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Early Forestry Research

a history of the Pacific Northwest Forest & Range Experiment Station

1925-1975

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of the Pacific Northwest
Forest & Range
Experiment Station
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by Ivan Doig

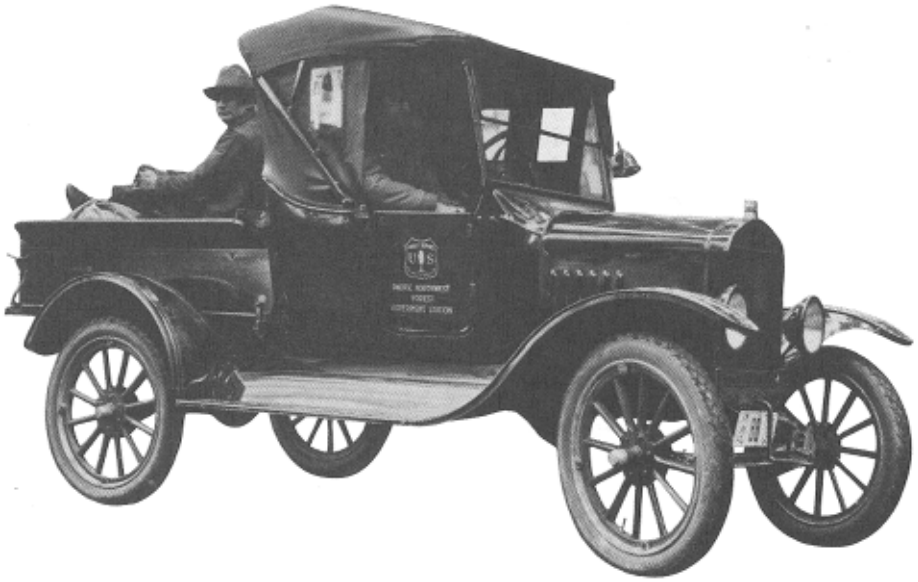
FIFTY YEARS OF FORESTRY RESEARCH

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 will read it with enjoyment, and at the same little learn a little mote about Forest Service research in the Pacific Northwest.

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.
-Walkrce Stegner, Beyond the Hundredth Meridian

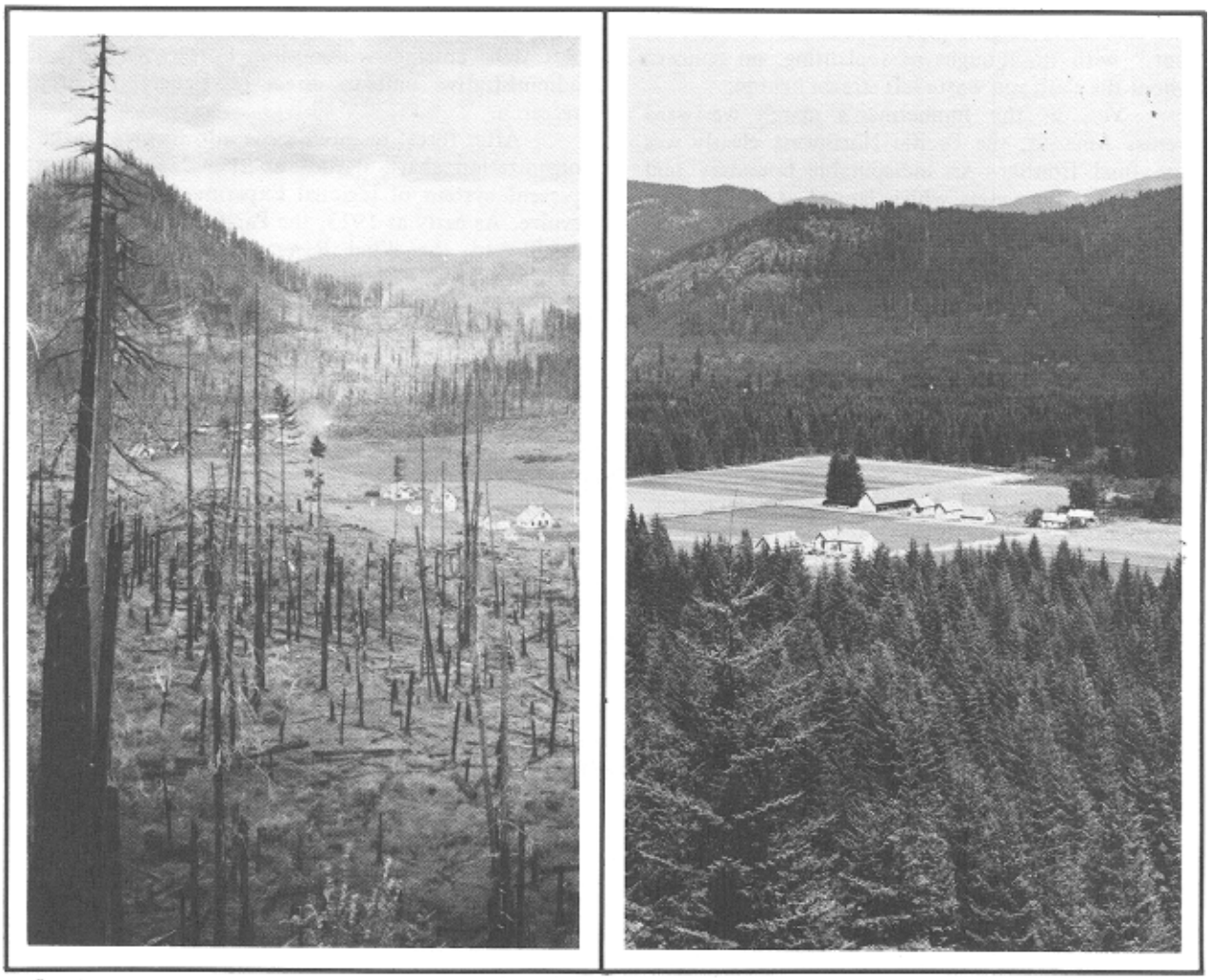
The storms track in from the Pacific on collision course first with the Olympic Mountains and the Coast Ranges, and then with the longer and loftier jut of the Cascade Range north to south through the states of Oregon and Washington. We can't say for sure what at least one writer has alleged: "The first 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: lumber men 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 Dough 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

