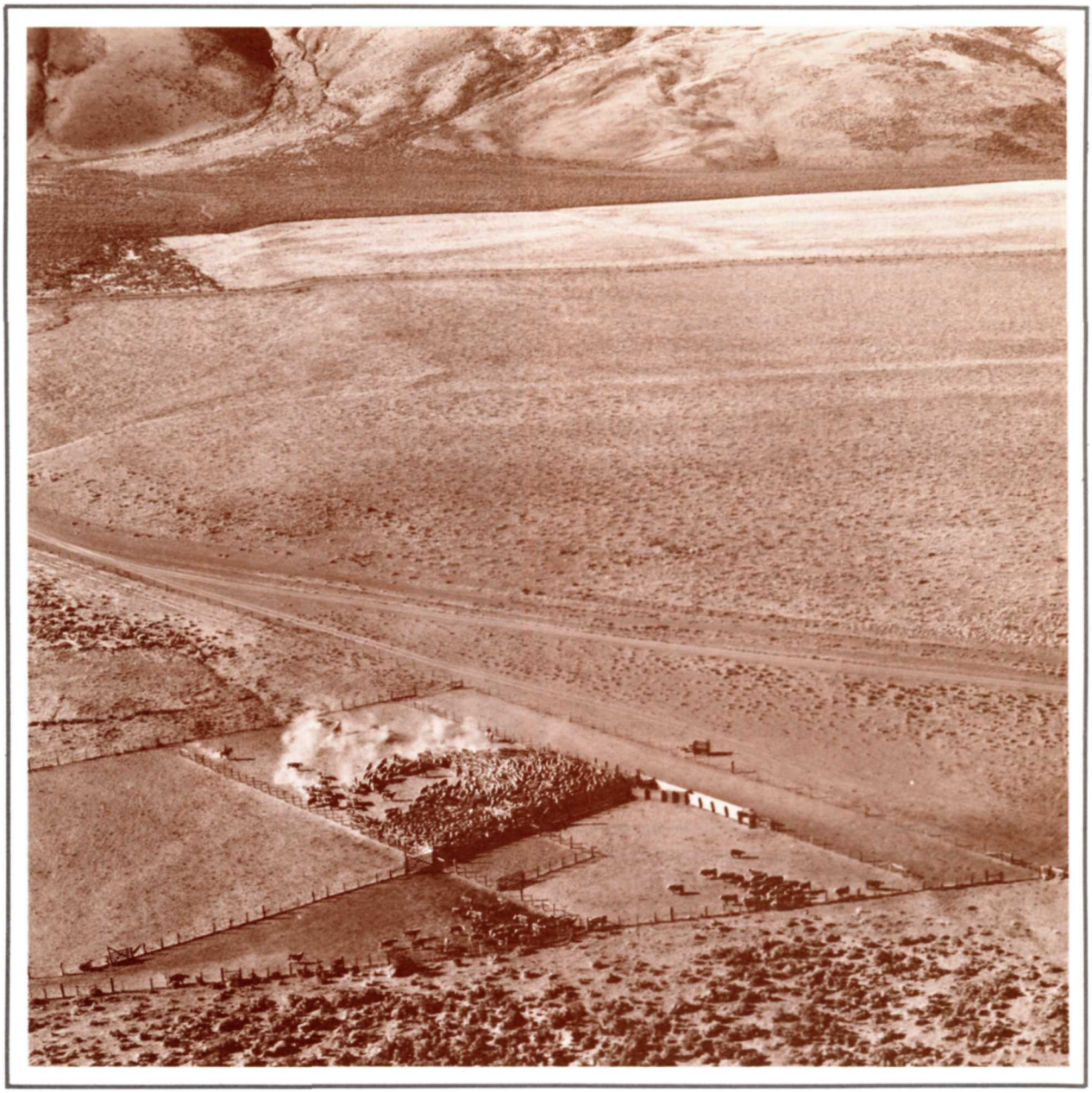
The night of June 21, 1942, a Japanese submarine surfaced off the Oregon coast and fired at least nine hasty rounds of gunnery toward Fort Stevens, near the mouth of the Columbia River. It was a show of bravado, but in its way the loud little episode symbolized the coming of World War II for the Pacific Northwest.

"A large part of the staff's time during these two months was spent on national defense and war work," remarked the Station Director in his report for December 1941 and January 1942. The comment could have been repeated in every subsequent report for the next 4 years. One of the first consequences of war was a longer work week for Station personnel, an increase from 40 to 48 hours. Another result was a constant stream of research projects to determine how timber resources could be channeled most effectively into armaments production. The Station spent the first half of the 1940's geared to the war effort.

In the Station Director's chair throughout World War II was Stephen N. Wyckoff, a plant pathologist educated at the University of California at Berkeley. Wyckoff had been Director of the Northern Rocky Mountain Station at Missoula since 1936, and on July 1, 1938, he succeeded Munger as head of the Portland research facility.

The change of command brought a different style of administration to the Experiment Station. With Wyckoff came new latitude for the Station's Division Chiefs and more emphasis on eventual results than on the day-by-day aspects of research which had characterized Munger's close and strict style of administration. The new Director, a tall, easy-going sort remembered for his love of music and books, made it a habit to talk earnestly with staff members during auto trips. His role as passenger was hailed with relief after the thrills of having Munger and sometime acting Director "Hoss" Andrews behind the wheel. Soon after Wyckoff's arrival, it was joshed around the office that "the Station never has had a Director who could drive an automobile, but Steve is the first one to admit it."

The new Director also made some changes in research emphasis. Even before the onset of war increased the need for livestock production, grazing lands were getting more attention from Station researchers. The new importance of the grasslands can be read into the addition to the Station name. In February 1938, the research agency was renamed the



Pacific Northwest Forest and Range Experiment Station. By 1939, it had been decided that there was a need for cattle management studies on National Forest summer ranges. The Starkey Experimental Range was established in the Umatilla National Forest of northeastern Oregon in 1940 as a center for cattle management research. By then, a Range Survey of the Pacific Northwest had been finished, adding up data on forage acreage the way the Forest Survey inventoried timber.

The war brought one very specific threat which required new fire control research by the Station. The Japanese were loosing balloons with incendiary devices, in hopes the Pacific winds would carry them into the woods of the Northwest and kindle forest fires. Although an estimated 9,300 balloon-bombs were launched during the war and many were found in the western timber country, they never became the weapon of conflagration they were intended to be. Nonetheless, the threat was taken seriously, and fire detection and suppression were bolstered in the research program.

Well before the United States entered World War II in December 1941, military needs were

changing the focus of work. A survey was done of the supply of Sitka spruce for use in aircraft production. The Pacific Northwest's production of lumber, plywood, and woodpulp was growing with the armament program. Since such softwood products were vital to military needs, Station researchers began studying lower grades and species of trees than had formerly been used. Secretary of Agriculture Henry A. Wallace directed that national defense measures were to be given first priority, postwar planning the next consideration, and the regular work program was to rank third.

At this time, and on into America's first years at war, the Douglas-fir industry caused some apprehension among defense planners. Construction lumber and other critical timber products were badly needed. But there were shortages of machinery and supplies needed for logging and sawmilling. Labor disputes were another problem; the American Federation of Labor and the Congress of Industrial Organizations at the time were rivals for union strength in the Douglas-fir country.

