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UNITED STATES DEPARTMENT OF AGRICULTURE
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BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS

FOREST ECONOMICS
RANGE RESEARCH

NOV 1931



BRANCH OF RESEARCH

August, 1931

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FOREST EXPERIMENT STATIONS

APPALACHIAN FOREST EXPERIMENT STATION

General

Three new appointments were made to the Station staff in August. R. M. Nelson, formerly Assistant Pathologist, was appointed Silviculturist on August 15, and will be engaged in the study on forest fire damage. E. M. Manchester, formerly Senior Ranger on the Pisgah National Forest, was transferred to the Bent Creek experimental forest. He will be in charge of buildings and grounds and will assist in the various projects under way at Bent Creek. Mrs. Mary P. Gudger was appointed to the clerical staff as Junior Stenographer.

The Region 7 planting meeting, held at the Parsons, W. Va., nursery was attended by Barrett and Sims. Frothingham contributed a short paper on administrative planting research, which was read by Sims. After the meeting Barrett and Sims made trips with Larry Gross of the Regional Office for the purpose of locating satisfactory conditions for an experimental area to be used by the Station.

Work on the new buildings at Bent Creek is progressing very satisfactorily. The exteriors of three laboratories, which are completed, show the pleasing effect of the combination of field stone, hand split chestnut shingles, and hewn chestnut timbers. The power line to the site is nearly completed.

Several of the staff are members of the Carolina Appalachian Trail Club, which was organized in February of this year. They have taken advantage of the week-end trips of the club to become better acquainted with the mountains around Asheville. During the summer several trips have been made into the Great Smoky Mountains. Buell is vice-president of the club and Mrs. Abell, secretary.

The Station has made a point of collecting seed from various species of trees at convenient times in order to meet occasional requests. A small amount of yellow-wood seed was received recently from Dean T. P. Cooper, Director of the Kentucky Agricultural Experiment Station. Because of the heavy seed crop a small quantity of Carolina hemlock cones were also collected on the Biltmore Estate.

Among the visitors to the Station during the past month were Professor J. M. Tinker of the Georgia State Forestry College; Professor Fay G. Clark of the School of Forestry at the University of Montana; J. W. Harrelson, Director of the North Carolina Department of Conservation and

(Over)

Development; Dr. R. C. Hall of the Central States Forest Experiment Station, and W. E. Bond of the Southern Forest Experiment Station.

Forest Management in North Georgia

Early in August work was commenced on the white pine release study, the first set of five plots being established on Cooper's Creek in the Toccoa District of the Cherokee National Forest. The work to date has included the tagging and measurement of advanced reproduction of white pine which has become established under an old, defective hardwood overstory. Fire protection under both national Forest and private administration has resulted in extensive areas where this condition exists. The purpose of the present project is to investigate costs of releasing the pine by girdling and poisoning the overstory, and to determine the effect of various degrees of release upon the pine understory.

Barrett assisted in setting up weather instruments at the Georgia Mountain Experiment Station near Blairsville. Knowledge of weather conditions in the Georgia mountains has been quite limited in the past, the station just established near Blairsville being the only one located in the mountains proper.

Several days were spent with Ranger Woody in looking over watersheds suitable for an experimental forest. Five areas were examined, two of which have decided possibilities. However, it was decided to postpone definite decision pending further reconnaissance.

Management of Loblolly Pine

The data taken in 1929 on costs of removing undesirable trees from a stand of mixed loblolly pine and hardwoods by felling, girdling by the removal of a continuous ring of chips, and poisoning with sodium arsenite were prepared by MacKinney for publication. The results of these several treatments, as shown by the reexamination of the treated trees in 1930, were also included in the paper.

The study showed that poisoning was the cheapest and most effective way of killing the undesirable hardwoods and preventing sprouting. In addition it showed the desirability of further work on different methods of girdling and the effects of various poisons.

Chestnut Replacement

MacKinney, Manchester, and Genth spent the last week of the month reexamining the reproduction quadrats on five of the permanent sample plots

on the Bent Creek experimental forest. These plots were established in 1927, at which time all the merchantable chestnut was removed from them. In addition all undesirable hardwoods of poor form and species were removed from three of the plots.

On the two plots from which the chestnut only had been removed there have been relatively few changes in the reproduction. The reproduction which was present at the time of the removal of the chestnut has grown slowly and offers rather poor promise for the future. The three plots from which the undesirable hardwoods as well as the dying chestnuts were removed now support fairly dense stands of black locust in mixture with yellow poplar ranging from one to sixteen feet in height.

Fire Damage Studies

Development of technique in determining the insulating properties of the bark of various species of trees by means of thermocouples was continued. The fire damage sample plots established by McCarthy in 1924, at Pritchard Creek, were reexamined by Abell and Manchester.

Streamflow and Erosion

During the early part of the month Hursh visited the soil erosion investigation stations of the Office of Erosion Investigations, Bureau of Chemistry and Soils, at Statesville, N. C. This Station is located in the upper Piedmont region and is representative of a considerable area. The soil of the region is chiefly Cecil series. The Station is particularly concerned with methods and problems of terracing. Experiments are in progress designed to determine the significance of gradient, length, and interval of the terrace. Experiments are also in progress to determine conditions governing run-off under different methods of cropping. Gauging stations have been installed for two small watersheds, one of which will be cultivated and one uncultivated. The influence of forest cover is being studied under a rather open stand of shortleaf pine and hardwoods. The influence of forest cover is also being considered, and an area of 1/100 acre has been provided with a catchment basin on which the amount of run-off and erosion will be compared with those of other plots in the vicinity. On one part of the Station area some very serious gullies are being used to determine the most satisfactory method of preventing further erosion. The Station will cooperate with the North Carolina Department of Conservation and Development in planting up eroded areas of this nature.

Hursh also visited the Nantahala National Forest and conferred with Supervisor Byrne and Technical Assistant Stone regarding possible locations of watersheds to be used for streamflow and erosion studies. A portion of the Nantahala National Forest is within the 70-90 inch rainfall belt which

represents as high an annual rainfall as any interior section of the United States. Furthermore, certain portions of the Forest within this high rainfall belt are of quite irregular topography and will possibly provide areas as small as two or three hundred acres giving a permanent stream of sufficient size for gauging. Several portions of the forest were visited and a number of paired watersheds were examined.

Hursh left Asheville on August 31 to visit the streamflow and erosion studies in the Western States with the idea of becoming familiar with the methods and apparatus used in these studies, and to determine methods suitable to the Southern Appalachian conditions. Hursh will visit the Intermountain, California, Southwestern and Southern Stations.

Forest Insect Investigations

During the month of August very little southern pine beetle activity was noted. At this time last year the beetles were present in large numbers and were responsible for the death of pines over large areas. Observations were made in the vicinity of Asheville, Spruce Pine, Hot Springs and Smokemont in western North Carolina, and near Paint Branch, Gatlinburg, Knoxville, and Cade Cove in eastern Tennessee.

Huckenpahler and St. George spent the period August 16-22 in the National Park Area of the Smoky Mountains in company with Mr. J. R. Eakin Superintendent of the Park, and with Rangers Hough and Needham. Extensive injury was noted which occurred during 1929 and 1930 during the period of drought, but practically no trees were found which had been attacked this season.

Around Bent Creek, Billy Moore's Creek and on Spivy Mountain small group killings of about fifty trees each constitute the only kills noted so far this year.

On August 16, Huckenpahler, Wygant, and St. George, in company with Manchester examined infested pine trees around Paint Branch, Tenn., and Hot Springs, N. C. As the result of attack in the former locality during the summer of 1930 many pitch, shortleaf and scrub pines were killed. Later in the fall the surrounding white pines were taken. In this region, as elsewhere the woodpecker work was noted to have been very heavy and is believed to have been an important factor in the natural control of this beetle. Abnormal weather conditions also are believed to have been important in this respect.

During the period August 24-31 Dr. R. C. Hall, Forest Entomologist, attached to the Central States Forest Experiment Station, Columbus, Ohio, visited the Station and conferred with Mr. Frothingham and members of the staff regarding the locust borer situation in this vicinity. Dr. Hall is studying locust plantations in the central and eastern states for evidence of borer injury.

Reports have been received recently from Sumter, S. C., that the May beetle (Phyllophaga sp., possibly P. futilis Lec.) is causing severe injury to slash pine seedlings in nursery beds. Some injury has also been found in longleaf seedlings.

Forest pathology

Phelps spent most of the month in the laboratory. Work on the extensive culture collection of heart rotting fungi was continued and a large number of microtome sections of blue stained wood were mounted and examined.

Forest biology

Burleigh continued his life history studies on birds and mammals in this region. Several collecting trips were also made to Mount Mitchell and the Smokies. A series of articles are being prepared on wild life for the Sunday editions of the Asheville Citizen-Times.

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CALIFORNIA FOREST EXPERIMENT STATION

. July and August

General

We have been favored with several visitors during July and August. Mr. Clapp spent two weeks in Region 5, going over all lines of work with the station staff. Field trips were made to the Stanislaus, Shasta, and Devil Canyon stations in company with Mr. Kotok.

Henry S. Graves visited the Station and the Regional Office in his search for information on various phases of the work of the Conservation Board.

Prof. I. W. Bailey of Bussey Institute, and Dr. A. E. Douglas of the Carnegie Institute, also visited the Station en route to the redwood region. They are both interested in the variations in redwood structure due to site differences.

The new staff members slowly arrive. In range investigations, A. L. Hormay and F. G. Renner are already on the job and M. W. Talbot is expected about the middle of the month.

P. B. Rowe and D. M. Ilch have been added to the erosion and streamflow force and Anselmo Lewis is working on cover types.

Forest Management - Pine Region

Mr. Hasel and Clements finished remapping 2780 reproduction and vegetation quadrats on the Stanislaus, Plumas and Lassen Forests about August 10. The sustained drought cycle and continued lack of heavy seed crops are the only remarkable features. Very little new reproduction was established this season, while shrubs and other vegetation continue to increase.

The Plumas plots have been under observation since 1911. Complete new base maps were made for these. The plots are in a site III western yellow pine stand lightly cut over in 1911. Surprisingly small changes are notable in the status of reproduction. The plots are fenced.

After finishing checking a few remaining quadrats on the Stanislaus, Hasel and Clements returned to Berkeley to resume work on the Mc progress reports.

Toward the end of August, Hasel and Hormay began establishment of the Jeffrey pine reproduction-sheep grazing plots on the eastern Plumas.

The instrument stations at the Stanislaus Branch and the seasonal growth records have been maintained by Lloyd. No remarkable differences have appeared between the timbered and clear-cut areas except the longer duration of maximum soil temperatures in the open and the higher moisture in the first few inches of soil in the open.

The seasonal growth promises to be good in spite of very low rainfall. Also the pine beetles are assuming epidemic proportions in spite of the good growth ring. So it goes with all theories.

A field conference was held in July by Woodbury, Evans, and Dunning to discuss uniform methods of timber cruising. At present there is considerable diversity of methods in reconnaissance, cruising for land exchange, cut-over inventories, and management plans. It seems desirable to provide a reconnaissance party chief to relieve Evans for coordination work. A test cruise of a considerable area is to be made on the Plumas with a check of scale and cull after the area is cut. This will give a check on tables, cull allowance, and cruising methods. Reineke has prepared a plan for the job and with Clements, joined Evans in the preliminary field work August 14.

Woodbury, Beeson, Hormay, Kevin, Delaney and Dunning met on the Clover Valley sale July 20 to lay out a small study of the influence of sheep grazing on Jeffrey pine reproduction. The location of plots, fences and methods were decided upon. Hasel, Kevin, and Hormay completed the preliminary charting early in August.

Weber of the Eldorado, and Dunning went over the red fir Christmas tree project at Leek Spring. A crew is making an improvement thinning on

the area cut-over in 1929 and 1930. Some small sample plots were selected for thinning tests and some changes in the thinning practice suggested.

Dunning spent a few days at the Stanislaus Branch in August with Lloyd, making cone counts and going over some possible experimental reserve areas. A conference was held there with Messrs. Carter, Clapp, Woodbury, Kotok, Wieslander, Roberts, Hall, Burnett, Parsons and Jones, concerning the future development of research at the Stanislaus Branch. A few days were taken in the office by Dunning in preparing for the growth revision conference at Portland September 2 and 3.

Forest Management - Redwood Region

The first week of July was spent in reviewing the data collected on the redwood planting study and in working out methods to be used in the extensive survey of conditions on redwood cut-over areas. The remainder of the month was spent in running sample strips through redwood cut-over areas of Humboldt County. T. B. Plair, a temporary field assistant, is working with Person on this project. For this study, cut-over areas are selected for which the approximate date of logging is known and also the fire history and whether grazed or not after logging. Lines are run through these selected areas and a group of four milacre quadrats are examined at one chain intervals along these lines. The height and symbol of the dominant tree species are noted and the exposure gradient, amount of slash, vegetation and date of last fire are recorded for each quadrat. Most of the time to date has been spent on areas logged between 1905 and 1915. A few areas logged about 50 years ago were also examined.