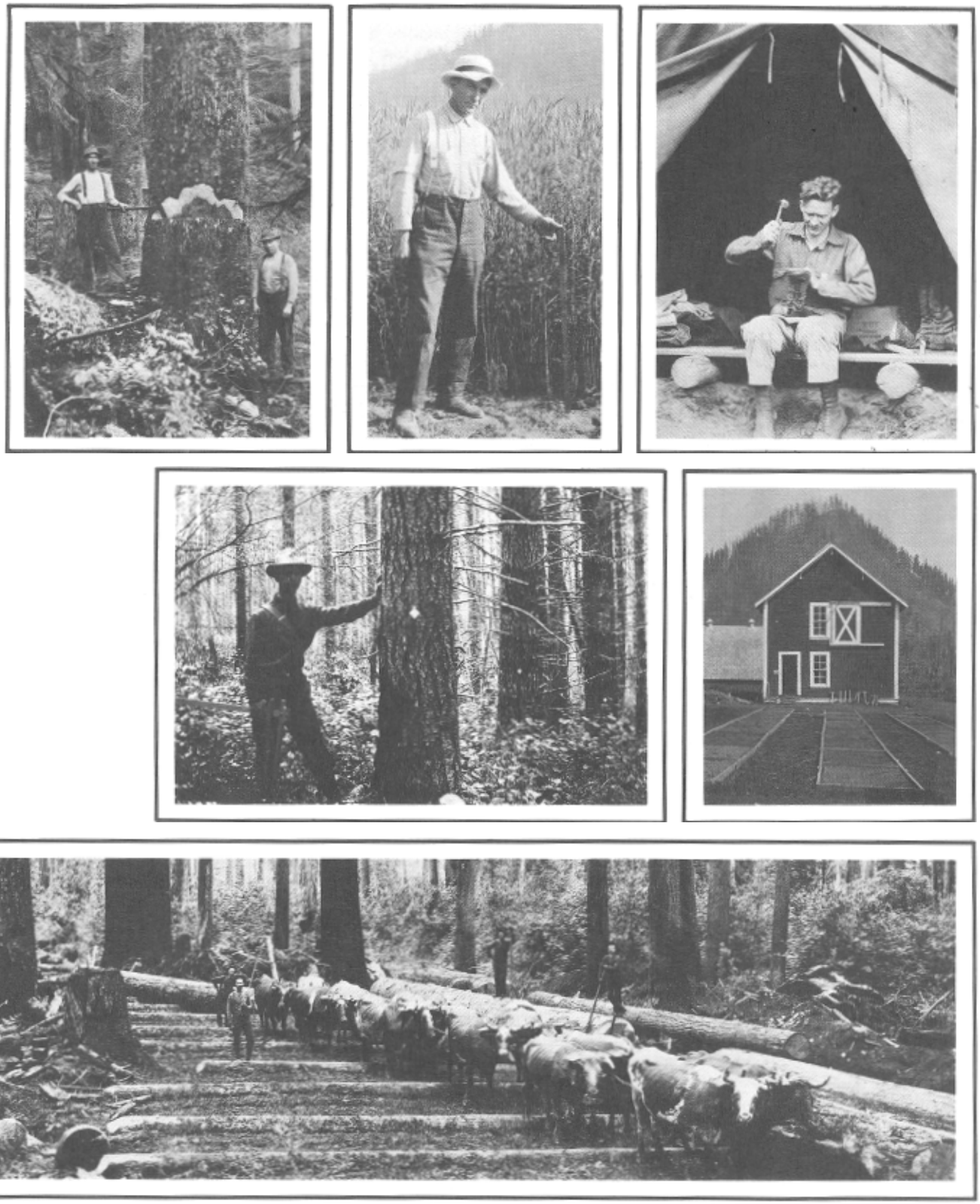
We had... a bicycle tire valve soldered to the gas tank under the seat so we could forcefeed the gas when we had to go up steep hills-the only other way was to drive backwards up the hills.
-Richard E. McArdle, recalling the Station's first truck