Worried about the Pacific Northwest's prime timber source, the Council of National Defense late in 1940 ordered a report of the Douglas-fir industry's economic situation. The deadline was tight; in March 1941, a 3-month wage agreement ran out, and a repetition of the widespread strike was expected. The role of the Station was to furnish data and office help, then handle the publication and distribution. It was the first of several research projects in the next several years to focus on the Douglas-fir industry and its part in the war effort.

Just as the New Deal brought new tasks into Federal forestry, wartime agencies also required unaccustomed types of projects. The Office of Price Administration asked the Station to do a study of the rubber tire supply needed by the logging and milling industries of the Pacific Northwest. Another special survey reported on the quantity of sawmill waste available for conversion to ethyl alcohol. (Late in the war, wood alcohol plants were started at Springfield, Ore., and Bellingham, Wash., with the Station providing data on sources of wood waste.) Breakdowns in the routines of lumber production inspired other research projects; one evaluated the wood supply needed to box agricultural products, another analyzed the problems of getting enough antifreeze to keep logging and lumber equipment at work, still another reported on the use of Port-Orford-cedar to make separation walls in submarine batteries. At other times, the Station was called on to determine the number of wooden barrels used to pack the Pacific Northwest's fruit crop, to see whether Douglas-fir bark could be used in making cork, and to estimate the supplies of hemlock bark as a source for tannin.

Such war-induced research projects notwithstanding, the most notable tempo of work by the Station in these years was month-by-month monitoring of the wood industry. This marked a drastic transition. A research facility which had customarily measured its projects in terms of years now had to pump out monthly evaluations of lumber production. Every month, shipments of Douglas-fir pontoon lumber, ship decking, and lesser grades of plank were reported. Every month, shipments of spruce for aircraft production were totaled. Monthly reports on plywood production were made; so were continual log inventories of the Columbia River, Puget Sound, and Grays Harbor timber regions. Month after month, the reports had to flow in response to the war effort's demand for statistical information.

But the war would not last forever. A few weeks after Pearl Harbor, the Forest Service had begun postwar planning. In his Report of the Chief for 1943—the year the Allies began to turn the tide of the war—the Forest Service's new Chief, Lyle F. Watts, said flatly: "The most urgent need is public regulation to stop destructive cutting." The time was past when reckless methods could be justified in the name of war needs.

On the regional level, Director Wyckoff pointed to the consequences of relentless logging in the Pacific Northwest: the old-growth forests had been heavily depleted, especially in the original prime logging areas of Grays Harbor, Puget Sound, and the lower Columbia River. Loggers were moving into the big timber of southwestern Oregon. What loomed ahead was the need to develop management methods that would assure a continual yield of lumber from Pacific Northwest forests.

Towards Better Use

I had a wonderful team, so all I had to do was sit and twitch the lines a little.
–Dr. J. Alfred Hall, Director, 1945-1951

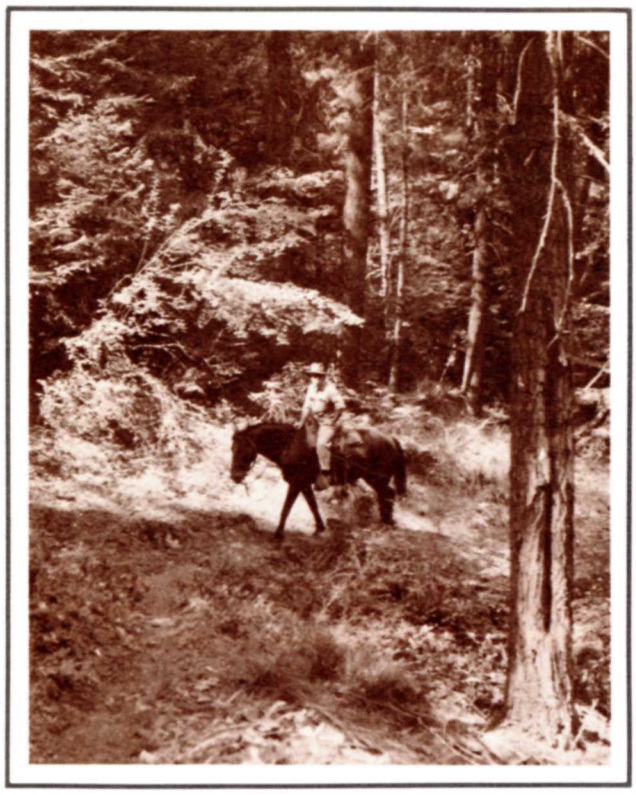
America came home from the war years of 1941-1945 to find science much more in its life than ever before. The Pacific Northwest Forest and Range Experiment Station, as we have seen, was edging into postwar planning well before the final defeat of Germany and Japan. But what ensued in Station research policy dates mostly from the appointment of a new Director and the return of Station personnel from their monthly monitoring of forest industries. Significantly, the new man in charge was a biological chemist of wartime repute.

J. Alfred Hall, an Indianan who earned his doctorate in chemistry at the University of Wisconsin, came into forestry research administration by way of a crownfire in the pine woods of Georgia. Hired by the Forest Service in 1930 as a biological chemist at the Forest Products Laboratory, Hall was dispatched from Madison, Wisc., to study the biochemistry of resin formation in the southern pine forests. He was doing research in the woods near Cogdell, Georgia, when a fire "blew up" and raced through some 15,000 acres in a single afternoon.

At the time, a debate was simmering within the Forest Service as to whether the policy of total fire protection within National Forests should be continued, or whether some fires should be permitted to clear out brush and perhaps prevent larger conflagrations. Hall had talked over his observations about the possibility of brush control in the southern pines with Austin Cary of the Southern Experiment Station, a forestry researcher who was a near-legend in the region. Cary, in his best Maine gruffness, instructed the newcomer: "I want you to write that up." Hall protested the unseemliness of a newly-arrived chemist telling foresters about fire, but Cary was firm: "Nope. Fresh point of view. Foresters can't see the woods for the trees. Fresh point of view. *I want it.*"

"So I wrote it," Hall recalled, "and that was the end of my career as a bench chemist." His forestry research led in the next few years to the Associate Directorship of the California Experiment Station in Berkeley, and then in 1939 to the job as Director of the Central States Experiment Station in Ohio.

The American entry into World War II brought Hall a remarkable new role. He was called to Forest Service headquarters in Washington, D.C., given the title of "Principal Biochemist," and turned loose to troubleshoot on war-related forestry research. He spent considerable time on a California project to grow guayule plants as an emergency rubber supply, and on plans for ethyl alcohol plants in Bellingham, Wash., and Springfield, Ore. As the war drew to its



Station Director Al Hall at Coyote Creek in the Umpqua National Forest, 1950.

close in 1945 and Hall's roving assignments were over, he was named to the Portland job to succeed Stephen Wyckoff, who had been transferred to the California Experiment Station as Director.