It is already evident from these surveys that redwood will reproduce quite abundantly from seed under favorable condition, though it is not nearly as aggressive in this respect as Douglas fir. The early age at which seed is produced by most of the conifers native to this region is also noteworthy. On areas logged 20 to 25 years ago, many small redwood and Douglas fir seedlings were found which must have started from seed produced by redwood sprouts and Douglas fir seedlings which were less than fifteen years of age.

Mr. George Cecil, formerly of the Forest Service, now with the Los Angeles Chamber of Commerce, was accompanied by Person on a two-day trip of inspection of the redwood planted area.

Most of August was spent in Humboldt and Mendocino Counties completing the field work for the cut-over land survey. A total of 26-1/2 miles of strip have been run through cut-over areas and over 9000 milacre quadrats have been examined. It is evident from a preliminary analysis of the records that redwood sprouts stock a much lower per cent of the total area than the 20 to 30 per cent usually accepted. It is also apparent that natural redwood seedlings are of much greater importance than is

generally believed and that a reasonable number of seed trees together with protection from grazing and fire will result in fair stocking on redwood cutover areas in a majority of cases.

Dr. A. E. Douglas of the Carnegie Institute and Prof. I. W. Bailey, of Bussey Institute, Harvard, spent several days in the redwood region collecting samples of redwoods from different localities for use in studies on the structure of redwood and variations due to differences in site and climate. Person gave them what help he could in locating desirable material.

Cover Types.

Wieslander spent the first three days of July with Hormay starting out a crew in the Mt. Hamilton Range, where a new departure in type mapping, the designation of dominant species of grass in the grass and grassy woodland types, was inaugurated. Heretofore these types were simply mapped and no attempt made to show species other than the dominant trees in the latter type. In the Inner Coast Ranges, of which Mt. Hamilton Range is a part, it was considered important to secure these additional data since grazing is practically the only use.

Hormay stayed with the crew for a week, giving instruction in the identification of grass species, and then proceeded to Eldorado County where he gave similar instruction to the crew working there. A recent check up by Wieslander testifies to the fact that Hormay's instruction was well done and has borne fruit. Both crews are now recording dominant grass species both on the maps and on the sample plots in excellent shape.

From Mt. Hamilton, Wieslander went to Eldorado County where he spent a day checking up the work there and another day with Reineke looking over the problem in the field of correlating site index of second growth stands with site based on heights of mature dominants. The type crew was instructed to secure data upon which to base this correlation. Reineke and Wieslander then proceeded to the Klamath National Forest where Junior Forester Crebbin and four field assistants plan to map cover types in connection with the mapping of all of the areas burned over on the Klamath during the past 10 years. Since the Klamath is a "hotbed of incendiarism", practically the entire Forest will be covered. Crebbin has been well trained in the type mapping, having worked in the Cleveland National Forest for four months this past winter. Two days were spent with him giving assistance in learning the species of the region and in the mapping of stocking of burns and cut-over areas and site classification which did not enter into the Southern California work. Opportunity was also afforded to contact the Blister Rust crew who are securing type data in connection with their Ribes Survey. They had already completed the typing of two townships in very detailed fashion.

The topographic mapping crews of the Regional Engineer's office working under the direction of T. R. Littlefield were then contacted. These

crews will secure type data on about 600 square miles located on the Northern Shasta and Goose Nest Division of the Klamath in connection with topographic mapping.

Littlefield and Wieslander then joined up with the U.S.G.S. topographic mapping crews of the U.S.G.S. who will complete this season three 30 minute quadrangles of the Sisson and Etna Mills on the Shasta and the Hoaglin on the Trinity National Forest. Instruction was given these crews in the identification of the major types of the region such as brushfields, open woodland, dense woodland, grass, timber, etc. It was not considered advisable to ask these men to secure the detailed data that the Experiment Station crews are securing. With the major types delineated accurately on the topographic map our men can secure data on subtypes, species, stocking, sites, etc., at a material saving in time and expense.

Influences

The month of July has been one of odds and ends in the completion of work which was carried out under the emergency employment appropriation funds. We have added to the Station two important installations which are counted upon to yield important information. One is an installation of large lysimeters of ten compartments, each of which has projectional area of 80 square feet and the soil profile depth of 50 inches. With this installation it is planned to measure the role of brush cover on the yield of water from rain through a soil profile of 50 inches. The first stage of the experiment will involve the running of tanks in quintuplicate to ascertain variations to be expected in the results from each of the five tanks. Thereafter the chaparral vegetation which is to be planted both inside and around the tanks will be manipulated in different areas to ascertain how much such treatment affects the delivery of ground water. This installation is constructed to last not less than 50 years.

The other installation is a dam of core wall back filled type in one of the tributary canyons in Devil Canyon in southern California. The core wall was set in solid rock so as to cut off all streamflow down the canyon and to cause it to be passed through the measuring devices. The primary object of this experiment is to measure the effect of riparian vegetation consisting chiefly of alders on the yield of water in mountain canyons in southern California. The remarkable oscillation in flow each day indicates that during the hours of sunshine a considerable quantity of water is lost through transpiration and evaporation from these mountain streams. In some cases the water has been piped past such thirsty vegetation. It is claimed that such a procedure amply pays for itself, but thus far no controlled measurements have been made of the increasing yield from these canyons by such a measurement.

A departure in design of the improved Venturi or Parshall flume was made to fit conditions in the mountain streams. It is to be recalled that

the Parshall flume is so designed that a reverse slope of 3 inches in 3 feet for flumes of crest length of 1 foot and larger is provided for, below the throat of the flume. Owing to the experience which Kraebel has had with this type of design in the accumulation of sediments in this section of the flume, the reverse slope was changed to forward slope of 3 inches in 3 feet. It is hoped that this modification will remedy the difficulties encountered with the standard type under conditions of flow from our mountain watersheds.

Fire Research

Visibility Mapping

The actual mapping from peaks was practically completed by the beginning of August. Further work was not done due to smoke from the continuous round of fires on the Shasta, adjacent forests and State territory.

Radius of Vision and Effect of Haze on Visibility

Diagram target charts have been prepared for eight lookout stations and installed and in operation on five stations. The smoke conditions existing during the month have interfered with the completion of this job. Data are being collected by the lookout men at fifteen minute intervals and considerable value is received in the assurance that systematic scanning of the country is secured.

Binoculars of various types and power have been loaned by optical firms for a test as to those most effective for lookout use. The testing will be carried on during the early part of September.

Colored filters of gelatin have been mounted and optical glass of different colors secured in an effort to find some filter that will minimize the effect of smoke on visibility.

Transportation Study

In preparation for the study on the value of motorways in fire control, a one-inch scale map was prepared on which are shown:

1. All motorways by year of construction
2. Starting points of all fires 1921-1930
Class C separated by symbol
3. Final burned area of all fires over 40
acres, 1921-1930.

Fire Atlas Shasta Area

* A revision of the 10-year fire occurrence zone maps was made. A composite of the individual cause zones was made in place of zoning all fires as spotted on the fire business map. A more accurate picture of the fire occurrence zones was secured. The occurrence zone map will be used in the evaluation of the lookout points mapped for the east side of the Experimental Forest.

Fire Liaison Committee Report

The report on the Liaison Committee Meeting held at Mt. Shasta, California, in June was prepared. The work plan for the Shasta Experimental Forest was revised to change or add items agreed upon at the meeting.

Automotive Spark Ignition Tests

Two weeks were spent by Curry at the University Farm at Davis, working with J. P. Fairbank, Extension Specialist in Agricultural Engineering, on automotive spark ignition tests.

In the tests conducted the role of temperature, humidity and wind in affecting the inflammability of fuels is recognized. An electric generator mounted on a truck has made it possible to conduct all of the tests in the field under natural weather conditions. Regular records are kept of humidity, temperature and wind velocity. The moisture content of samples is determined at the same intervals.

All experiments to date have been conducted in a field covered principally with a sparse growth of withered wild oats six to eight inches tall. Daytime relative humidities as low as 11% and air temperatures as high as 111° F. have been obtained. Under these conditions fires usually started instantaneously when the exhaust pipe heated to 1150° F. was applied to the grass. At lower temperatures ignition required forty seconds or more of contact. Carbon sparks over 1/8 inch in size heated to 1250° F. caused fires in the larger percentage of trials under very hot dry conditions. With some forms of carbon used fires were obtained with very much finer material at this temperature.

The data obtained will be used by Mr. Fairbank in designing efficient protective devices for automotive equipment. The Experiment Station will cooperate as far as possible in the experiment, particularly in the tests to be conducted on the ignition of typical forest fuels.

Products

White Fir Study at the Fruit Growers Supply Co.

Brundage and Mason spent two weeks at Susanville at the Fruit Growers Supply Company mill and sale area on the Lassen National Forest. A small mill study of white fir was made at the joint request of the Regional Office and the Company.

Many white fir logs on the present cutting area of the Company show a dark discoloration locally called "black heart". Company officials believe that such logs are practically unmerchantable due to a combination of original low value yield and subsequent heavy degrade in seasoning. The study will show the yield by grades and the seasoning and planer depreciation of normal and discolored white fir logs. This information will be of immediate value in timber sale administration and will also supplement the white fir project now in progress.

For the first time in this Region a complete correlation from tree to surfaced boards will be secured. Felled tree analyses of 87 trees were made in the woods and the logs were numbered for identification at the mill. There were 350 study logs sawed at the mill scaling 90,000 board feet. Each board was given a log and board number. No green chain tally was necessary as the identification, grading and description of each board was taken as the lumber was piled. It was possible to obtain much better grading and fuller description of the boards under this procedure than can be secured on the green chain. In all there are about 7000 study boards, in five full and two half piles.

Preparation of the data for this study for punching on the tabulating machine was completed this month. All necessary coding was finished, the card designed and printed, and punching is now under way. We hope to have made preliminary runs and computations on the green lumber data on this study before the dry lumber inspection is made in October. The possibility for keeping office work apace with field work in this study would be impossible without the use of the University tabulating machine.

Reinspection and dry grading will be done after the lumber is dried to 15% moisture content. Whether the piles will reach this moisture content this season is doubtful unless the weather is very favorable. As white fir is practically all surfaced, the boards will be followed through the planer, and final shipping grades and footages secured.

The green lumber inspection indicates that losses due to spiral check will be severe.

Wagener and Gill of the Office of Forest Pathology inspected the study lumber for indications of advance rot in the discolored areas. They have not yet examined the samples taken for microscopic inspection, but from superficial observation they do not believe the discoloration called "black heart" by the lumber company officials is a symptom of decay.

Woods and Mill Study

The Stanislaus study computations are well along toward completion. Prospects appear favorable for publication in the trade magazines by October or November.

An interesting sidelight on the cull in incense cedar logs is shown in the following tabulation in which the logs of each four-inch diameter group are divided into three classes, (1) sound; (2) up to 50% defective; (3) over 50% defective. The average cull for each group appears in the

last column. The principal cause of defect is incense cedar dry rot, Polyporus amarus.

CULL DEDUCTED BY SCALER IN MILL RUN INCENSE CEDAR LOGS

LOG	PERCENT OF TOTAL GROUP			AVERAGE
DIAMETER	FALLING IN EACH DEFECT CLASS			CULL %
GROUP	Sound	1% to 50%	Over 50%	FOR GROUP
6-9	93.1	6.9	-	2.8
10-13	84.8	7.8	7.4	9.0
14-17	74.9	15.1	10.0	10.9
18-21	61.3	23.6	15.1	16.3
22-25	40.6	35.6	23.8	24.8
26-29	29.3	37.0	33.7	34.0
30-33	11.1	40.8	48.1	44.1
34-37	-	53.8	46.2	42.2
38-41	-	50.0	50.0	54.1

Mill Run 24.2

In volume cut from the average acre on the Stanislaus study plots, the five cutting systems analyzed line up thus:

CUTTING SYSTEM	M FEET MILL TALLY			
	W.P.	W.Fir	Total	% of Total
	&	&	Cut	Stand cut
	SP	Cedar	Avg. Acre:	12" & over
1. Clear cut to 12" DBH	32.6	25.6	58.2	100.0
2. Heavy cut	32.1	21.0	53.1	91.2
3. Forest Service marking	27.9	19.6	47.5	81.6
4. Cut Pines to 16", leave F & C	32.3	0.0	32.3	55.6
5. Economic Selection	27.2	0.6	27.8	47.8

Notwithstanding these differences in volumes removed (a spread of 30.4 M feet between the first and last systems) there is very little difference in total conversion costs. The Forest Service system was lowest with costs of \$19.75 per M feet mill tally and the "Cut pines - leave fir and cedar" system was highest with costs of \$20.60 per M feet, a spread of only \$.85. "Economic Selection" costs were \$20.49, "Clear cut to 12" DBH" costs were \$20.33, and "Heavy Cut" (old style private land system) costs were \$19.88.