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. Barren, 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, end 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.

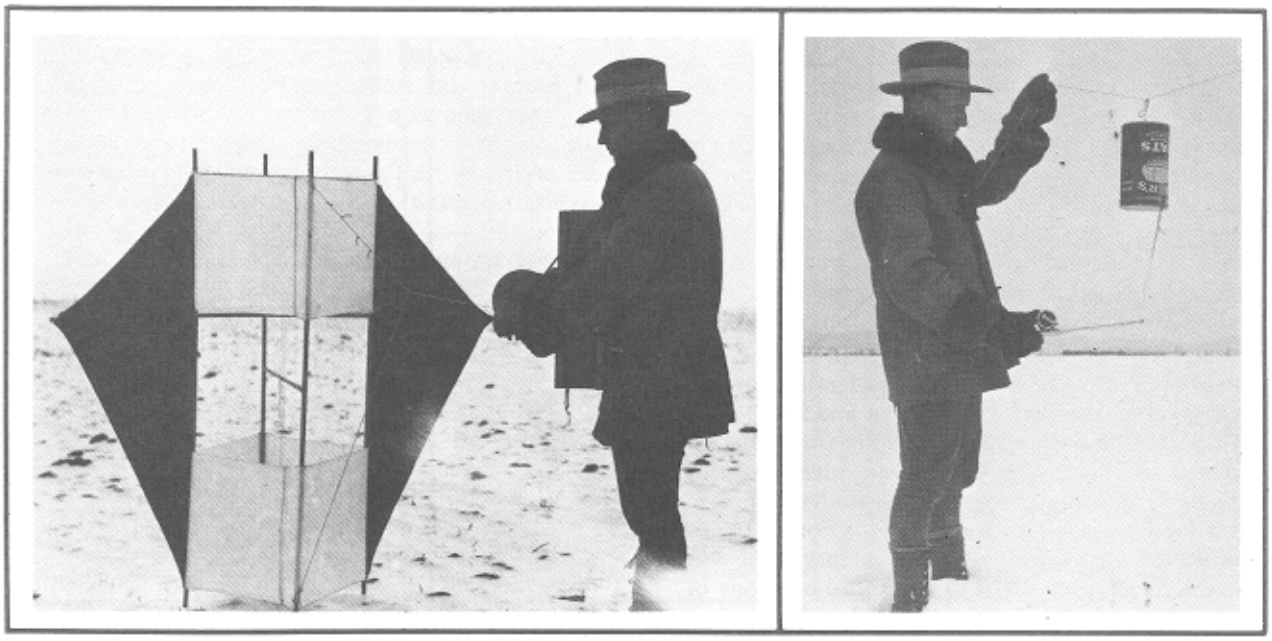
Other projects were tidier and more productive. Munger did some tree planting to slow the drifting of sand dunes along the southern Oregon coast. He made reconnaissance trips into avalanche areas of the North Cascades to study the effects of deforestation. And in 1912, Munger and a crew gathered the 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 5500 "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.