Hall came to the Pacific Northwest at a time much changed from the early days of "cut out and get out." The cheap and available stumpage, those several-centuries-old Douglas-firs and redcedars so readily felled into high-grade logs, were a thing of the past for many timber operators. Now, National Forests and other public timberlands were becoming the principal source for some lumbermen. Conservation, too often neglected or scorned in the past, began to inflict itself as a necessity; World War II had added its own dire marks of hasty and wasteful logging. More of the tree was being used than in the past: towering stumps of earlier eras were now seen to be an unaffordable waste, and the once-scorned smaller diameters up near the crown of the tree were being used as well. Sawmill waste which might be converted into byproducts was appraised with new respect. Under Hall's priorities, the Station now shifted its research program to help the timber industry toward even more efficient utilization.

In his roving job during the war, Hall had conceived the Forest Utilization Service as a nationwide set of research units to work towards this end. Now, as Director, he could develop such a unit at the Station first-hand. Hall's notion was to revamp areas of research into closer relationship with the Forest Products Laboratory. The Forest Utilization Service was to make the work at the Madison research center known to the timber industry and encourage its use, and in turn help to steer the Madison laboratory programs to meet current timber problems.

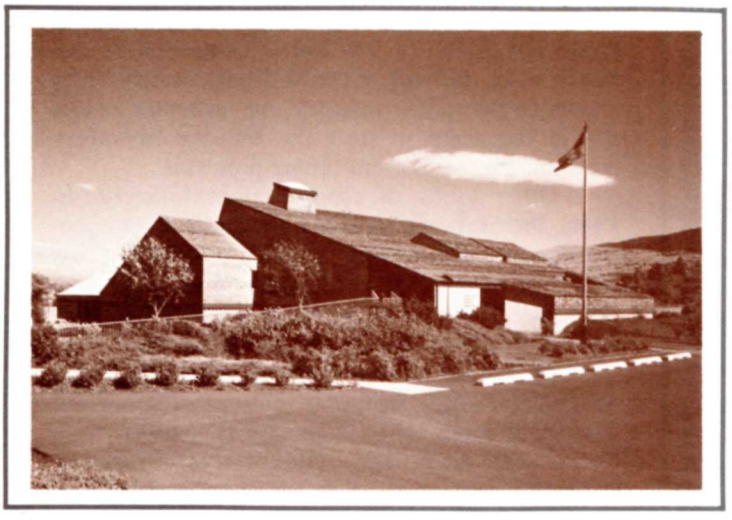
Other kinds of reorganization followed. In 1946, the Station's territory was divided into geographic areas with separate research centers. The first two were established at Olympia, Wash., and Corvallis, Ore. Others were set up in the next few years in Oregon at Bend, La Grande, and Roseburg.

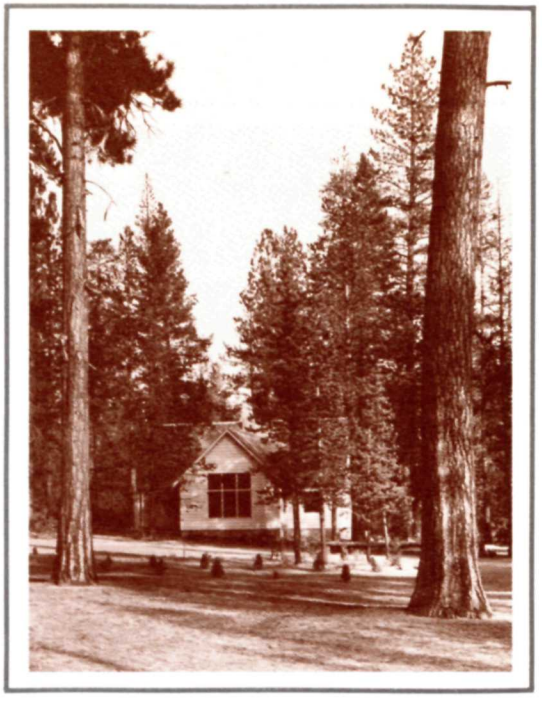
Utilization projects began to mount up. There was more salvage logging of cutover lands in the Douglas-fir region and a successful pilot plant which turned mill scraps into usable boards. Douglas-fir waste was being used for fibreboard and pulpwood. The Station helped to spread information about hydraulic log barkers which used jets of water to peel logs for pulping, and worked with the lumber industry on less costly methods of kiln drying lumber. Research on plywood production resulted in the discovery that cull logs with white speck—a decay commonly found in old-growth stands of Douglas-fir in the southern Cascades—could be used to make low-grade plywood.

Using the huge old trees more efficiently was one new necessity for the lumber industry. Managing the generation of trees that followed the vanishing giants was the next. The Station, cooperating with timber companies which owned large stands of second-growth forest, set up three experimental tracts in the Puget Sound area to test ways to improve and harvest these stands.

Another new area of research came with the floods which swirled through the Columbia River Basin in the spring of 1948 in the watershed management study which began hurriedly in the wake of the high water. The Station contributed manpower to an interregional Forest Service team pulled together to evaluate causes of the severe flood season. Both weather and man's heavy impact were responsible. Heavy snow in the upper Columbia Basin was followed that year by a warm, late spring. But the runoff had coursed down much watershed acreage which had been denuded by fire or unregulated grazing. The next fiscal year, the Station was allotted funds for a flood control survey of the entire Columbia River Basin.

Grassland drew attention, too. Forest ecologist Joseph F. Pechanec was added to the staff to head the Division of Range Research, and a program of range reseeding was begun. A particular target was cheatgrass, the bane of many a grazer—low in





nutritional value, high in fire hazard. The ranges of central Washington, heart of the State's cattle industry, were especially plagued with cheatgrass. A 2-year program of planting various perennial grasses amid the cheat was established on a large ranch near Wenatchee. Pechanec's division next launched a study on the Starkey Experimental Range in eastern Oregon to compare the impact of different intensities of grazing on the grasslands.

These postwar years were also a time for catching up, for fitting together research done in the hectic eras of the Depression and World War II. In 1946, projects were begun for the first time under the title of Applied Forest Management. Hall explained the background: "Most of the forest management research in the Station's terrritory had been excellent work but had been confined to plots—growth and yield and spacing and thinning and so on." The next step was to test the results reached in the many studies of small sample plots on timber operations of commercial size.

The Experimental Forests at Cascade Head, Pringle Falls, and Wind River were used for some of the work, but other sites were needed with different forest types and conditions. In 1948, the H. J. Andrews Experimental Forest was established within the Willamette National Forest of western Oregon. This new experimental forest was keyed to the most venerable of the Northwest's timber resources—the old-growth Douglas-firs.

At that time, about 9 million acres of old-growth timber remained in the Douglas-fir region—roughly one-third of the total commercial forest land in the Pacific Northwest. Clearly, the management of this remaining prime timber demanded research attention. Across three decades—in fact since Thornton Munger's plantings of Douglas-fir seedlings at test sites around the Northwest in 1912-1916—an extensive body of information about the Douglas-fir had been building. Both clearcutting and partial cutting had been studied on small experimental plots, as had artificial and natural regeneration, and growth and yield patterns. But the accumulated knowledge had yet to be tested in a big, commercial-size timber management project, and the Andrews Experimental Forest offered the chance. A harvest cut of 10 million board-feet was laid out for sale in early 1949, with the emphasis on determining the optimum size of clearcuts. This project for the next half dozen years was the site of research into cutting practices, forest roadbuilding, and siltation problems—a range of major problems of timber and watershed management.