Individual species selling values, mill run, were also surprisingly close together considering the big difference in diameter ranges cut, for example, a thousand feet of sugar pine from the clear cutting system, which took everything down to 12" DBH, was worth \$40.16 while a thousand feet of the same species from the Economic Selection System had a value only \$2.50 higher. The latter system took out very few trees below 40" DBH. The average selling value per M feet, all species combined, shows a different kind of a picture however, the cutting systems lining up as follows:

CUTTING SYSTEM	: Avg. Value : M ft. Mill : Run, All sp.	: Variation : from F.S. : value
1. Economic Selection	\$38.85	+ \$8.00
2. Cut pines to 16", leave F & C	37.63	+ 6.78
3. Forest Service marking	30.85	0.0
4. Heavy cutting	30.33	- .52
5. Clear cut to 12" DBH	29.44	- 1.41

The inclusion of white fir and incense cedar in the latter three systems and their exclusion from the first two are chiefly responsible for this large variation between the two groups.

Preparation of a series of articles for publication in a western lumber trade magazine is now going forward. The manuscript will be ready in about one month. This series will be greatly abbreviated as to detailed phases of operating and methods used in working up the data. The full report will appear later in technical bulletin form.

Consulting Entomologist

A regional survey party under Dr. Salman completed the 1931 program on the Modoc Forest July 16. Since May 15, when this work was started, six permanent sample plots, covering 1,920 acres, were mapped, tagged and marked, four sample sections were cruised and about 70 miles of strip counts were run, covering approximately 4,000 acres. Summer-generation attacks by the western pine beetle indicate that there will be about four times as many trees killed in this attack as succumbed to the 1930 summer generation. On the poor sites the infestation is becoming conspicuous and can be classed as epidemic. The survey party moved to the Sierra Forest, and will be engaged until about August 15 in the examination of yellow pine areas on the San Joaquin watershed.

A series of large screen cages have been constructed at the California Forest Experiment Station base on the Stanislaus to study controlled attacks of the fir engraver beetle.

CENTRAL STATES FOREST EXPERIMENT STATION

General

The resignation of E. F. McCarthy as Director of the Station became effective on August 31. "Mac" leaves us to return to his first love, The New York State College of Forestry, where he will take over the destinies of the Silvicultural Department. While we all congratulate "Ma." on his well-earned advancement, the entire staff is keenly appreciative of the loss to the Station which his departure will mean.

McCarthy has been the Director of the Station since its establishment in 1927, coming to Columbus after six years as Silviculturist at the Appalachian Station. During his four years of leadership, the Station has made steady progress. Cordial cooperative arrangements have been established with all important research institutions and all State forestry organizations in the region, and the Station is becoming more and more to be recognized clearing house for all forestry matters of region-wide significance.

The Central States Forestry Congress very largely owes its successful start to his leadership and this institution represents his most important contribution to Forestry in the Central States.

Mr. Willis M. Baker, who for the past one and one half years has been Director of the Research Institute at Mt. Alto, Pennsylvania, has been selected to succeed McCarthy as Director of the Station. Mr. Baker will assume his duties about September 15.

Before leaving for Syracuse, McCarthy attended a conference in Cincinnati for the purpose of setting the date and arranging a tentative program for the second Central States Forestry Congress. Mr. Alexander Thomson, President of the Forestry Congress; Mr. C. V. Anderson, Chairman of the Central States Forest Research Council; Mr. O. A. Alderman, representing the State Forester's office of Ohio; and Mr. Joe Kaylor, representing the State Forester's office of Indiana were present at this conference. The Congress will meet in Cincinnati, December 3, 4, and 5 and a very interesting program has been tentatively arranged.

Plantation Project Fp-1

Dr. Hall and Kellogg continued their examination of stands ahead of the field parties in Ohio until August 15, when they transferred their activities to southeastern Indiana. On August 23 Hall went to Asheville, North Carolina to confer with R. A. St. George on his experiments to control the locust borer by use of sprays. He returned on the 31st to Indianapolis, where he and Kellogg conferred with State Forester Wilcox.

Because of pressure for office assistance in the Extensive Revision work, McCarthy withdrew Kuenzel from active field work on this project

on June 17. Mr. C. R. Cochran was employed to fill out this party for the balance of the season. Cochran was employed by the Station in 1929 to climb 400 black walnut trees for volume table purposes. Mr. G. Z. Rayner became chief of this party and continued the examination of old and younger locust plantations in southeastern Ohio.

By the latter part of the month, the two field parties finished their work in Ohio. On August 27, Chapman moved his crew over to the Clark County State Forest in southern Indiana and Rayner's crew moved into the state a couple of days later.

Development of Nodules on Locust

Chapman points out that in practically every case where locust plantations are heavily pastured, the development of nodules on the roots of the locust was found to be very meager, in contrast to the unpastured stands where they are very abundant. The nodules form most readily just at the surface of the mineral soil in stands where duff and litter are well developed.

Nodules vs. Soil Acidity

Early in the season Auten and Hall decided that soil acidity apparently had no material influence on the development of nodules on locust rootlets. Chapman concludes, after carefully watching this feature on various soils throughout Ohio, that these preliminary observations are correct. On glacial limestone soils, those derived from sandstone and shale, and on residual soils of various degrees of acidity, no apparent difference has been observed in nodule development on sites which were approximately comparable except possibly in origin of soil and its acidity.

Several members of field parties have noticed that the occurrence and thrift of black locust sprout regeneration seem to be roughly correlated with glaciation. The largest amounts of sprouts are found in the unglaciated districts along the Ohio River, or in the areas of old Illinoian Drift. Where the more recent Wisconsin drift sheets are found, to the northward, sprouting is observed to be less vigorous and much less frequent. In places the transition is very marked and apparent.

Borer Infestation

Many young plantings in southeastern Ohio were found to be extremely infested with the borer (*Cyrtene robiniae*). Many of these stands are on "spoil banks" of lands stripped for coal. In the past they have been regarded as being immune to borer damage, but present infestation shows this to be an error. Hall split out one stem and removed 37 pupae and adults from a section 6 feet long and 3-1/2 inches in diameter. At this rate of infestation, this year's crop of adults will run into thousands per acre.

In contrast to this infestation, the plantings in southeastern Indiana in Jennings and Ripley counties were found to have a very light crop of insects this year. Some stands are knobby and warty from past severe damages but very few new frass-holes were seen.

Locust vs. Crops

A farmer (Mr. Murphy) east of Dayton, Ohio pointed out that his crops usually showed a detrimental influence at the edge of his oak-maple forest and that crops planted alongside of his black locust grove did not display any injury. It is very probable that in the case of the locust, any moisture deficiency in the edge of the field is compensated by the added amount of nitrogen which is made available along the edge of the field by the presence of the locust grove.

Other Plantings

Chapman observed at the plantings of the Ohio Power Company in Muskingum County, that ground preparation in 1929 and 1930 apparently had a relation to survival of Scotch, Norway, and jack pine. Where the ground had been plowed, survival was not over 10 per cent, and where the plants were put in with a grubber, the survival was as high as 85 per cent. These plantings were made on upper slopes of all exposures and ridge tops.

Yield Plots taken in August

Black Locust (pure)52
Black Walnut (Ohio)9
Black Cherry and Locust (Remeasurement)1
Catalpa and Locust sprouts1
Total	<u>.63</u>

Locust Borer Investigation

During the month of August, an additional 66 sample plots have been established, bringing the total up to about 135 to date. The field crews finished up work in Ohio the last week in August and will spend the rest of the season collecting data in southern Indiana.

On August 6, Hall and Kellogg conferred with Secrest, State Forester of Ohio, and Professor Hauser, State Entomologist, at Wooster concerning the progress of the work to date.

Current State of Locust Borer

The first emergence of adults was observed in eastern Ohio by Cummings and Rayner on August 17. It appeared from periodic examination of

infected trees that the bulk of the emergency of adults will take place early in September.

Woodland Grazing Project Pa-1

The establishment of permanent sample plots in Indiana was continued by Diller and Baker. Thirty-nine plots altogether have been located in the better agricultural sections, where woodland grazing is most serious. These have been divided about equally between the beech-maple and the oak-hickory types, and represent a wide range of conditions in the life history of the pastured farmwoods.

Many of the areas which are being established were located and measured as semi-permanent plots last year. In comparing the data from these permanent plots with that secured on the same areas last year, the most striking feature is the entirely different character of the current year's reproduction on many of the plots. This difference has been so marked in some instances as to indicate the desirability of annual remeasurements of a number of the plots to determine if this is a normal condition resulting from variation in the seed crop or if it can be accounted for by the excessive drought of last year and the abnormally wet present growing season.

Dr. Stanley Cain and Mr. Lindsey of the Butler University spent several days at the Pinney-Purdue Farm checking up on the summer vegetation and the degree of utilization of the various species in the carrying capacity study. The following table was prepared by Dr. Cain following his examination.

Pinney-Purdue Grazing Project

Estimate of damage and extent of utilization of herbaceous and
browse forage. August 11, 1931. Stanley A. Cain

	PLOTS					
	18 acre		12 acre		6 acre	
	D	U	D	U	D	U
Grasses and sedges	1	4	1	4	1	5
Rubus alleghanensis	2	2	3	5	3	5
Prunus serotina	2	2	2	4	2	4
Corylus americana	1	1	1	3	2	4
Carya ovata (C. laciniosa)	1	1	1	3	2	3
Quercus spp.	1	1	1	1	1	1
	:	:	:	:	:	:

Pastured since May 1. Steers taken off 6 acre plot August 4.

Damage is indicated in five classes: (Breaking, trampling, browsing)

- D-1, Little or none
- D-2, Noticeable
- D-3, Severe damage or killing

Utilization is indicated in five classes: (available forage, grazing and browse)

- U-1, 1-20% removal of leaves
- U-2, 21-40%
- U-3, 41-60%
- U-4, 61-80%
- U-5, 81-100% almost complete defoliation and heavy use of young woody growth.

- Notes:
- 1- *Corylus* and *Prunus* are occasionally browsed to a height of six feet and sometimes more, apparently by "riding down" the shrubs.
 - 2- Although usually not eaten, *Prunus* was here taken early.
 - 3- Grasses and sedges were present in small quantity to start. Much of the grass is so scattered that it seems hardly worth their trouble to crop it, which seems to account for lack of complete utilization.
 - 4- The following fairly common weeds seem not to be eaten: *Polygonum*, *Urtica*, *Rumex*, *Circaea*, *Phytolacca*, *Vernonia*, *Solanum*, and *Arctium*, etc. Among the woody plants *Pseudera quinquefolia* are not eaten while *Sambucus*, *Rosa*, *Populus*, and *Crataegus* are largely ignored.
 - 5- Utilization in 12 acre plot almost complete: larger acreage enables steers to maintain weight to date.

On September 1 Day visited the farm and assisted in the monthly weighing of the remaining six animals, the three animals in the six acre tract having been removed on August 4 after showing an average weight loss of about ten pounds apiece for three weeks. Animals in the twelve acre tract appear to be in fair condition and all three animals show a slight gain in weight. Those in the eighteen acre tract show a fair gain in weight and appear to be in good condition. It seems probable that the animals in the twelve acre tract will not be able to maintain their weights during September and will have to be removed shortly after October 1. The animals in the eighteen acre tract will possibly show a further gain on October 1 and will probably be able to remain until the close of this year's test on October 31. Unquestionably, however, the unusually heavy rainfall during the past growing season has resulted in gains during this year's test, which will be far in excess of those which would be expected during normal seasons. Not only have the animals had the advantage of a favorable growing season, but it seems extremely doubtful if next season, many of the species will have sufficient reserve food to put forth the repeated crops of foliage in the face of the continued browsing during the present season.

Litter Study M-1

Auten completed his field work during the first half of August and started on laboratory tests and computation of data secured.

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION

General

Personnel

F. G. Renner was transferred August 15 from the Boise erosion project of the Intermountain Station to the California Forest Experiment Station to be in charge of grazing studies there. G. W. Craddock of this station has been assigned to Renner's job on the Boise erosion project where it is planned to install instruments and select a headquarters.

Raymond Price, field assistant at the Great Basin Branch Station, was appointed junior range examiner on August 14 to assist in the compilation of important range research data needed by the range livestock industry in meeting the existing depression and drought conditions.

Pickford and Hutchings from the spring-fall and desert range projects have been on fire detail on the Idaho Forest since August 4.

Mr. Watts, for the past two years a member of the staff of the Intermountain Station, has been appointed director of the newly consolidated Northern Rocky Mountain Forest and Range Experiment Station and left to take up his new duties about the middle of August.

Research Meeting

A meeting of range research workers was held at the Great Basin Branch Station near Ephraim, Utah, August 17-20 under the auspices of the Ecological Society of America, of which Dr. A. G. Weese, of the University of Oklahoma, is president. This meeting, the first of its kind, brought together workers from all sections of the West to discuss methods of investigating forest and range problems. Thirteen states and the District of Columbia were represented, including members of the Forest Service and the Bureaus of Animal Industry, Indian Service and the Biological Survey, State Universities and Agricultural Colleges, as well as other organizations.