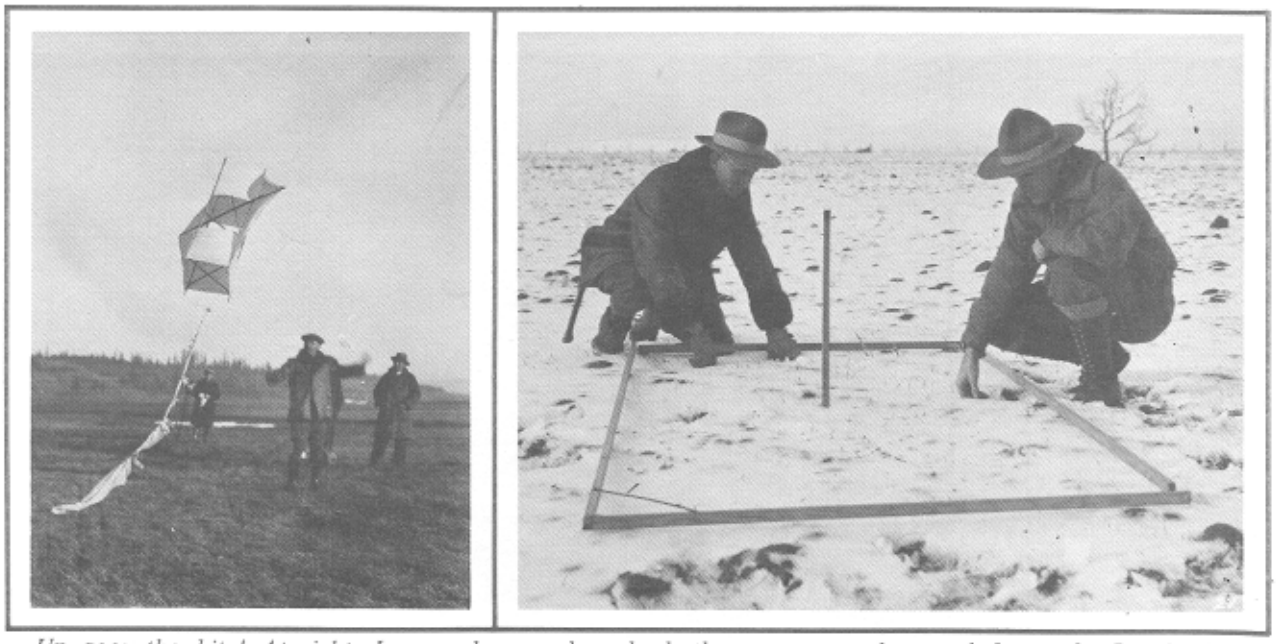
Munger is remembered as the sharp-eyed administrator who ran the Experiment Station in its earliest era. Another figure from that time is remembered for a different brand of keenness Leo Isaac, the Douglas-fir scientist.

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 heel 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 clearcut 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) bottomside-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 our 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