Director Hall, who had sized up research and administrative talent during his wartime years of troubleshooting, kept adding to his staff. Phil Briegleb came back from the Northeastern Experiment Station to head the Division of Forest Management Research. Other names that would become well known in forestry research showed up on the Station roster: Edward G. Locke and James J. Byrne in forest utilization, Ralph W. Marquis to conduct a study of resource trends affecting the forest industries, Robert F. Tarrant from the Soil Conservation Service to begin a forest soils project, Elmer E. Matson and Archie C. Knauss on the applied forest management staff, Edward S. Kotok to work on forest management, and Roy R. Silen as a silviculturist working on the Andrews Experimental Forest projects.

While the new faces arrived, this period also marked the passing of the Station's original administration. In October 1946, Thornton Munger retired from the Forest Service after nearly four decades of work in the Pacific Northwest. June H. Wertz, who had been his administrative assistant when the Portland office was opened, retired at the same time. Throughout the Forest Service, retirements in these postwar years took away the last of the personnel dating from "the Pinchot era."

New eras, new faces. The array put together by Hall proved too talented to last. By the time the U.S. was enmeshed in the Korean War in the early 1950's, promotions were dispersing the Station's staff. Three of Hall's top-level hirees—Briegleb, Marquis, and Pechanec—went on to head other Experiment Stations. Locke was drawn to the Forest Products Laboratory and later became Director there. Byrne became Chief of Engineering for the Forest Service in Washington, D.C. In April 1951, Hall himself left to become Director of the Forest Products Laboratory at Madison.

New facilities contributed to the growth of forestry research. Top row: Range and Wildlife Habitat Laboratory at La Grande, Oregon, in the 1970's and CCC crew house at Pringle Falls Experimental Forest in the summer of 1936. Middle: Forestry Sciences Laboratory at Olympia, Washington. Bottom: Silviculture Laboratory at Bend, Oregon, and office at Cascade Head Experimental Forest on the Oregon coast, 1936.

New Provinces for Research

Since 'tis Nature's law to change, Constancy alone is strange.
–The Earl of Rochester, Works

When young Bob Cowlin came up from California in 1929 to report for his new job with the Station, Director Munger greeted the newcomer and idly asked where the Cowlins had found lodging. Munger, ever the Yale man, was impressed to learn they were staying with Mrs. Cowlin's uncle, a graduate of the Yale law school. Shortly afterward, Cowlin was called into Munger's office to meet a lumberman who also had earned his degree at New Haven. Munger made the introduction: "Cowlin is not a Yale graduate, but he has Eli **connections**."

Cowlin had considerably more than that to commend him, as his subsequent years at the Station showed. His career concluded with a dozen years as Director; only Munger served longer in the job. As successor to Al Hall in 1951, Cowlin inherited both the thrust of research begun by Hall and the problem of replacing a talented administration being dispersed by promotion.

Cowlin had graduated from the University of California in 1922 with majors in forestry and economics, and spent the next several years in the California redwood and pine industries. But the jobs never quite suited him. "I seemed to gravitate or was propelled into the sales end, and not into working in the woods," Cowlin soft-spokenly recalled. "I decided I wanted to practice my profession."

What helped him decide was a new job in a company town, with the pay in company scrip and not much in the way of company amenities. "That galled on me sooner or later . . . And I didn't want to bring a bride up to a company town with unpainted houses," he recalled. He returned to the University of California for a master's degree in lumber marketing. Interested in the forthcoming Forest Survey, Cowlin next took the civil service exam and lined up the new job in Portland.

Cowlin was heavily involved with the Survey of the Pacific Northwest's Douglas-fir region, and in those years became head of the Station's Division of Forest Economics. He served brief terms as Acting Director a number of times, then, with Hall's departure to the Forest Products Laboratory in 1951, became the first Director promoted from within the Station staff.

The new Director seemed to be presiding over a revolving door rather than a research staff, as promotions scattered the Hall administrative staff to

new Forest Service jobs elsewhere. Cowlin looked back on his first few months to find that the only division of the Station unaffected by personnel changes had been Range Research–and promptly Joe Pechanec, head of that division, was detailed to Somaliland on a United Nations mission. Also, there was a familiar story–tight funding– brought on by the Nation's latest calamity, the war which broke out in Korea in June 1950.

Cowlin's term as Director was bound to improve, and it did. New administrators for the research divisions were found, fiscal fortunes improved in 1952 as the Korean War simmered toward a truce, and new research fields were in the offing. So was the imminent growth of the Station into an agency of its present dimensions, with facilities dotting the map throughout its region.

Those dots of growth were drawn in a revamping of Forest Service research administration after World War II. The concept born of the McSweeney-McNary Act in 1928 was basic–11 geographical regions of the United States, with a Forest and Range Experiment Station for each one. Then the administrative chart was redrawn into some 80 research provinces, with each original experiment station overseeing the provinces in its region. Each province had a research center, plus one or more Experimental Forests or Ranges.

It was a formula for branching administration into the locales where onsite research was being done. Under this new charter, the Pacific Northwest Station established seven research provinces, drawing on the eight Experimental Forests and Ranges which over the years had been established on National Forest lands, and on four cooperative Experimental Forests on private lands.

Something of a scientific renovation followed. Except for elementary facilities squeezed into extra space somewhere, the Station had never had a scientific laboratory. Research work had been done primarily through field studies. Now laboratory science took on new emphasis. In 1960, Congress provided funds for a construction program. Out of that funding the Station built its Forestry Sciences Laboratory at Corvallis, opened and operating in the summer of 1962. A smaller laboratory had been established at Olympia. Next came a soils and water laboratory at Wenatchee, a silviculture laboratory at Bend in the ponderosa pine region, and a range and wildlife laboratory at La Grande. Branch offices were also opened at Roseburg and Seattle. The Portland office itself had been moved in 1954 to 729 N.E. Oregon St. In May 1958, came the short move to the Station's present location at 809 N.E. Sixth Avenue.

By the end of Cowlin's term as Director, the overhaul of administration and research could be read in the list of projects. Of the Station's 39 research projects, 20 were underway out in the branch offices or laboratories; the Portland headquarters had 19.

Well before these structural changes, an entire new field of research was inherited by the Station. In the 1953 reorganization of the Department of Agriculture, the Forest Service for the first time was given responsibility for forest insect and disease research. To the Portland office, this meant a revision of agency titles and administrative lines. What had been the Forest Insect Laboratory of the Bureau of Entomology and Plant Quarantine became part of the Station as the Division of Forest Insect Research. What had been the regional office of the Division of Forest Pathology within the Bureau of Plant Industry, Soils, and Agricultural Engineering now was reoriented as the Station's Division of Forest Disease Research.

The newcomers actually were many years senior to the Experiment Station as research staffs. The Office of Investigations in Forest Pathology was organized in 1907, and an agreement was reached in 1910 to establish a branch office of Forest Pathology at each regional headquarters of the Forest Service. The Federal entomologists go back even earlier. Serious research on forest insects of the Pacific Northwest seems to date from Prof. A. D. Hopkins, who in 1902 became the first chief of the Division of Forest Insect Investigations. In 1899,

The Oceanlake Garden Club gathers for a show-me trip in the Cascade Head Experimental Forest, 1954.

when Hopkins still was professor of "economic entomology" at the University of West Virginia, he made a 2-month trip through California, Oregon, Washington, and Idaho, and is reported to have returned home with 4,363 specimens of insects.