Director C. L. Forsling acted as chairman of the meeting and was assisted by Prof. W. G. McGinnies, of the University of Arizona, as secretary, and a group of sub-committee chairmen. The sub-committee chairmen and the topics for discussion over which they presided were as follows:

Methods of studying plant populations and their changes.

Chairman: Dr. H. C. Hanson, North Dakota Agr. College, Fargo, N.D.

Methods of studying forage production and yield.

Chairman: M. J. Culley, Santa Rita Experimental Range, Tucson, Ariz.

Methods of studying plant development.

Chairman: Prof. R. J. Beecraft, Utah Agr. College, Logan, Utah.

Methods of measuring utilization and palatability.

Chairman: D. A. Shoemaker, U. S. Forest Service, Albuquerque, N. M.

Methods of controlling the grazing factor.

Chairman: Dr. W. A. Sampson, University of California, Berkeley, Cal.

Instrumentation.

Chairman: Prof. W. G. McGinnies, University of Arizona, Tucson, Ariz.

Methods of studying the influence of grazing on raw timber and the inter-relation between erosion and grazing.

Chairman: C. K. Cooperrider, Southwestern Forest & Range Experiment Station, Tucson, Arizona.

Methods of studying animal life.

Chairman: Dr. Walter P. Taylor, Biological Survey, Tucson, Arizona.

Terminology, Nomenclature and compilation and analysis of range research data.

Chairman: R. S. Campbell, Jornada Experimental Range, Las Cruces, N.M.

The meeting was a signal achievement for the Ecological Society and a memorable occasion for the Great Basin Branch. All methods which have been used by the different investigators were thoroughly considered with a view to determining the most effective means for studying each problem. In this connection the field methods in use at the Great Basin Branch were demonstrated on the ground. That the subject matter presented was interesting and profitable was shown by the discussion which followed. In each case it was necessary to stop the discussion, and sometimes to interrupt it to keep it on the topic being discussed.

Dr. A. W. Sampson of the University of California, who organized the station in 1912 and initiated many of the projects, including successful erosion experiments, was on hand to observe and discuss developments. It was Dr. Sampson's first visit to the branch station since 1922.

Messrs. E. W. Nelson and W. E. Mann arranged for housing and "eats."

The group accepted an invitation from the University of Arizona to meet in the vicinity of Tucson sometime in 1933.

Fifth Biennial Field Day

Just preceding the meetings of the Ecological Society, a two-day field meeting was held (August 14 and 15) to which neighboring stockmen and others interested in the results of research work in range management and watershed protection were invited. An invitation to other federal and state workers to attend was widely accepted by workers in the Indian Service, Biological Survey, Geological Survey, Utah Agricultural College, State Department of Agriculture, and various livestock associations. Dr. F. S. Harris, president of the Brigham Young University and Senator Smoot were also present, as was also Dr. E. H. Clapp, Chief, Branch of Research, Washington.

During the day Forsling and his staff explained their experimental work. In the evening Senator Smoot, the principal speaker, spoke of the depression and the value of Forest Service work, promising his support to research work. Other speakers were Dr. Harris; J. M. Macfarlane and Geo. E. Collard, presidents respectively of the Utah Cattle and Sheep Growers' association; Wm. Bailey of the Utah Tax Commission; and E. H. Clapp, in charge of Forest Service research.

At a morning meeting on August 15, the stockmen passed resolutions favoring federal control of the public domain not only of Utah but of the entire West. Their opinion was practically unanimous that the administration of the Public Domain should have the nearest possible relationship to the National Forests.

About 300 were in attendance, the evening meeting of August 14 being somewhat the largest, though all were well attended. P. C. Peterson, a stockman of Ephraim; was chairman of the evening meeting.

Dr. Stewart of the Intermountain Station and Mr. Winkler of the Regional office also attended two other field meetings of stockmen and farmers. Range management, erosion, and the relation of supplementary pastures were the topics for the Forest Service men. The meetings were at annual outings of the Wasatch County Livestock Growers at Wolf Creek at which there were about 600, and the Uinta Basin Industrial Convention, at which there were about 12,000 with good attendance in livestock sections. These meetings were in cooperation with the Utah Extension Service and with Supt. H. M. Tidwell, Uinta-Ouray Indian Agency.

Utah Erosion Survey

The Utah erosion survey on the headwaters of the Colorado River and of the Great Salt Lake watershed began on August 1, with the Intermountain Station, the Utah State Land Board, and the Utah Agricultural College cooperating. Associate Professors Reed Bailey and R. J. Becraft of the college, and Milo H. Deming of the Intermountain Station are doing the field work.

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NORTHEASTERN FOREST EXPERIMENT STATION

Branch Stations

Some progress has been made in the selection of additional experimental forests for this region. Finch, Pruyn and Company, paper manufacturers of Glens Falls, New York, have set aside a section of land in the

Adirondack Mountains on the headwaters of the Hudson River, for experimental purposes by the experiment station in cooperation with the forestry department of Cornell University. A tentative agreement which will open the way for experiment station activities on this area has been prepared. Under this agreement the company would retain rights to the standing timber but the experiment station would have a free hand for the conduct of research work. Under its working plans the company operations would not return to the territory in which the experiment forest is located for at least twenty years. During this period merchantable wood may be cut and delivered to the company's log drive by motor truck haul which will vary from seven to fifteen miles over state roads.

Behre spent several days examining the Green Mountain Purchase Unit as a possible location for an experimental forest. This unit will afford an excellent opportunity area primarily for working out problems connected with the rehabilitation of abandoned farm lands interspersed with woodlots which have been cut over in varying degrees. A likely tract of about 1800 acres is located at the southern end of the purchase area. A portion of this tract lies on a main state highway and the area is accessible from two town roads.

Spruce Management

During the month Westveld remeasured his girdling plots near Greeley Pond in the Waterville Valley. These plots were established five years ago. Under Westveld's guidance a meeting of the Stand Improvement Committee of the New England Section of the Society of American Foresters was held at the Gale River Experimental Forest so that the Committee could visit Westveld's experimental plots and inspect the stand improvement work which has been done in the vicinity by the White Mountain National Forest in the last few years.

Arrangements have been made to sell from 100 to 200 cords of balsam pulpwood from the Gale River Experimental Forest. Part of the wood will be derived from clear cuttings of small plots made in connection with Doctor Spaulding's study of decay in balsam. The remainder will be taken out in the form of a selection cutting which will aim to utilize the trees which have reached merchantable size in advance of the time when decay becomes an important factor.

Toward the end of the month Westveld went to Rockwood, Maine, where he has been engaged in the remeasurement of a large number of temporary plots established in 1924-5 for the study of growth of cut-over lands.

Hardwood Growth

Progress is being made with the management inventory of the Bartlett Experimental Forest. This survey will yield several hundred tallies of quarter-acre sample plots which will be used for an analysis of the growing

space occupied by trees of different size, and in combination with studies of growth rates of the various size classes will make possible an estimation of the growth per acre under various conditions. A start has been made on the construction of new volume tables for the northern hardwood species, using tree measurements on file in the Washington Office. Scaling diameters to be used in making up these tables will be derived from the multiple correlation of the diameter inside bark as a function of D.B.H. and height above ground. It is expected that this method will yield much more satisfactory tables than those now available, which assume arbitrary diameters at the top of the last log.

Planting

Doctor Stewart has made preliminary trips to Connecticut, New York, Vermont, and Maine in order to become familiar with conditions in these states. He attended the Region 7 Planting Conference held at the Parsons Nursery, West Virginia, and learned much of planting practices and problems in the eastern district. Detailed examination of plantations, including the collection of soil samples has been started in New York. These examinations will be continued on areas of known interest in anticipation of the distribution of a questionnaire covering practically all of the known plantations in the region.

Forest Biology

Mr. Miller began a laboratory experiment the first part of the month to determine the effect of bird activity on weeviled tips of white pine. It appears that some interesting information may be forthcoming from this source.

Mr. F. M. Uhler, Assistant Biologist, Division of Food Habits Research, Bureau of Biological Survey, worked with Miller from August 16 to August 27. Three days were spent in going over the work in Massachusetts, after which they left for a trip thru New Hampshire, Vermont, and Maine, during which they inspected various lakes and ponds, making notes on their adaptability for water fowl, as well as inspecting numerous forest plantations and natural stands. Uhler remained in Maine for more intensive work on the activities of fish eating birds. Miller returned to New Hampshire to gain additional information on forest plots relative to establishing permanent study plots.

Forest Entomology

Doctor MacAloney returned from New Hampshire on August 8 and since then has been examining permanent sample plots laid out for the white pine weevil investigations. On August 12 he attended a Farmers' Week conference

at the University of New Hampshire, Durham, N. H., where he explained in greater detail the method mentioned in Bulletin No. 152, Massachusetts Forestry Association, entitled "A Method of Reclaiming Severely Weeviled White Pine Plantations."

Forest Pathology

Doctor Spaulding continued work on hardwood heart rots at the Bartlett Experimental Forest, paying special attention to beech which is abundant in that section. Curiously, Fomes igniarius, which is usually the most common heart rotting fungus of beech, is almost absent in the Bartlett area, so that cruising rules here differ from those for the Gale River area where this rot is plentiful.

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NORTHERN ROCKY MT. FOREST AND RANGE EXPERIMENT STATION

General

Director Watts arrived in Missoula August 19th, and began immediately the task of balancing the budget for the enlarged station. The problem of quarters also is most acute, as a result of the expanded personnel and the present employment of three computing clerks. With present quarters suitable for about four staff members, three computers, and two clerk-stenographers, the housing of six or eight new staff men and the necessary clerical help requires considerable new space. The preparation of emergency unemployment relief estimates also required time by both Watts and Wiedman during August.

Forest Management

Along with all other lines of work, management studies contributed time during August to the prevailing fire emergency. Weidman was called to the fire desk on the Kaniksu for ten days during the control of the 24,000 acre Freeman Lake fire that threatened the Priest River Experimental Forest. Starting - or started? - at 11:00 a.m. on August 3rd, with the duff moisture content down to 4% that afternoon, this fire ran and spotted nearly fifteen miles before evening that day. Some 300 men were on the fire line that night, and by the following morning over 500 men in eight camps were at work. By the night of August 8th, the fire was completely trenched, 1475 men being on the line in fifteen camps, with five pumps and eight plow units, and with 90 miles of trench constructed. No area was burned on the Experimental Forest.

Haig also was called on for eight days during the peak of the emergency on the Lolo Forest, helping both in smoke chasing and central dispatching out of the Powell Ranger Station on the East Selway District.

In spite of these interruptions, considerable progress was made in both the field and office work of management studies. The seasonal examinations of methods of cutting and reproduction plots were completed during August by Ross Williams and the three field assistants who have been engaged in this work. This crew has made rapid progress and the examinations were completed on the date scheduled, in spite of several days of fire detail when the Freeman Lake Fire was threatening the Priest River Experimental Forest.

Williams reports a minor catastrophe on two of the Cocur d' Alene plots on which from 75 to 78 of the White Pines, including practically all pines of seed bearing size, were blown down in a wind storm of exceptional severity, which swept the Inland Empire late this spring. As these two plots were installed specifically to follow reproduction on representative seed tree cuttings, the severe loss in seed bearing trees will at least partially invalidate the value of the plots.

Haig, except for his eight days on fire detail, spent the month chiefly on growth and yield problems. One of these involved an analysis of the available data on the effect of stand composition on yield, some question having arisen as to the importance of this factor in predicting the yields of fair sized tracts of even composition. In general it can be said that stand composition does have some effect on total yield. For example, stands of pure white pine or of white pine-white fir tend to be somewhat higher yielding than the average, while stands of certain other combinations, such as white pine-hemlock, and white pine-larch are somewhat lower. The effect of stand composition on yield, however, is so obscured by the many other factors also affecting yield, that its influence is largely unpredictable, at least upon present knowledge, and it must be accepted in mixed stands simply as an additional factor causing variation from normal or tabular values. As the scatter around the average values is only slightly greater in white pine stands of mixed composition than it is in pure types also covered by yield studies, the influence of stand composition can be ignored for most practical purposes.

The coding of permanent yield plot records, upon which two computing clerks have been engaged during most of August, is now well along and it is hoped that these data will be ready for card punching and compilation about September 10.

Transportation and Visibility

These studies were held almost to a standstill by fire demands during August. Hornby was on the large and troublesome Deer Creek fire from July 26 to August 14, and then was forced to retire for recuperation

on sick leave. J. B. Yule, who had commenced field work on the visibility study, was on the Kootenai fire desk for the entire month, while W. I. White was on Kaniksu and Flathead fires. H. R. Richards was able to devote some time to office work, but during the latter part of the month he has been assisting steadily on the employment desk in the Regional office.