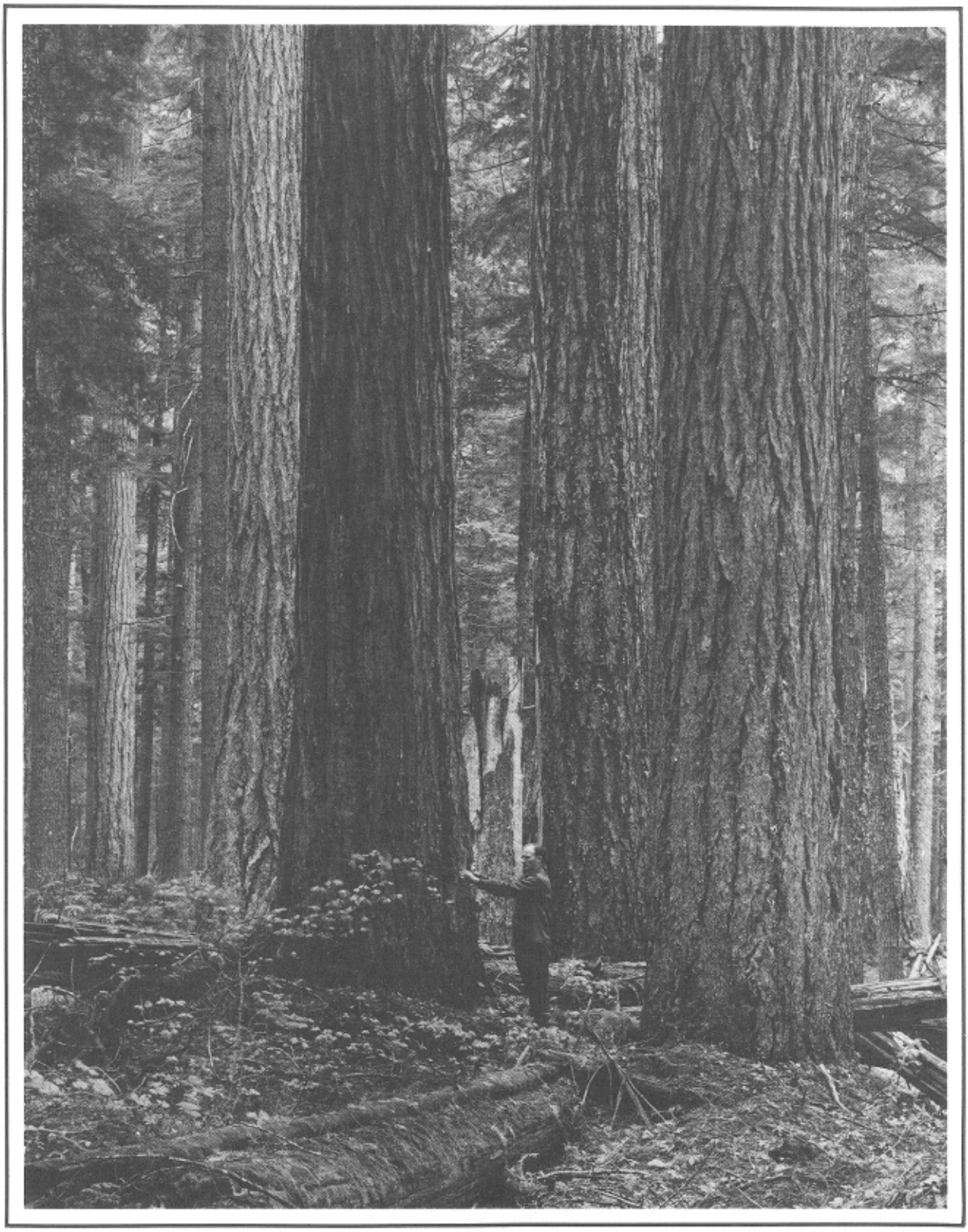
Early in 1929, Munger went to Washington, D.C., to discuss an ambitious new project prescribed in Section 9 of the McSweeney-McNary Act. This was to conduct a long-needed inventory of American timber resources-both private and public-an accounting of the timber stands left after many generations of logging. 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. "floss" 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 Guard, 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 Guard 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, Firings, and travel were restricted. Salaries, never very substantial in the Forest Service (junior foresters with college degrees were being hired for about 52000 a year), now stood frozen year alter 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, that' 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 canted out by experienced timber cruisers and graduate foresters left short of employment by tire 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 Mind 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 I 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 oldgrowth 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 "Ross" 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.