It is clear why research on forest insects was funded long before other kinds of forestry research were given serious considerations. The insects killed trees and terrified lumbermen. In 1910, for instance, an infestation of mountain pine beetle hit the forests near Baker, Ore. Lumbermen promptly formed the Forest Protective Association and cooperated in a beetle control project with the Bureau of Entomology and the Forest Service. That tussle was only the first of a succession: there followed campaigns against the Douglas-fir bark beetle, the hemlock looper, the spruce budworm, and many other forest pests up through the Douglas-fir tussock moth problem in 1970-74.

The lumberman's detestation of insect epidemics may not have changed over the years, but much else about the Pacific Northwest lumber scene had. The Douglas-fir region supported two different forest economies by the mid-20th century—one still based on the old-growth timber, the other on the smaller second-growth trees. Both kinds of logging posed nagging questions about the long-term timber supply in the area. By the early 1950's, the figures looked bleak; about 300,000 acres were being clearcut each year in the Pacific Northwest, but only about 75,000 acres were being planted. A considerable portion of the logged-over area would restock itself naturally. Other areas would not, and there were scars from the past, too—old cutovers and burned regions that were not growing back. It was in this era that log exports to Japan began to increase and developed into an economic controversy which is still going on. Then, as the 1950's drew to a close, a slump in the demand for construction lumber and plywood pinched the timber industries of the Pacific Northwest. By the end of 1960, seasonal shutdowns were being lengthened, workweeks shortened, and marginal mills and plants shut down.

Threaded through the economic ups and downs was the trend toward merger, which during the 1950's affected the lumber industry even more rapidly than it did other manufacturing fields. Cowlin later recalled that "of the 20 largest lumber producers, 8 disappeared through mergers, 3 went out of business, and 1 became a cooperative." He pointed out, too, that despite the mergers, "there remained a high degree of competition in the industry nationally."

In response to these trends, the PNW Station added several new projects and reorganized old ones. In 1954, forest genetics became a full-fledged research project. Genetics research had begun back with the establishment of the Wind River Arboretum in 1912 and in Thornton Munger's test site plantings in the next few years. Now facilities were obtained at Corvallis through the forestry school of Oregon State College, and research intensified on the production of better tree seed and improved timber species.

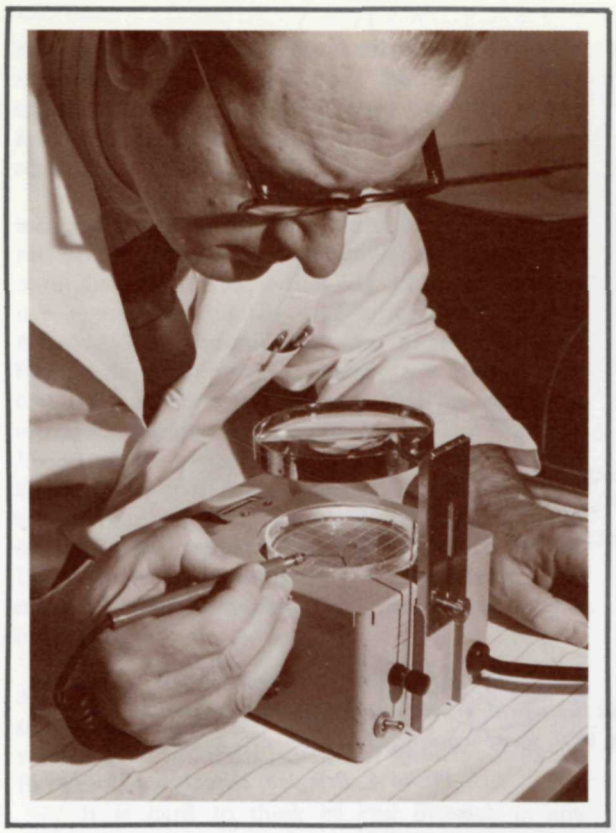
Cowlin had been drawn to the Station in 1929 to work on the Forest Survey. That timber inventory had been updated several times; in the decade following World War II, the Station reinventoried some 31 million acres. In 1958, a new computation—the timber trends study—was begun on the quantity and quality of timber supply in the Douglas-fir region. This time, ownership patterns and policies were the focus—an analysis of who owned the forest lands, and their management of the resource.

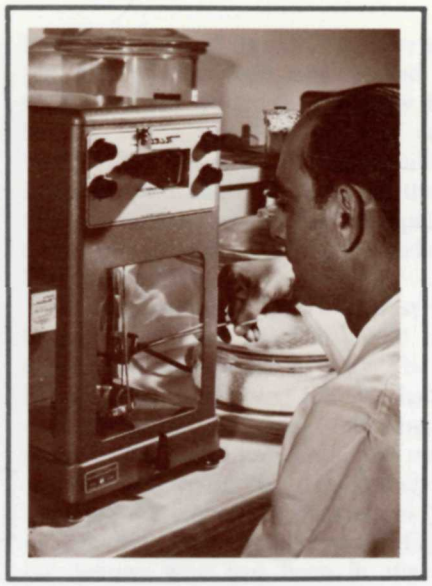
The Station's Forest Utilization Service meanwhile was working on logging technology. The FUS staff played a major part in the installation of the first big Wyssen Skyline Crane in this country. The Wyssen system, developed by a Swiss company, was an experiment in taking logs out by crane and cable to save the watershed soil and to cut the costs of roadbuilding. In this same period, also with the Station's encouragement and participation, helicopter logging was first tested.

By the first years of the 1960's, the Station had taken on a modern gleam in facilities, organization, and research orientation. Change had been the hallmark of the past dozen years, and the Station had gone far from its origins in a small set of offices. Two small facts from this era may sum up what was happening:

—In more than three decades with the Experiment Station, Leo Isaac had become a nationally-known expert on Douglas-fir regeneration. Isaac was the old type of woods-roaming researcher who thrived by his wits, as in his imaginative studies using kites to study the dispersal of tree seeds. His strong personality and affection for the Douglas-fir species were known almost as widely as his scientific achievements. It was Isaac the Douglas-fir champion who asked ponderosa pine researcher Ernest Kolbe how Kolbe went about finding the logs of this lesser species "when they got lost in the tall grass." On a day in 1956, Leo Isaac retired.

—On another day that same year, the Portland office became the first of the federal experiment stations to use the computer.





The Age of Ecology

I thought that job on the Forest Survey . . . was the best possible job in the world. It was exploring an unknown resource, in beautiful places, with some wonderful timber–and getting paid for it.

–Philip A. Briegleb, Director, 1963-1971

During this era, the words *ecology* and *environment* passed from their customary usage in the biosciences into the national vocabulary. A sizable number of Americans turned to the ethic of the late conservationist Aldo Leopold, himself once an eager young forester in the U.S. Forest Service: "Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild, and free. For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasque-flower is a right as inalienable as free speech."

The endless debate over environmental quality versus economic and industrial considerations began in earnest, and some notions which before had suffered little criticism were now argued hotly.