Hornby has been able, nevertheless, to complete a first draft of new standards of visibility desirable for meeting the hour control requirements for each forest type in this Region. These standards specify the largest size of blind spot, and the per cent of the area that may be left blind, permissible in each fuel type of each timber type. These standards were determined by conference with Regional office men, by field work on the Flathead Forest, and by reference to the analysis of the fire records showing relative need of quick detection by timber and fuel types. Moving detection is expected to cover about two-thirds of the visible area, while stationary detection will cover the other third. In all cases the detectors are considered as available smokechasers, hence their distribution is also governed by the travel and searching time requirements for the type. The standards established apply to critical fire seasons, the plan being to leave some positions vacant during easier years.

Standards for report, get-away, travel, and searching time also are included, according to the speed shown necessary by the analysis of the fire records. In establishing these "desirable practices" the total time from origin to control of a fire was subdivided into detection, report, get-away, travel, searching, and firefighting. It was recognized, however, that many different combinations of these six steps might result in control which would keep the acreage burned within the limits established for each type. Consequently, the average time from origin to control, found to correspond to the permissible burn for each type, has been set as the total which should not be surpassed by any combination of detection, report, get-away, travel, searching, and firefighting. Certain desirable minima for report, get-away, and rate of travel per mile by specific means have been specified, however, and an average allowance for searching time after reaching the vicinity of the fire is provided for.

Analysis of the Fire Records

Work on the fire records, previously sorted and tabulated by machine in Washington, was continued by Gisborne and one computing clerk throughout August, except for seven days when Gisborne assisted at the fire desk on the Lolo Forest. The analysis of these records is being guided to produce the particular results most urgently needed by Hornby in the Transportation and Visibility Studies, but gradually the entire field is being covered from origin to control, insofar as the records contain usable information.

As stated above, the field is being subdivided into detection, report, get-away, travel, searching, and firefighting time, and also

includes strength of initial attack, and reinforcements. The results to date show that time allowances for different steps can be changed very materially according to the strength of initial attack, the number of reinforcements sent, and the time between arrival of the first men and arrival of the reinforcements. Our records show that reinforcements were sent to approximately one-third of all the fires during the past ten years, with some timber types requiring additional support much more often than others. When the initial attack was by two men, rather than by one man, the need for reinforcements decreased materially, while a three-man initial attack reduced this need to a negligible percentage. Likewise, it is obvious that if a three-man initial attack is satisfactory in, say, three hours after discovery, the time must be greatly shortened, or reinforcements must be sent if an initial attack is made with only one man. Conversely, if a one-man attack in one hour is satisfactory, a three-man attack in two hours may also produce the desired result.

As a result of these findings, no definite travel time is being set up as a standard for all parts of any particular fuel and timber type. Instead, the total time from origin to control is established as the standard, with requirements for strengthening the attack when detection has been too long, or when the travel time obviously will be long. And when the initial attack cannot be strengthened to compensate for slow detection or long travel time, then provision must be made for reinforcements within periods of time shown as satisfactory by our past records.

The analysis of total travel and searching time according to means of travel has shown some rather disappointing results, considering the increased mileage of roads and trails, and the increased availability of autos during recent years. Likewise, it appears that there has been no marked tendency to lower the time from discovery to began-work, in spite of increased facilities for faster travel. Bad years, like 1929, also show a longer time from discovery to began-work, whereas these are the very years when this time interval should be reduced to the minimum. In practically all of these cases, however, the cause of the disappointing result can be traced so that remedial action is possible. As we see it, this is the objective of this analysis.

Measuring Fire Danger

The three inflammability stations at Priest River, have produced exceptionally valuable information this year by showing in more detail than ever before the status of weather and fuel moisture during an extreme peak of fire danger. Jemison has submitted very detailed reports promptly at the close of each 10-day period, which have permitted an accurate comparison of conditions this year and last. A summary has been prepared by Gisborne, comparing 1931 with 1929 and 1926, which indicates, at least for Priest River, that the present season brought a higher degree of inflammability than either 1929 or 1926, minimum duff and wood moisture contents being lower this year than during either of these two other critical years. Up to date, however, the present fire season has prevailed for only 54 days, whereas the 1926 season lasted 71 days and that of 1929 continued for over 90 days.

The Spokane office of the Weather Bureau has been asked to prepare a summary of meteorological conditions at four stations in this region, which will permit comparison of the present season with those of 1929, 1926, and 1919. From the information available, it appears that the present season may establish an all-time-worst, as indicated by Jemison's report from Priest River, showing that since 1912 there has never been a month at that station with no measurable precipitation until August this year. Spokane also reports only 0.01 inch of rain for August, 1930, but that was surpassed with only a trace in August 1928, 1917, and 1915 at Spokane. Record breaking relative humidities also were reported from Priest River in August this year, while Spokane reported 5 p.m. humidities of only 8% or 9% on four days. The average 5 p.m. humidity at Spokane was only 15.6%, while at Priest River it was 22.0%. The August normal for Priest River is 42.0%.

This year is emphasizing more than ever before the great need of comparing the character of fire seasons by some means other than such fire records as number of fires, area burned, etc. If the fire records were used, the 1931 season to date would appear to be only normal in number of fires, and about normal in area burned. But this year these records are clear evidence of exceptionally efficient fire control during an extremely dangerous season. Without climatological and inflammability data there appears to be no method of determining how exceptionally efficient fire control has been this year. Fortunately, we have a few forest stations measuring enough factors, and with records covering a sufficient period of years to permit determining the character of the present season and comparing it with other years. The fire records will then show the results obtained under these conditions. Unfortunately, we have not enough stations to cover the whole region adequately.

Forest Survey

Mr. Bradner spent the last few days of July and the first ten days of August with the Forest Survey organization in the Douglas Fir Region. About two-thirds of the detail was spent in the Portland Office where Bradner familiarized himself with the plan of work built up to handle the inventory phase of the Survey in that Region and with the details of the work as it is actually being carried on both in the office and the field.

In company with Mr. Granger, a five and one-half day trip was made down into the Siskiyou Forest where two of the Forest Survey men were visited on the job. A day in the field was spent with each of these men.

Bradner returned to Missoula on August 11 and on August 13 he started with Mr. Granger on an auto trip through western Montana and north Idaho. This was Mr. Granger's first trip through the Inland Empire region. Merchantable stands, young growth stands and cut-and-burned-over areas in all of the principal timber types were visited. Side trips were made into

the Bitterroot and Coeur d'Alene Forests and into the selective cutting areas of the Clearwater Timber Company near Lewiston, Idaho. Contacts were made with the State Foresters of the two States, the deans of both State Forestry Schools, and a number of the lumbermen.

Mr. Granger and Mr. Bradner returned to Missoula on August 24th, and since then have been busy on plans for starting the inventory phase of the Forest Survey in the Inland Empire Region.

Range Research

L. C. Hurtt's transfer from Supervisor of the Helena forest to Range Examiner in charge of the new range research work becomes effective September 16th.

Priest River Forest

Routine work at Priest River was completely disrupted during August by the demands of the Freeman Lake and other fires. Thompson put in about twenty days on fire, while the temporary improvements man was called upon several times.

Visitors at Priest River during the month included Dr. Hedgecock, pathologist, and his assistant, Mr. Bierkemper; Dr. Faull of Harvard University; and Dr. E. C. Jahn of the University of Idaho.

Thompson reports that the water supply at the Priest River Station is so low that there is none available for lawns, gardens, or fire protection. This is the same condition that occurred in the fall of 1929, it being necessary that winter to dig a well in the meadow and to haul water from it for use at the buildings.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

Mr. Clapp was at the Station until August 8, and in addition to several days in the office took three field trips with the Director - one with Brandstrom and Kirkland in the Puget Sound Region, one to the Wind River District, particularly to view the proposed experimental forests, and one with Granger and Andrews to test the stocked quadrat method of classifying an area of reproduction.

Experimental Forests

Isaac, with one or two assistants, made detailed examination of the two tracts from which it is proposed to designate the Wind River Experimental Forest. One lies on the Trout Creek drainage and consists largely of old growth Douglas fir and other species. The proposed experimental forest will include several thousand acres of this and also some burned country with reproduction of various ages. This area will adjoin the present Experiment Station reservation, and headquarters. The other area is on the Panther Creek watershed, five miles distant and easily accessible, which is covered with a practically pure even-aged, 85-year-old stand of Douglas fir where a series of permanent growth plots has already been under observation for fifteen years.

At the Pringle Falls Experimental Forest, Meyer and Kolbe spent a week or so doing our first research work on this forest with the help of twenty-seven Iowa State Forest School students who have been spending the summer with Professors Horning and Jeffers on the Deschutes National Forest. This week of work was of great instructional value to the students and practical assistance to us. Land lines were rerun and new corners placed. A few sections were type mapped and estimated; twenty acres of permanent sample plots were laid out for a study of net yield in virgin stands; reproduction counts on a recent burn were made by the new stocked quadrat method and by the old method of seedling counts; and some permanent reproduction plots were established. The new cabin at Pringle Falls has been completed and already made good use of.

Selective Logging in Douglas Fir

With the actual field work out of the way and with the bulk of the work of compiling the data well behind, this project is approaching the point where final results are beginning to show up in a great number of cases. Final graphs and tables covering approximately thirty separate time and case studies are next in order.

Brandstrom is getting interesting results in regard to the relative effectiveness of different types and sizes of machinery for comparable log sizes and yarding distances. In one operation, for example, where time studies were made both of a high lead yarder and a skidder, the results show that for a yarding distance of 500 feet and for logs ranging from 1600 to 6400 feet B.M. in volume, both machines show practically identical costs. For logs below 1600 feet volume, the high lead method falls considerably behind, showing nearly twice as high a cost for logs below 200 foot volume.

Comparing the same machines for different yarding distances, the results show that the high lead method gives higher costs than the skidder. At 500 feet yarding distance the two machines are about equal. At 750 feet the skidder shows a considerable advantage over the high lead, and at 1000 feet and over the high lead is hopelessly outdistanced.

All of the larger yarding machines for which final figures have so far been obtained show a very marked spread in relative costs of handling large and small logs. The greatest differences occur with the large high lead machines. These as a group show that for a given distance the cost per M feet B.M. of yarding logs of 100 foot B.M. volume is approximately 14 times greater than for logs of 2000 foot volume and 25 times as great as for a log of 5000 foot volume. The corresponding results for the skidder shows these ratios to be 10 and 18, respectively. In the case of caterpillar tractor yarding, which was discussed in last month's report, the corresponding figures are 7 and 9, respectively (the latter applying to a 4000 foot log).

Thus while the different types and sizes of machines differ considerably from each other, it appears that in all cases there is a very pronounced spread in relative costs in handling large and small logs.

Forest Insurance

Field work in connection with the first phase of the study, analysis of burned areas, was brought to conclusion in August with the completion of Coos County. Office workup of the field data is now under way.

The preliminary summarization of the weather data was completed early in August and material progress has been made toward final integration and the determination of climatic zones. Shepard is undertaking this phase of the study and hopes that before the end of September it will be completed. It is a perplexing problem, and calls for a great deal of discussion and thought in order that the technic applied may be as sound as possible.

The causative hazard map studies have been completed for Tillamook, Clatsop, and Cowlitz Counties and nearly completed for Coos and Skagit Counties.

An interview was had with J. K. Woolley, Manager of the Washington Surveying and Rating Bureau at Seattle. Mr. Woolley is an extremely capable fire insurance rate man whose cooperation will be of distinct value. He expressed a very live interest in the study and can confidently be expected to render some valuable assistance.

Forest Survey

During August field work on the inventory phase of the survey went ahead full swing with all men at work in the field. On the private lands in the region five men were mapping in place and four men were adjustment cruising, while on the national forests seventeen were in the field. Cowlin, Matthews and Girard spent a large amount of time checking the field work of the men mapping in place, the adjustment cruisers, and the men working on the national forests.

Amendments to the instructions for the inventory of the private lands were written and put into effect for the purpose of intensifying and strengthening the procedure. Working plans for checking the inventory phase on national forests were prepared, and it is anticipated that four men will be working at this job in September.

The drafting of base maps for western Oregon and Washington has been practically completed. These base maps at a scale of four miles to the inch will be used in the preparation of the extensive type map of the region.

Girard prepared a new hemlock volume table which has been checked with the scaled volume of 700 trees. This volume table checks to within 1% of actual scale, except for some poorly-formed, swell-buttressed trees in Grays Harbor County where it is about 3% off.

Silviculture

Natural Reproduction of Douglas fir

As an expansion of the current observations of the physical factors affecting natural reproduction, Isaac took readings at Wind River on four slopes, north, south, east and west to make comparisons with the main station on the flat during the critical period of the growing season.

Cooperation with West Hills Civic Arboretum

Kolbe spent two days early in the month selecting and identifying conifers for arboretum purposes for the Portland Park Department. The South American species, seeds of which were obtained by this Station from the Argentine National Arboretum at Isle Victoria, are growing vigorously in the nursery and will require outplanting in a few years. Most of the Arboretum has been made ready for planting early this spring and now the chief work is to obtain the planting stock.