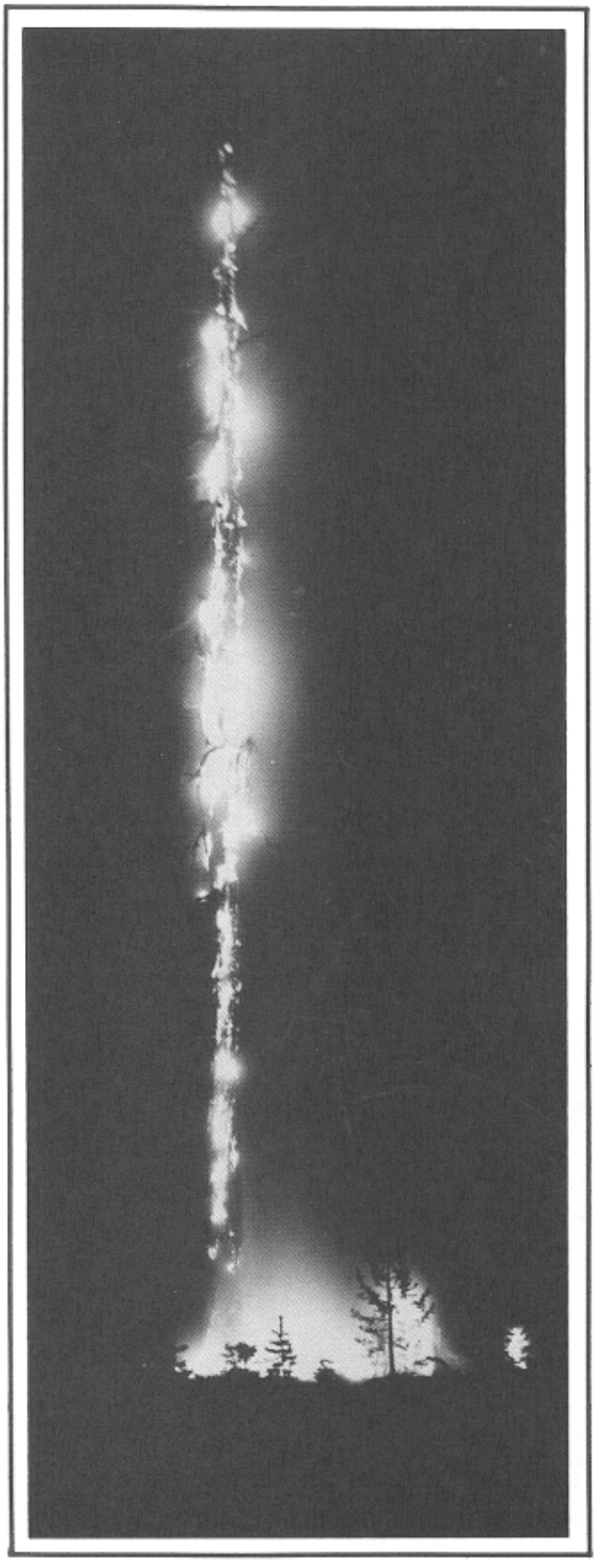
The Forest Survey was the Station's major research achievement in this era, but other milestones can be counted as well:

- 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.

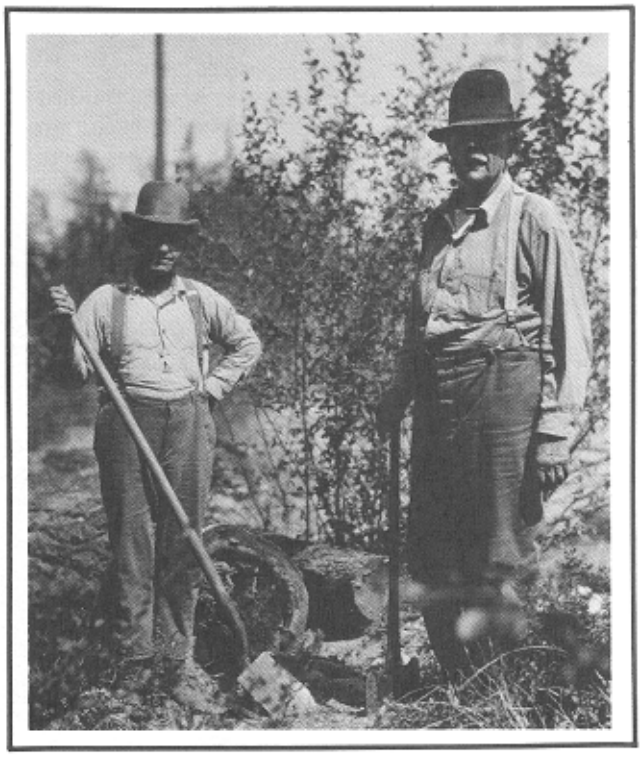
This was an early round in the complex battle over clearcutting. Munger was especially perturbed



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 clearcuttrng once again.

One achievement of these years was long overdue-the Station's fast 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 9300 balloon-bombs were launched during the war and many were found m 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 needy 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

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