For the Station, perhaps no words uttered during the 1960's held more consequence than this single sentence: "The most alarming of all man's assaults upon the environment is the contamination of air, earth, rivers, and sea with dangerous and even lethal materials." Rachel Carson's best-seller *Silent Spring*, published in 1962, became a power unto itself, and the use of pesticides in this country has been affected by it ever since. The Station's Division of Forest Insect Research had behind it some 60 years of research on tree-destroying pests, and at least 20 years of work with effective chemical insecticides. Some research already had been done on biological control of insects, but now in the 1960's there was a major change in this direction at the Station.

The surge of environmental concern also brought up topics such as erosion and siltation on wildland watersheds, points of research by the Station for a number of years. As a result of past research and increased public interest, the complexity of the forest ecosystem became better known. Now it was more widely realized that it was the chainsaw that felled the timber that denuded the slope that lost the silt that clogged the stream and killed the salmon. And beyond the chainsaw was the demand for lumber in our economy and style of life.

Federal forestry in the Pacific Northwest long since had undergone its own debate about the most controversial logging method–clearcutting. Opinion had been sharply divided even within the Station in the late 1930's, when the point at issue was largely

economic. Now, with clearcutting targeted as an environmental issue and such matters as timber supply again coming into question, the public interest was again looking over the shoulder of research.

Along with the environmental concern came increased use of the forests for outdoor recreation. The number of backpackers and families at campgrounds multiplied with the availability of leisure and a new appreciation of the wild heritage remaining in America. The chronic dilemma of the National Forests—how to provide multiple use of landscape coveted both for natural beauty and for economic resources—became even more severe. The Station's 1963 annual report soberly mulled the national trend of the past half-century: "Recreational visits to our National Forests weren't accurately counted in 1913, but probably they didn't much exceed 100,000; the count for 1963 will probably approximate 12,000,000—an indicated increase of over a hundredfold."

Into the rising force of such trends stepped a new Director for the Station. When Bob Cowlin retired in March 1963, his successor was another veteran hand in Pacific Northwest forestry—Philip A. Briegleb.

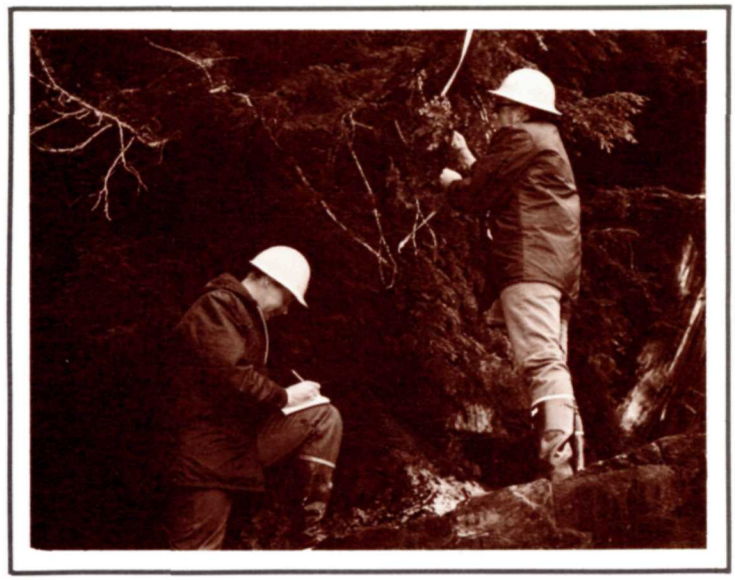
It is hard to think of Phil Briegleb in any occupation other than forester. Tall, raw-boned, a look of the outdoors in his manner, he talks in a measured drawl about the profession as a way of life: "Forestry is partly a science, but the application of it is an art." Then, more measured yet: "Some of the artistry has been a little slow in coming along."

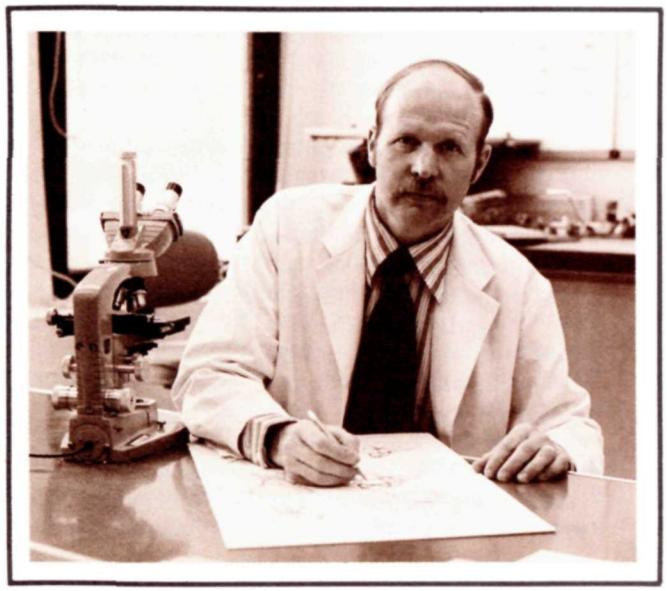
Briegleb, like Cowlin, had hired on at the Station in 1929 for the Douglas-fir Forest Survey. He came west, fresh out of Syracuse University and his hometown in Missouri, in a brand-new Model A. A few days after he arrived, Thornton Munger sent him north to a timber survey party on the Middle Fork of the Snoqualmie River in the Cascade Mountains east of Seattle. "I drove the Ford up to the end of the road and parked it there, and shouldered my packsack, with my belongings and bedroll—and a brand-new pair of calk boots—and hiked to the camp, which was 12 miles up the trail." Briegleb spent about 6 weeks on the timber cruise there, then was sent into the Olympic Mountains for a survey project near the headwaters of the Wynoochee River.

That season in the Northwest woods was the beginning of what Briegleb would remember as a deeply rewarding period of work. The Forest Survey, he said, "was a thrilling job. We had a feeling that the information we were collecting was going to result in the better protection and management of a very valuable resource." The enthusiasm even overwhelmed matters of the pocketbook. "When I came in from that first summer in the field . . . some of the fellows who had been in the Forest Service longer asked me if I was going to turn in an expense account. This was the first time I had heard there was such a thing as an **expense account** in the Forest Service."

Briegleb worked on the Forest Survey until 1935 and then began training as a mensurationist, a specialist in forest measurements. From 1936 on, he divided his time between the Forest Survey under Cowlin and mensuration studies under Munger. When World War II came, Briegleb was chosen for a team which was to survey the timber resources of Chile. "I had the experience of sketch-mapping the forests of Chile from the gunner's blister in the back end of a Catalina flying boat." In the autumn of 1944, another Forest Survey project beckoned, this one in the Northeastern States. He came back to Portland in 1946 to succeed Munger as head of the Station's Division of Forest Management, then went on to direct first the Central States Station in Ohio and next the Southern Station in Louisiana. His next, and final, return to Portland came with his appointment to succeed Cowlin as Director in early 1963.

Briegleb had seen, during his quarter-century of Federal forestry research, a changing attitude in the lumber industry. "Gradually some of the skepticism developed into tolerance," as he put it. Now, with the lumbermen more amenable, segments of the public were skittish about the Forest Service. The first annual report of the Federal Council on Environmental Quality bespoke such concern: "Good forest management is no longer synonymous with timber production." Yet, despite the push and pull of stronger environmental and recreational demands, timber production had to continue. Briegleb charted the policy for the Station: "Mostly, more intensive forest management practices were in





need—such as genetics research, fertilization, precommercial thinning, more intensive protection of watersheds."