1931 Seed Crop

Reports received from rangers on the national forests of the Pacific Region indicate that the crop is generally scant on the more important timber species. The reports gave the status of 16 species. Douglas fir which produced abundant seeds last year over the entire west slope of the Cascades has a very light crop in all parts of the region except in southwestern Oregon where a fair crop is reported. The supply of western yellow pine seeds is very sparse this year in all localities.

Fire Studies

Static and Lightning Storms

Equipment for the intensive studies was made and installed at the Pringle Falls Branch and will be operated by Field Assistant Jacobson for a month or so. This does not appear to be a year of frequent lightning storms, but if information can be obtained on two or three storms, we will be able to check previous observations and probably will be able to decide definitely whether or not empirical use can be made of "static" as an aid in localizing forecasts of lightning storm occurrence.

Reporting and Charting Lightning Storms

Following the system outlined last month, the paths of lightning storm movement were plotted for the years 1930, 1929, and 1928. It is expected that this work can be completed in September. The information contained on the reports of these years will be coded during September and analyzed according to a working plan now being prepared.

Hour Control Study

Tables for the analyses of the eastern Oregon and the eastern Washington groups of forests are now being typed and are about three-fourths completed. An outline for the report to accompany these tables is in preparation.

Smoke Detection and Visibility Studies

More than half of McArdle's time during August was spent on these studies. Nearly a week was devoted to getting the smoke detection studies started on the Deschutes and Cascade Forests. Following this, McArdle and Coile spent two weeks on the Deschutes making more intensive studies of smoke detection as influenced by amount of smoke, timber type, topography, wind velocity and especially, atmospheric conditions. More than two hundred tests were made and Coile will remain on the Deschutes for another two weeks in order to complete the study. The artificial smoke produced by smoke "candles" has proved to be very satisfactory.

Section of Forest Products

Minor Forest Products Study

Johnson spent the entire month compiling the data and preparing the reports related to this study. It was found that the production of piling

in Oregon and Washington in 1930 amounted to 146, 943 pieces or 7,942,287 lineal feet. Oregon produced 32,402 pieces or 1,689,564 lineal feet, and Washington 114,540 pieces or 6,252,723 lineal feet. The total wood volume entering into piling production was 7,117,093 cubic feet. Of the total lineal feet produced about 86 per cent was Douglas fir, 11 per cent western red cedar, 2 per cent western hemlock, and the remainder Port Orford cedar, western larch, and Sitka spruce. On the basis of number of pieces, piling over 60 feet in length comprised better than 27 per cent of the production, 60-foot piling, 11 per cent, 50-foot piling 14 per cent, and 40-foot piling 13 per cent. Piling classified as over 60 feet in length included stock up to 135 feet. The bulk of the piling cut from species other than Douglas fir was under 45 feet in length.

Better than 55 per cent of the piling output of the two states was produced in the Puget Sound region.

The total pole production for Oregon and Washington in 1930 amounted to 332,935 pieces or about 12,740,465 lineal feet. Washington produced 287,982 pieces, or 6,648,541 lineal feet, and Oregon 44,953 pieces, or 1,498,248 lineal feet. The total wood volume entering into pole production was 8,146,789 cubic feet. Of the total production, western red cedar accounted for about 85 per cent (lineal feet basis), Douglas fir 14 per cent, and the remainder Port Orford cedar. About 66 per cent of the poles were in the 30, 35, and 40-foot classes. Although comprising only 14 per cent of the total production, Douglas fir supplied about 51 per cent of the poles over 60 feet in length.

Felling Breakage Study

Rapraeger with an assistant spent the entire month in the field investigating the breakage losses in felling Douglas fir and western hemlock. Thus far studies have been conducted in four camps covering 782 trees with an approximate gross merchantable volume of 6,500,000 board feet. It is planned to measure about 400 more trees during the present field season. The samples taken represent a wide range of felling layouts and ground conditions.

In the course of the study Rapraeger has found that present market conditions are reflected in the present utilization practice, many operators taking out only the high-grade logs, and leaving the lower grades in the woods. This is especially true of western hemlock for which there is a more or less active demand in the export trade for choice logs and squares. Operators supplying this trade and marketing their rougher logs for pulpwood have an entirely different merchantability standard in the woods than those selling their logs on the open market.

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SOUTHERN FOREST EXPERIMENT STATION

General

Visitors at the Station during the month included: Dr. Elliot of Tulane University; Dr. D. Stern, plant pathologist employed by the Mexican Government; Dr. Carl Hartley, from Washington, D. C.; Mr. C. E. Graves, representative of the du Pont Chemical Company; Mr. J. A. Soothill, formerly District Superintendent with the United Fruit Company; Mr. H. C. Mitchell, Assistant State Forester of Mississippi; and Mr. K. E. Kimball, District Forester for the state of Mississippi. Dr. Elliot conferred with Demmon concerning plans for the Agricultural Section of the American Association for the Advancement of Science meeting to be held in New Orleans this December. Dr. Stern was on a tour following a visit at Ceiba, Honduras. He is chiefly interested in the Fusarium disease of bananas, commonly called banana wilt. His visit prompted considerable discussion with Siggers, who has had experience in that particular field. Dr. Hartley arrived the last of the month to review the pathological studies in progress at the Station.

Junior Forester T. A. Liefeld reported for duty at New Orleans and later went to Lake City, Florida, to assist with work on the Olustee tract. Ranger T. E. Pease of the Natural Bridge Forest reported at Starke, Florida, to replace T. N. Busch. Dale Chapman arrived the last of the month for assignment with the forest pathologist group.

On August 4 Demmon appeared before a joint meeting of the Industrial and Agricultural Bureaus of the New Orleans Association of Commerce and presented a report on Erosion Legislation. He later drafted a resolution on the subject and presented it to a committee representing the respective Bureaus. Demmon made a visit to Lake Shore and McNeill, Mississippi the latter part of August for conferences with Mr. Greene, Director of the State Agricultural Experiment Station at McNeill. During the remainder of the month Demmon spent considerable time working on an extensive fire report for the South.

Management

Wahlenberg, Chapman and Bickford spent the first two weeks of August at Urania, Louisiana, going over the status of the various management plots. Chapman, with the assistance of Bickford, made cone counts on the pine plots. They report that there are practically no loblolly or shortleaf and a light crop of longleaf cones. Chapman also reports that a good burn was made on the loblolly summer fire plot. Chapman returned to the office for the latter half of the month and worked on the Urania sample plot data.

F. B. Merrill, State Forester of Mississippi, and H. C. Mitchell, Assistant State Forester of that state, spent two days at Urania obtaining fire data.

Wahlenberg worked a week in the office on the analysis of fire data and on plans for further extensive surveys pertaining to the effect of fire on the establishment of longleaf pine. These surveys were started the last week of the month in Alabama and Florida. H. C. Mitchell, of the Mississippi State Forest Service, Gemmer, Bennett and Bickford assisted with this work.

Naval Stores

Methods of Chipping

The samples from the July dip of the Interval of Chipping trees were analyzed by the Bureau of Chemistry and Soils and progressively higher turpentine percentages accompanied greater frequency of chipping. A second set of samples was collected for analysis August 31. The Interval of Chipping yields are being currently worked up and analyzed. Five faces which have been chipped daily with an adz received from Sumatra are now rapidly falling off in yield. In July these faces were deepened and apparently this has had an adverse effect upon the yield. Part of the decline may be due to the length of face. This will be checked by raising the tins very shortly.

Major Benedict reports good results from the use of the old French hack. He claims his chippers put on 1,200 streaks a day and that even at the very low prices for gum he is paying expenses exclusive of stumpage. His overhead is very low. He reports that after trying out Harper's tool for six weeks he found it not satisfactory on trees 10 inches and over in diameter.

NS-3, Weather

Wyman spent most of the month on the gum gage charts. Current hourly yields are being plotted on the same sheet with thermograph and hygrograph curves. These records show that there is no yield during the nights after the streak has run for three days. Yields later in the week consist of midday increases which start as soon as the temperature starts to go up at sunrise and stop at about 2 or 3 o'clock in the afternoon. These midday yields are repeated for a number of days and in the winter time some yield may be expected for three weeks or more. The yield usually starts at a much lower temperature in the morning than prevails when it stops in the afternoon.

The atlas records of the 1926-30 chipping tests will require about one month's ^{more} work on the summaries and averages before the records can be

fully utilized. It has been found necessary to collect certain odd bits of field data in order to complete the group records.

Wyman gave a talk on Practical Ideas for Increasing Financial Returns from Farm Woodlands at the Ninth Farmers' Week at the University of Florida. He also prepared an article on "Taking Advantage of the 1931 Longleaf Seed Crop" for the Agricultural News Service at the request of the Director of the Florida Extension Department.

The library is in the process of rearrangement and has now been classified in the same way as the main library in New Orleans, although not all of the cross-reference cards by subjects have yet been prepared.

T. E. Pease of the Natural Bridge Forest reported for duty, replacing Busch in the Ranger position.

Visitors

Visitors included Major R. E. Benedict, who called relative to his French chipping work, and C. E. Harper, who has a patent nail for use with oblong metal cups, designed to prevent the cups from tilting and thereby wasting gum.

Publications

The recent publication, "Cleaner Gum Obtained by Using Chip Paddle", by T. N. Busch of the Southern Forest Experiment Station, appeared in the Naval Stores Review of August 29, 1931.

Olustee Tract

Osborne and Diller, assisted by Gemmer the first half of the month and by Liefeld the last two weeks, continued work on the Olustee tract. They assisted Shingler and Spoh of the Bureau of Chemistry and Soils in selecting and surveying the boundaries of a ten-acre area for the use of that Bureau.

Osborne spent several days obtaining information and writing a history of the Olustee tract. Marking of compartment boundaries and type mapping occupied the remainder of the month.

Forestation

During the first part of the month Wakeley completed a reorganization of the Forestation files. He also prepared a report on the new classification of these files.

Wakeley attended the Region 7 Planting Meeting held at the Parsons Nursery near Parsons, West Virginia, on the Monongahela National Forest, from August 23 to 27. He spoke on "Planting Southern Pine". About twenty-five attended this meeting. Besides the several days devoted to prepared papers and the discussion of planting problems, an all-day field trip was made over portions of the Monongahela Forest.

Wakeley reports that the Southern Station has undertaken the seed testing of all southern pines for Region 7.

Protection, Grazing

During the first week of August, Dr. Pessin, assisted by Bennett and Beyer, completed cone counts on the longleaf seed trees in the pasture plots at McNeill, Mississippi. They report a fair crop.

Ecology

The ecological studies of root competition, soil moisture, etc. were continued at McNeill by Dr. Pessin. He was assisted by Watkins, who also continued the meteorological readings.

Camp Pinchot

Heyward collected soil moisture data and continued the root studies during the entire month.

Gemmer spent the third week of August at Camp Pinchot working in the nursery and starting a report of the root studies conducted there from 1927 to 1929.

Financial Aspects

The Economics group, under Dr. Ziegler, divided their time between the Bradford-Hamilton County Report for Florida; the institution of the final Farm Woodland Survey in Hempstead County, Arkansas, in cooperation with Dr. Turner (Forester) and Mr. Hall (Agricultural Economist) of the Arkansas College of Agriculture; work on the Extensive Revision Report; and a week's reconnaissance of Case Studies in south Arkansas.

After completing the field work on the Polk County, Texas survey, Mr. Bond went on vacation. Later in August he worked on the Polk County compilation and drew up a tentative plan for the summarization of the Hempstead data. He joined Dr. Ziegler in the Case Study Reconnaissance

in the south Arkansas and north Louisiana Shortleaf-Loblolly-Hardwood belt, where the winter field work will be centered on several promising case study prospects on the Cost of Growing Southern Pine.

The features that seem promising are (1) Cutting by a Selection System, using a diameter limit as an approximate guide; (2) leaving a growing stock well distributed and in sufficient quantity to furnish a large periodic increment; (3) rapid growth and good reproduction; (4) reasonable costs for administration protection and taxes; (5) a developing market for thinnings of pine pulpwood; showing a profit in 1931 in favorable transport locations.

Erosion

Meginnis spent the month of August at Holly Springs collecting the first data from the recently installed soil erosion and run-off plots. Standard rain gauges were installed near each of the plots and one float-operated, recording gauge was centrally located. With the coming of the first storms, the procedure for measuring and recording the run-off water and eroded material was developed. A laboratory in which to carry on the weighing and soil moisture determinations was constructed by remodeling a portable building furnished by the Holly Springs Experiment Station.

During the first rain several of the plots were almost completely wrecked and had to be re-installed. Surface water collecting in the loose "fill" soil around the collector tanks caused the upheaval of both tank and plot borders. Proper surface drainage was secured and in later storms prevented a repetition of this damage. Such a source of damage will be recognized in installing the larger tanks for a proposed study involving the measurement of run-off and soil loss from large gullies.

During the month, the plots yielded data from seven rains. The maximum rain occurred August 19. Although the rainfall from this storm totalled only about one inch, practically all the rain fell during a fifteen-minute time interval and resulted in washing five pounds of soil (oven-dry weight) from one of the cultivated plots, or the equivalent of about three tons of soil per acre. The preliminary data from the plots shows interesting trends in that no erosion and very little run-off has occurred from the bermuda grass pasture plot and neither erosion nor run-off from the native grass (Andropogon sp.) plot. No erosion and very little run-off has occurred from the oak brush plot and the plot located in a twenty-year-old locust plantation. In contrast, the cultivated and unvegetated plots have yielded surficial run-off amounting to nearly 75 per cent of the rainfall and relatively large amounts of eroded soil.

While on a vacation trip to California, Sinclair visited the California Station and the Division of Forestry at the University of California. This afforded an opportunity briefly to discuss and observe some of the forest and grazing influence studies being conducted by the above institutions.

A visit was also made to the Foreign Plant Introduction Station near Chico, California. The introduction of forest trees and forage grasses has been discontinued at this station for some time. However, considerable plant material was observed and a few species of promise for erosion control planting in the South were noted.

Sinclair attended the Ecological Society field meeting held at the Great Basin Branch Experiment Station near Ephriam, Utah, August 17 to 20. This meeting was devoted to research methods, especially pertaining to grazing and closely related subjects, including erosion. Of special interest was a visit made to the run-off and erosion experimental watersheds established by the Forest Service in 1912 on the Manti National Forest.

Another stop was made at the Soil Erosion Experimental Farm conducted by the Bureau of Chemistry and Soils and the Bureau of Agricultural Engineering near Guthrie, Oklahoma. The effectiveness of broad base terraces constructed at different intervals and on varying grades is being studied on this 160-acre tract. Flumes and silt traps so placed that the individual terraces empty into them are used to measure the run-off and eroded soil.

This Station has equipment installed to measure the run-off and erosion from four watersheds of about five acres each, as follows:

1. Cultivated and terraced
2. Cultivated and unterraced
3. Woodland (scrub oak cover)
4. Pasture land (mostly formerly cultivated and abandoned due to erosion).

The effect of annually burning a scrub oak woodland cover, on run-off and erosion, is being studied by means of one-hundredth acre plots established on a slope of approximately five per cent. Preliminary results indicate that burning greatly increases both run-off and erosion.

Forest Survey

During August Lentz and Bull continued the Hardwood Survey analysis work in Washington in the Branch of Forest Measurements, under Schumacher's supervision. Lentz made a hurried trip to Syracuse over the week-end of August 15 and had a chance to tell some of the College of Forestry faculty about the work of the Survey.

Bull went on leave August 29 and Lentz started south shortly afterwards.

The Hardwood Survey analysis has brought out some very interesting facts concerning the work in East and West Carroll Parishes, Louisiana. A total of 503,000 acres was covered by the line plot method at a total cost

of \$4,772, not including overhead. Some 30 tables, based on the field data, have been compiled giving areas by condition, site and type and showing the board-foot volumes by species, condition, site and type. A cull factor of 1.79 per cent to be applied to the gross volume was also determined and the radial growth data were analyzed. A few of the figures derived may be of interest.

Of the total area (503,000 acres) 315,381 acres, or 62.7 per cent, were classed as forest land divided into the following five sites:

1. Ridge	- 39.2 per cent
2. Flat	- 51.5 per cent
3. Swamp	- 2.5 per cent
4. Batture	- 5.3 per cent
5. Upland	- 1.5 per cent

Total 62.7 per cent

The forest area by per cent in each condition was:

1. Virgin	12.6 per cent
2. Culled	1.9 per cent
3. Cut-over restocking	63.7 per cent
4. Cut-over not restocking	8.6 per cent
5. Ruined	4.1 per cent
6. Old Field	4.4 per cent
7. Second-growth	4.7 per cent

(mostly on batture land)

The total gross volume was 831,804 M board feet, Scribner Scale, divided by condition as follows:

Condition	Gross Volume M Board Feet	Average Stand per Acre - Board Feet
Virgin	299,694	7,542
Culled	42,527	7,113
Cut-over restocking	384,340	1,914
Cut-over not restocking	38,308	1,416
Ruined	4,922	384
Old Field	20,166	1,442
Second-growth	41,797	2,637

Red gum accounted for 123,042 M board feet, the most of any single species, with the Red Oaks accounting for 119,736 M board feet gross scale.

As a result of the analysis of the data, several changes will be made in the Hardwood Survey Working Plan before any further field work will be undertaken.

Hardwood Growth and Yield

Winters spent the first part of the month analyzing data collected to test the suitability of Form 558 (a) for use in constructing volume tables for the bottomland hardwoods. He was assisted by Wheeler, Beyer and Liefeld. Winters was on leave the latter part of the month.

Several members of the Hardwood Survey crew, including Putnam, Lehrbas, Cruikshank and Faulks, devoted most of the month to the collection and analysis of volume table data for the bottomland hardwoods.

Putnam spent the last days of August with Doctors Hartley and Overholts, and Kaufert, in the field near Ferriday, Louisiana, conferring on plans for the pathological studies to be made in conjunction with the Forest Survey.

Forest Pathology

Siggers made an examination of native and exotic pine needles which had been collected at various points in the South, to determine the presence of the brown spot needle blight. The principal collections of host tissue had been made in nurseries at DeRidder, Louisiana, Woodworth, Louisiana, and Camp Pinchot, Florida. The following species of pine showed lesions bearing spores of the brown spot needle blight:

<u>Host</u>	<u>No. of Localities in which collected</u>
<u>P. attenuata</u>	Two
<u>P. apacheca</u>	One
<u>P. caribaea</u>	Three
<u>P. contorta latifolia</u>	One
<u>P. coulteri</u>	Three
<u>P. echinata</u>	One
<u>P. halepensis</u>	Two
<u>P. jeffreyi</u>	One
<u>P. montezuma</u>	One

<u>P. muricata</u>	Two
<u>P. palustris</u>	Seven
<u>P. pinaster</u>	Two
<u>P. ponderosa</u>	Two
<u>P. radiata</u>	One
<u>P. sabiniana</u>	One
<u>P. rigida serotina</u>	One
<u>P. taeda</u>	Two
<u>P. thunbergii</u>	One

Dr. Overholts and Kaufert continued the recently initiated studies of decay in hardwoods. Particular attention was given to the extent of decay in trees and an attempt is being made to correlate the presence of fire scars with the extent of decay. This information would be of special value to the Hardwood Survey.

Lindgren spent most of the month finishing manuscripts relating to methods of controlling sap stain and molds in stored logs.

Davidson continued making collections of molds associated with stained lumber of the pitch pines. Localities of collection were lumber yards at Bogalusa and Urania, Louisiana.

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SOUTHWESTERN FOREST & RANGE EXPERIMENT STATION

Mr. Chapline spent the first half of the month at the station, visiting Fort Valley, Roosevelt, Tucson, Santa Rita and Jornada. His presence was opportune in view of important matters to be considered in connection with unemployment estimates.

Cooperrider, Campbell and Culley attended the Range Research conference at the Great Basin Experiment Station, which accounted for their absence during the last half of August. Cooperrider made the return trip through Colorado in order to look into erosion conditions on the upper Rio Grande drainage area.

After considerable hesitation during July, the summer rains got into action early in August. The Santa Rita Experimental Range reported

8 inches in the first three days, and several heavy rains fell after that. Fort Valley received about 8 inches during the month. On the Jornada, it varied from 1.57 inches at headquarters to 3.80 at Ropes Springs near the base of San Andreas Peak. Livestock are generally in excellent condition. Clipping studies were in progress on the Jornada at the end of the month. The tobosa grass had made no growth on July 29, but a heavy rain on that date produced a growth of 4 inches by August 5.

Newly constructed roads suffered severaly from floods on the Santa Rita; little damage was experienced on the Jornada where the rainfall was much lighter.

Bert R. Loxen, after two years in the Washington office as a trainee in statistical methods, has rejoined the staff of the Southwestern. Fifteen and twenty years' records on some 30,000 trees should furnish good material for a statistician.

Rio Grande Erosion Survey

Field work on the Rio Grande Watershed Survey was started shortly after August 1. For a week, Cooperrider assisted the party in developing methods to show the condition of the vegetative cover, the degree and extent of erosion and the relation of depletion of herbaceous vegetation to soil breakdown.

Because of the diversity of conditions to be found and the importance of the stream as a silt contributor to the Rio Grande channel, the Galisteo drainage was selected as a starting point.

After Cooperrider's return to Fort Valley, the party consisting of B. A. Hendricks, Associate Range Examiner, G. D. Merrick, Junior Range Examiner, and J. T. Cassidy, Summer Field Assistant, completed the work on the Galisteo and moved northward from Santa Fe up the east side of the Rio Grande to the state line, taking records principally on lands outside the national forests.

The plans for the work provide for an extensive survey of erosion conditions, and character of vegetative cover over the watershed in general with intensive work on selected drainages to bring out in more detail the relation of cover to degree and extent of erosion. In order to show the character of vegetative cover quadrats are charted, and composition and density estimates are made. Profiles across quadrats or areas on which estimates are taken are measured to obtain vertical cross-sections which show soil stability or lack of stability in relation to clumps of vegetation. All possible information is gathered on the extent of grazing and other use, character of soil, geologic formation, and any other factors which have a bearing on erosion. Photographs illustrating conditions are made a part of the record.

It is expected that approximately three months' field work will be required to complete the survey in a satisfactory manner.

Willard Bond, recently engaged in Land Exchange surveys, and Richard Lewis of the Tusayan are being detailed to the work by the Regional Forest office and they are expected to join the party about September 10. Cassady leaves on the 5th for Tucson, and will enter the University of Arizona as a senior in the botany department.

Range Management in the Yellow Pine Type

Studies started in 1927 in regard to damage to W. Y. P. reproduction by cattle and sheep under open range conditions have quite definitely shown that the amount of damage depends on many things. The most obvious of these is overgrazing but with it eliminated damage still persists during the spring dry season when the current growth of pine seedlings is most succulent. Further studies indicated that availability of stock water well distributed throughout a range and at not too great distance apart would materially reduce this damage.

To obtain further information, four pastures were constructed - two in an area formerly badly overgrazed in cutover W. Y. P. and with a low density of surface vegetation; the other two in practically the same type but with vegetation of maximum density and more bulky growth. In both areas, Arizona fescue, mountain muhlenbergia and beardless bunch grass predominate. All four pastures have approximately the same amount of feed, although those in the area of low density necessarily had to be about twice the size of the others.

Plots were established throughout the pastures and individual records of all reproduction kept.

Four steers were put in each pasture and were watered in troughs from a tank wagon during the spring and dry summer season - from June 15 to July 18. In one pasture in each of the areas of high and low vegetation density the steers were watered all they could drink in 6 hours every three days. In the other pastures, water was kept before the cattle at all times. The idea was to simulate as nearly as possible conditions on a range where stock are forced to stay out from water long periods, and also where water is available to the stock at all times. It is recognized that these conditions were not fulfilled entirely. There could be no effect of cattle trailing from 5 to 6 miles to a watering place when they were dry and getting drier every mile. Under these conditions, they apparently take the succulent new growth on reproduction to relieve thirst and probably do more damage than at any other time. The summer rainy period abruptly closed the experiment as practically all damage ceases with the first effective rains.

A very general analysis of the data secured shows unquestionably more damage in the pastures where the steers had water every 3 days than in those where they had water before them at all times. There was more contrast between the wet and dry pastures in the area of high density than in the area of low density. The area of low density, due to past overgrazing and heavy recent use, produced more succulent feed than the area of high density. Tentative conclusions indicate the desirability of available stock water during the dry periods of not over 2 miles apart, and of maintaining the natural surface cover conditions.

The study will be continued and extended to sheep next year.

Reproduction of Douglas Fir

One of the important silvicultural studies to be conducted by the experiment station is natural regeneration of stands in the Douglas fir type. Such a study was begun about 6 years ago when several plots representing different methods of cutting were laid out. At the same time a number of seedling count plots were also established. The results obtained so far indicate that the prospects of obtaining adequate restocking through natural regeneration are none too good. There are several adverse conditions which, although they are not in themselves to be regarded as limiting factors, are nevertheless probably largely responsible for reproduction failure. Chief among the many contributing causes of failure are thought to be insufficient seed and the destruction of seed and seedlings by rodents and grazing animals. Obviously, it is necessary to know to what extent these causes are involved before the blame can be placed on faulty silvicultural methods. Accordingly, in formulating a plan for studying the reproduction problem provision has been made for fencing some of the plots against rodents and grazing animals and - if necessary - also against birds.

Although the object of the study is to determine what may be accomplished through natural seeding alone, some plots will be artificially sown. In this way, some seedlings at least will be assured for studying the effect of physical factors. Furthermore, the results obtained on these artificially sown plots will serve as a basis for comparison with the unsown plots, and thus in a measure indicate the extent to which lack of seed is responsible for a dearth, or absence of seedlings.