In terms of specific research projects, a study of the residual effects of pesticides was begun in the fall of 1964, and the emphasis began to shift toward biological and silvicultural measures to control insects. The computer came more and more into research. Through one dramatic piece of computer programing, different perspectives of the landscape could be drawn electronically to show the visual impact of proposed timber cuts. Thinning experiments showed that the lodgepole pine, one of the region's frailest lumber producers, could be made to grow in much more productive dimensions. An alternative to clearcutting was studied at the Cascade Head and Hemlock Experimental Forests: it was found that a system called "shelterwood," which left enough trees to shade the site, could be used to reforest the carefully logged areas of Douglas-fir, western hemlock, Sitka spruce, and red alder.

Meanwhile, the 1960's also saw the growth of research facilities and projects in the vast northern frontier of the Station's territory—Alaska. The Institute of Northern Forestry, with headquarters at Juneau, became part of the Station in 1967. Two Experimental Forests already had been set aside in coastal Alaska, another was designated in the interior, and the new Forestry Sciences Laboratory was established at Fairbanks.

Some of the basic research in Alaska read like a new edition of earlier projects carried out in Oregon and Washington. In a survey of the timber stands of this final wilderness, the figures were big ones: 28.2 million acres of commercial timber land, more than in any other state; a total volume of sawable timber estimated at 215.5 billion board feet, more than three-fourths of it in the Sitka spruce and western hemlock stands of the wet coastal region.

Along with these traditional research areas, the Alaskan ecology posed some specific new problems. Erosion was a particular concern. It was found, for instance, that firelines cut to control forest blazes in areas of permafrost grow into deep ruts, and a study was begun. Another focused on fish habitats which, vital as they were to the fishing industry and recreation, had to be protected from logging and construction near the streambeds.

It is too early yet to know just how far and where the levers of environmental concern and recreational demand will move the Forest Service and its research aims. As late as 1970, Forest Service Chief Edward P. Cliff said ruefully that "our programs are out of balance to meet public needs for the environmental 1970's and we are receiving mounting criticism from all sides. Our direction must be and is being changed." Phil Briegleb, himself a man of deep feeling for the loveliness of forested slopes, found some hard cross-pressures in his 8 years as Director, such as "the preoccupation with an unwanted war" which perpetually tightened budgets.

This era of ecological outcry crested with the celebration of Earth Day on April 1, 1970. By then, the Station, along with the rest of America, could well ponder the environmental priorities of coming years—and what the right balance might be.

Field work is especially hard in Alaska where winters are long and travel is difficult. Boats and planes are the usual methods of getting to research locations.

Today and Tomorrow

Fragrant little chips of history spewed from the saw cut, and accumulated on the snow before each kneeling sawyer. We sensed that these two piles of sawdust were something more than wood: that they were the integrated transect of a century; that our saw was biting its way, stroke by stroke, decade by decade, into the chronology of a lifetime, written in concentric annual rings of good oak.

–Aldo Leopold, A Sand County Almanac

Chips of history, and the give-and-take strokes of those who make them, accumulate into a record we can read as the recent past of Pacific Northwest timberland and grassland, and the Federal research centered on them. But the accumulation continues even as we size up the past; already the Station is more than halfway through the decade that opened with the environmental push of 1970.

A new Director presided over most of the first half-decade of the Seventies. Robert E. Buckman, a silviculturist with a research background earned in the conifer forests of the Northern Rockies and the region of the upper Great Lakes, came into the Portland job when Philip Briegleb retired on May 31, 1971. Buckman had served as assistant to the Deputy Chief for Research in the national office at Washington, D.C. He saw the new complexities of Federal forestry: "The problems of forestry today concern not so much the lack of knowledge about single uses and single commodities; they concern not fully understanding the interrelationships of multiple uses–water and recreation or timber, wildlife, and livestock."

A reorganization of research began under Buckman. In 1971, four projects at Fairbanks, Alaska, were welded into a single interdisciplinary team–entomology, botany, silviculture, and forest management–to study the forest ecology of the Alaskan interior. Since then, many of the Station's scientific projects have been retooled into research work units which combine several areas of expertise.

The experimental areas the Station had drawn on for decades also were used in new ways. In late 1974, the handsome set of headlands and estuaries midway along the Oregon coast which had been the Cascade Head Experimental Forest became the country's first scenic-research area. Even before that, in 1972, an inventory of the Federal government's Research Natural Areas in Oregon and Washington was published–there are now about 60 of them under various agencies with the Station administering the research use of 34.

Alaska was given increased research emphasis. The global scramble for natural resources has coincided with the apportionment of 220 million acres of public domain lands in the Alaskan vastness

Six directors of the Experiment Station were living in Portland at the time this photograph was taken in 1974. Standing, left to right: Robert F. Tarrant, 1975-; Philip A. Briegleb, 1963-1971; and J. Alfred Hall, 1945-1950. Seated, left to right: Robert W. Cowlin, 1950-1963; Thornton Munger, 1924-1938; and Robert E. Buchman, 1971-1975.

among Federal agencies, the Alaska Natives, and the State government. One of the concerns has been the effects of logging white spruce from interior Alaska's fragile ecosystem: studies of harvest methods and regeneration were started on the Bonanza Creek Experimental Forest near Fairbanks. Other Alaskan projects have included research on the effects of log dumping and rafting in southeast Alaska, and on techniques to increase spawning areas for salmon.

Even as new research ventures were planned, an old subject pushed into prominence again—the forest insect, this time the Douglas-fir tussock moth. By 1973, the Forest Service was calling the tussock moth outbreak "the worst epidemic of the destructive forest defoliator ever recorded," calculating that the pest had spread through some 800,000 acres of forest in eastern Oregon and Washington, Idaho, and Montana. Studies on the tussock moth dated back to 1927, long before Federal entomology research was transferred to the Forest Service. But now the environmental risk of chemical insecticides has been added into the research equation, and a number of Station researchers worked on nonchemical remedies, such as the virus that often contributes to the natural collapse of tussock moth outbreaks. And during 1974, the entomologists identified the sex attractant, or pheromone, which lures the tussock moth. Using this synthetic attractant in traps may provide an early-warning system to signal a growing infestation.

Buckman's 4-year Directorship concluded in June 1975, when he was named to the Washington, D.C., post of Associate Deputy Chief for Forest Service Research. His successor, Portland-born and

the first native Northwesterner to head the Station, is Robert F. Tarrant. Tarrant came to the Station from the Soil Conservation Service in the fall of 1946, and in his career as a research soil scientist headed up a project on forest soils and regeneration, and then—in the post-*Silent Spring* days—the project which studied the impact of chemicals on the environment. He became an Assistant Director of the Station in 1971 and Director on July 10, 1975.

By the end of 1975—a half-century since the wonderworker of the gooseberry bush dropped by to see what the Station was doing—the Pacific Northwest Forest and Range Experiment Station had a complex family tree of current and past research. Sorting out the lineages might produce some of these conclusions:

—An agency is pushed and pulled by the times. The Station has felt the Depression, three wars, the growth of environmental concerns, the burgeoning of science in the nation's everyday life, and the effects of inflation and concerns about Federal spending.

—The bloodline of an agency is its people. The decades of research by a man such as Leo Isaac—a painstaking observer as well as inventor—yield priceless information, the foundation for improved forest management practices and new research. In the eras of the six Directors who have headed the Station can be read, not surprisingly, some guiding notions of each man: Munger's brisk administration and his emphasis on the great Douglas-fir species; Wyckoff's delegation of authority amid the many demands of war; Hall the biochemist focusing on better methods for using the forest's wood; Cowlin the economist presiding over the growth of scientific facilities and administrative units; Briegleb's attention to more scrupulous forest management; and Buckman's retooling of research projects into interdisciplinary teams.

—The five decades of the Station have produced several thousand publications on a spectrum of research from insect control to watershed protection, from grazing management to forest inventories. New trends already have been shaped by the environmental and recreational demands of recent years. But the principal timber species of the Pacific Northwest—the great Douglas-fir tree—has been the focus of the most significant research accomplishments at the Station.

—And finally, the forests and grasslands thrive or wane according to the heartbeat of our society. The patterns on the Pacific Northwest horizon, whether the close-textured green slopes of selectively cut timber or the patchwork of clearcuts, whether rangelands gullied with erosion or unbroken stands of grass, reflect our current values. Tomorrow will be written there, too. Somehow over the years, the trees have continued to green and grace the mountain slopes, the grass has whisked its eternal wind dance across the valleys and prairies. Not for nothing are such scenes called horizons.

Sources and Acknowledgments

The source notes listed below are meant to document quotations and, in special instances, specific points of history. A copy of the manuscript fully annotated with sources is on file with the Pacific Northwest Forest and Range Experiment Station, and another with the author.

This history has drawn heavily on the 459-page manuscript compiled by former Station Director Robert W. Cowlin, "Federal Forest Research in the Pacific Northwest." The Station files yielded a useful year-by-year summary of projects and personnel. The first of these typescript volumes is titled "A Record Concerning the Wind River Forest Experiment Station, July 1, 1913-June 30, 1924, and the Pacific Northwest Forest and Range Experiment Station, July 1, 1924-December 30, 1938," with supplements for 1939-43. The second is "The Pacific Northwest Forest and Range Experiment Station History Supplements 1944 through 1953." The annual reports published by the Station, beginning in 1935, provide a summary of research activities and publications.

For detailed documentation, the archival material on deposit at the Federal Archives and Records Center in Seattle is highly valuable, especially the monthly reports written by the Station Directors.

The files of the Forestry Sciences Laboratory at Corvallis contain two brief mimeographed histories: "The Evolution of Forest Insect Research and Its Present Status in the Pacific Northwest," a 1956 conference paper by V. M. Carolin and K. H. Wright, and "History of the Division of Forest Disease Research, Pacific Northwest Region," dated 1958 and listing no author.

As for personal recollections, it is extraordinary luck that four of the Station's first five Directors were available for interview. (Stephen N. Wyckoff, Director from 1938-45, died in 1959.) Thornton T. Munger, who died in 1975, was interviewed in 1967 by Amelia R. Fry of the Forest History Society, with the results published under the title *Thornton T. Munger: Forest Research in the Northwest* (University of California Library, Berkeley, 1967). Three former Directors were interviewed by the author in the spring of 1975: Philip A. Briegleb, Robert W. Cowlin, and J. Alfred Hall.

Several researchers at the Forestry Sciences Laboratory in Corvallis also took time to talk about their projects: Robert K. Campbell, Jerry F. Franklin, Robert H. Ruth, Roy R. Silen, Ronald E. Stewart, and Douglas N. Swanston. Charles Sartwell was especially helpful concerning the history of forest insect research. Much information about research in an earlier era was drawn from Amelia R. Fry's interview with the late Leo A. Isaac, published as *Leo A. Isaac, Douglas Fir Research in the Pacific Northwest, 1920-1956* (University of California Library, Berkeley, 1967).

For background on the history of Americans and their forests, two books are indispensable: Thomas R. Cox, *Mills and Markets: A History of the Pacific Coast Lumber Industry to 1900* (University of Washigton Press, Seattle, 1974), and Richard G. Lillard, *The Great Forest* (Alfred A. Knopf, New York, 1947). And the author was fortunate to be able to read in manuscript Harold K. Steen's history of the U.S. Forest Service.

A number of persons helped considerably by commenting on the first draft of the history: Philip A. Briegleb, Robert E. Buckman, George Garrison, J. Alfred Hall, Frank Harmon, Louise Parker, Charles J. Petersen, Robert M. Romancier, Harold K. Steen, and Robert F. Tarrant. And finally, after sharing his own manuscript and sources and sitting for an extensive interview, Bob Cowlin still had the good grace to improve this version with further information and advice.

Source Notes

A Beginning

Page 1 **"One caller, name unknown":** PNW Forest Experiment Station monthly report, Jan. 1925, p. 2.

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Page 4 **"Boss loggers and lumbermen":** Stewart H. Holbrook, *Holy Old Mackinaw* (New York, 1939), p. 248.

Page 4 **established the Wind River Experiment Station:** Annual Report of Wind River Experiment Station for 1913, p. 1.

Page 4 **"it was then a sad affair":** *Leo A. Isaac: Douglas Fir Research in the Pacific Northwest, 1920-1956* (Forest History Society interview by Amelia R. Fry, Berkeley, 1967), p. 49, p. 53.

Page 4 **allotted $26,060:** PNW Forest Experiment Station Record, 1924-1938, p. 13.

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Page 5 **"We had . . . a bicycle tire valve":** Richard E. McArdle letter to Robert W. Cowlin, Oct. 18, 1973.

Page 5 **"From the start":** *Thornton T. Munger: Forest Research in the Northwest* (Forest History Society interview by Amelia R. Fry, Berkeley, 1967), p. 45.

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Page 7 **"October has been divided":** PNW Forest Experiment Station monthly report, Oct. 1925, p. 1-3.

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Page 12 **"In those years":** interview with Philip A. Briegleb by Ivan Doig, Portland, April 30, 1975.

Page 12 **"They did a lot":** *Munger* interview, p. 138. Details of projects by the CCC and other New Deal work forces can be found in the year-by-year summary in the Pacific Northwest Forest Experiment Station Record, 1924-1938.

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Page 21 **"Most of the forest management research":** Hall interview.

New Provinces for Research

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Page 23 **The Office of Investigations in Forest Pathology:** History of the Division of Forest Disease Research, Pacific Northwest Region, p. 1.

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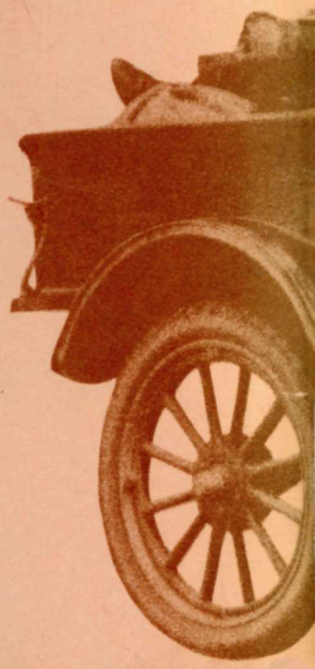

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