Outside of the disturbing influences mentioned, it is thought that the character of the shelterwood also has a bearing on the success or failure of reproduction establishment. The indications are that the best results will be obtained where a nurse crop of some other tree species is first allowed to become established. Good stands of seedlings are observed to have established themselves under the canopy of western yellow pine, limber pine, oak and aspen trees. However, it is not known whether it is the character of the nurse trees themselves, or their litter, that renders conditions favorable for Douglas fir seedlings. Therefore, in order to

determine this, it is planned to establish a series of small plots under or near Douglas fir seed trees with litter of different nurse trees placed in those plots. At the same time, similar plots will be established under the different nurse trees themselves, to serve as a check on the results.

In these empirical experiments, it is intended first of all to get seedlings established and then later to actually measure the governing physical factors.

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RESEARCH ACTIVITY IN REGION 2

The past month was one of considerable field activity on the part of both the Experiment Station and the administrative research organizations.

Higgins spent most of the month on the western slope Forests in the Colorado River drainage getting first-hand information on the erosion situation, which, generally, appears to be confined to marginal lands lying below the present Forest boundaries in the pinon-juniper type. A considerable portion of this marginal area has been recommended for addition. Messrs. Forsling and Lowdermilk accompanied him on his tour. At the end of the month, Mr. Cooperrider also visited the Region in the interest of the erosion problem. He inspected the Salt Creek experimental area, which was established last spring on the Pike, and recommended the inclusion within the working plan of additional intensive observations to make this administrative project yield the fullest possible return in the way of results. Research will probably be called upon to lend assistance in this work.

Roeser spent the first week of the month at the Fremont Station in the completion of activities incident to the establishment of additional experimental management plots within the experimental forest to supply the 1931-1932 fuel demand. Some cutting was also done, but most of this will be undertaken in September. Following Roeser's departure on August 9th, Williamson gave most of his time to thinning the last remaining plots (C-11 and 38) in management unit Block C, and to necessary improvement maintenance.

On an extended three weeks' trip, Roeser visited three of the western Colorado Forests, namely, the Rio Grande, Uncompahgre, and Gunnison. His principle objective was to conduct the periodic remeasurement of various sample plots in the spruce-type cutting-methods study on the two former Forests and in the lodgepole pine thinning plots on the last-named. This objective was accomplished with the help of exceptionally

favorable, although unseasonal, and fire hazardous, weather. On the Rio Grande, Roeser tied in with Mr. Thompson, in charge of the Regional Office of Management. Escorted by Supervisor R. E. Clark, the opportunity was had to procure first-hand knowledge of the vast spruce pulpwood resources existing on this Forest. The information obtained confirmed the opinion that the Rio Grande area, centering at South Fork, constitutes one of the Region's logical Research center units. The physiographic and floristic conditions are typical of a much more extensive area, extending into the trans-continental divide Gunnison and Uncompahgre "alpine" country, than was previously supposed to be the case.

Some time was spent in the Pass Creek territory, which is part of the management unit included within the recent unconsummated sale to the International Paper Company. A typical average character stand desirable for sample plot purposes to study growth and desirable cutting practice for pulpwood utilization in the spruce type was scouted. None was found at the time but the search will be continued by the administrative force so that the experiment can be promptly initiated at the appropriate time. Incidentally, a sample marking plot of one acre, laid out at the same time in a stand estimated to typify average Site I conditions, contained 51,600 board feet, Scribner scale, indicating the yields which may be anticipated in this type.

Thompson and Roeser made their first visit to the old Wagon Wheel Gap Experiment Station, where the well known streamflow experiment was discontinued five years ago. The administrative improvements are still on the ground, but are now in rather poor condition. With Supervisor Clark in consultation, a decision was reached bearing upon the final disposition of improvements upon the area.

The one-half acre plot in Block B and the three one-acre units of Block A in Willow Park, established respectively in 1911 and 1913 to study the effect of various degrees of cutting upon subsequent growth, in the spruce-fir (corkbark) type in this region, were remeasured. Diameter increases of one inch in five years were not uncommon for both spruce and fir. The outstanding difference between the two species in their respective growth habits on this quality II site, where fir appears to be more abundant in mixture than on quality I sites, lies in the fact that the rate of growth of fir is consistently rapid under all growing conditions while that of spruce is distinctly influenced by the degree of competition, being as good or even better than fir in the dominant crown class, but very appreciably inhibited in the intermediate and suppressed crown classes.

Before leaving the Rio Grande, Roeser inspected the administrative natural reproduction study area on an old burn in the spruce type on Elk Creek (Block K) and assisted in the periodic examination. He also spent a little time in studying the possibilities of instituting a thinning study project in Douglas fir where this species is restocking itself on burned-over lower slopes under aspen. Most of these stands, however, are still in the sapling stage and it is unlikely that a thinning project may be attempted within the next few years.

On the Uncompahgre Plateau three one-plot blocks in the spruce type were recalipered. On one of these reproduction counts were also made. Similar counts are still to be made on one other plot before the end of the field season. One result of this year's work has been to synchronize the routine examinations, so that all may now be undertaken at the same time.

The heavy spruce seed crop of last year has resulted in an abundant crop of new seedlings amounting to approximately 4,000 seedlings per acre. New fir seedlings, on the other hand, are relatively scarce. It is not expected that many of the spruce seedlings will survive the long summer drouth. The history of the stand indicates that the percentage of survival of Alpine fir (*Abies lasiocarpa*) is much greater than that of spruce because of the more rapid initial development of this species which permits its seedlings to survive the adverse growing conditions to which the smaller spruce seedlings succumb.

Before leaving the Uncompahgre Plateau, the spruce type was extensively scouted in order to obtain information upon which to base judgment bearing upon the relative importance of this physiographic region from a research center standpoint. Its status in this respect has been more or less in doubt since the first tentative research center plan for Region 2 was formulated.

On the return trip to Colorado Springs two days were spent in re-measuring three one-tenth acre thinning plots in lodgepole near Pitkin on the Gunnison Forest. These were established in 1912 in a 26-year old sapling stand. As may be expected, the rate of diameter accretion under a 5 x 5 ft. spacing has been about twice as rapid as it has been where the trees were left approximately 3 ft. apart. The results indicate, however, that even with the wider spacing, an appreciable percentage of trees are finding competition too keen to make much headway and these represent more or less unproductive capital. On the control plot, which averages about 10,000 stems per acre, increment is confined almost exclusively to the dominant poles. Their relative gain approximates closely the average gain under the lightly thinned stand.

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MANUSCRIPTS

APPALACHIAN

- "Occurrence of the Savannah Sparrow (*Passerculus sandwichensis* Savannah) in West Virginia and Maryland during the summer months." By T. D. Burleigh. (For The Auk.)
- "Wild Life in the Great Smoky Mountains." T. D. Burleigh. (Address before Appalachian Trail Club.)
- "What is Expected of the Forester in Public Service." L. I. Barrett. (Address, Forestry Section, Vocational Agricultural Training School, Young Harris Academy.)
- "A Suggested Program of Administrative Planting Studies." E. H. Frothingham (For Region 7 Planting Meeting.)
- "The Forest Legion Carries On! C. R. Hursh (For American Forests.)
- "Eroded Old Fields as Forest Sites." C. R. Hursh (Forest Worker.)
- "Planting versus Light Seeding of Yellow Poplar in the Southern Appalachian Region. C. F. Korstian and A. L. MacKinney (For Journal of Forestry.)
- "Longleaf Pines Subjected to Thirteen Years Light Burning Show Retarded Growth." A. L. MacKinney. (Forest Worker.)

SOUTHERN

- "Effective Soil-Binding Plants for Reclaiming Gullied Lands in the South." H. G. Meginnis.

IN PRINT

- Abell, C. A. Positive gas and water pressure in oaks.
(Forest Worker, July, 1931)
- Burleigh, T. D. Wild Life in the Great Smokies.
(Asheville Citizen-Times, August 30, 1931.)
- Cunningham, R. N. The land economic surveys in the Lake States.
(Utah Juniper, 1931)
- Frothingham, E. H. Timber growing and logging practice in the Southern Appalachians. (Tech. Bul. 250)

Hursh, C. R. (with
F. W. Haasis)

Effects of 1925 summer drought on southern
Appalachian hardwoods. (Ecology, vol. 12,
No. 2, 1931.)

Matthews, Donald N.

Mapping forest cover types from the air. (West
Coast Lumberman.)

Pearson, G. A.

Forest types in the southwest as determined by
climate and soil. (Tech. Bul. 247.)

Watts; L. F.

Research by the forest ranger. (Utah Juniper,
1931.)

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OFFICE OF FOREST PRODUCTS, R-1

Extensive Revision

The job of checking the final summary sheets on stand and acreage in the two States and submitting the estimates to well-informed men and agencies outside the Service for review and approval came when practically everyone in the Regional Office, including the Products force, was out fighting fires. Mr. Anderson, who was in for a few days between fires started the work of checking and made arrangements with the Montana State Forester, Dean of the Montana Forest School, and one well-informed Montana lumberman, to review the estimate. Bradner who was in Portland at the time, conferred with Mr. Dave Mason and obtained his approval of the figures as being the best available.

While on Forest Survey with Mr. Granger during August, Mr. Bradner was able to interview Dean Miller of the Idaho Forest School and C. L. Billings, general manager of the Clearwater Timber Company in regard to their views on the revised estimates. Men and agencies outside the Service have likewise been busy with fires, and statements from all the men contacted or to whom the summary sheets had been submitted have not yet been received. Mr. Lee Muck of the Indian Service was also written regarding Indian Reservation estimates for the State of Idaho, but his reply has not yet been received.

It is hoped that the final report can be submitted to the Washington Office in the very near future.

Fire Detail

To date Mr. Anderson has been on fire detail 52 days. On July 13 he and Field Assistant Ibenthal left for the Gold Creek fire on the Bitterroot Forest. Since that time they have been engaged in fire suppression work on the Silver Lake and Barker Ridge fires on the Deerlodge Forest, the Freeman Lake and Ione fires on the Kaniksu Forest, in Idaho and Washington, and the Henderson and Kildoe fires on the Cabinet Forest.

The Freeman Lake fire which covered an area of 35,000 acres burned out practically every settler in the peninsula district of the Kaniksu, besides causing a large loss of deer, game birds, and domestic stock.

The prolonged fire detail has caused a serious interruption to Mr. Anderson's field program for this year. It will be necessary to postpone indefinitely the proposed tractor time studies at the Montana Logging Company and the Tie Mill Study at the Lupfer operation of the Great Northern Railway holdings.

Whitney spent 29 days on fire duty during August. After going to Newport, Washington, by plane on August 3, he was in charge of a fire crew

on the Freeman Lake fire, Kaniksu Forest, until August 14, and from August 15 to the end of the month was assigned to the Hubbard Reservoir, Flathead Indian Reservation, fire at Mill Creek and Niarada near the east boundary of the Cabinet National Forest.

The Hubbard fire had been burning for several days in Indian Reservation and Protective Association territory and was rapidly approaching the heavily timbered Thompson River watershed when Forest Service crews began work about 1-1/2 miles outside of the Cabinet Forest boundary. During the period August 15 to 22 from 250 to 500 men were employed by the Forest Service on this fire which was placed under control near the head of Rock Creek, a tributary of Big Thompson River, only a short distance within the Forest boundary, with a relatively small acreage of National Forest timber burned.

Lumber Prices

Average Mill-Run Prices	Annual, 1930	1st Q., 1931	2nd Q., 1931
Idaho White Pine	\$33.56	\$31.41	\$31.12
Western Yellow Pine	21.64	19.25	19.52
Larch-fir	17.32	14.26	13.53
White fir	16.34	13.76	13.82
Spruce	21.93	18.39	18.94

Miscellaneous

During August Mrs. Bullard completed the second quarter lumber price report, cedar prices and retail lumber prices.

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FOREST TAXATION INQUIRY

(July and August)

No field projects were undertaken during this period, the attention of the staff being turned chiefly to the completion of progress reports and preparation of portions of the comprehensive report.

A number of staff conferences were held in the latter part of July, and tentative plans of meeting the forest tax situation were agreed upon as a basis for application studies in which the effect of proposed measures are tested by application to conditions in various sample areas, detailed data for which have been collected by the Inquiry. These application studies are now going on under the specific direction of Wager and Pingree.

Herbert spent most of the month of July completing office reports on work in which he was particularly concerned, in order to provide for his resignation, which became effective July 31.

Fairchild compiled the pertinent data from Inquiry sources for the use of the Timber Conservation Board's Committee on Forest Taxation, of which he is Chairman.

Two progress reports were completed and sent to Washington for multigraphing, No. 14 entitled "Taxation of Timber Properties in Oregon and Washington," by R. C. Hall, and No. 15 entitled "Some Aspects of the Forest Tax Problem in Selected Towns of Wisconsin," by Daniel Pingree. The former, No. 14, has been issued and is now being distributed to the mailing list.

Hall represented the Inquiry at the Fourteenth Annual American Country Life Conference held at Ithaca, New York, August 17 to 20. He addressed the forum on taxation on the subject, "The Tax on Forests."

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