UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

MONTHLY REPORT OF THE OFFICES OF
FOREST EXPERIMENT STATIONS AND DENDROLOGY

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MONTHLY REPORT OF THE OFFICES OF
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January, 1926

FOREWORD

(Extract from Edward Bok, "Twice Thirty.")

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One of the teachings which a young man will find it most difficult to practice is thoroughness, because he will meet on every hand a lack of it. He will meet men who go round in circles, who leap from topic to topic in conversation, who jump from one thing to another in their daily lives, who go from one meeting to another absolutely forgetful at the last of what transpired at the one before.

We meet men whose orbit is pitifully small; whose horizon is contracted and whose vision reaches not beyond the day or the circle in which they move; those of whom Hannah More so well said:

"In men this blunder still you find;
All think their little set mankind."

In each case the absent ingredient is that of thoroughness,- the lack of will to think a problem through, to think before action, to deliberate before decision, to attain a larger horizon.

But by just so far as a young man will meet so much that lacks the thorough touch will his own thoroughness stand out the more clearly for men to see. He will learn for himself how fundamental is this need of thoroughness, even in the smallest deed. He will discover that the man who is indifferent to it is the man whose carelessness in deed makes him also confused of word and rambling of thought. Thoroughness is always born of an orderly mind, and such a mind can accomplish with apparent tranquillity the purposes that to others would appear impossible. The acts of man should be constructive, and most of man's undertakings have some permanent achievement in view. But what permanence can there be that is not born of thoroughness? Acts done haphazardly usually return to their maker for accounting, like a duty shirked that one meets as he turns a corner a little further along. We are asked to do certain things only once; we are permitted to go through life only once; the place we are at today we shall never see again. Today is all we have, since yesterday is gone and tomorrow is but a

hope. What we do, therefore, with only the present and one chance given us admits of none but the finished rule that governs every act, remembering that often it is the smallest act, seemingly trivial at the time, by which we are judged and our character is measured. We have all the time there is to do what we are called upon to do; hence whatever we do should be of our best and according to our best. For we little know by what act we are appraised or how we are judged by the seemingly inconsequential thing that leaves our hands.

There is not one of us who is not an example to some one else. Often our actions are watched by some one, and are accepted as a standard for some other life. We may consider ourselves the humblest and the most obscure, but always is there some one else who considers himself humbler and more obscure, and looks to another for precept and example. The most unthought-of saying of ours may be the seed that drops on fertile soil; the smallest action, in our eyes trivial and inconsequential, is an example which is observed and followed by another. Our influence may fall in the most unlikely places:

"This learned I from the shadow of a tree,
Which to and fro swayed o'er my garden wall;
Our shadow--selves, our influence, may fall
Where we can never be."

Every faculty we have is preserved and strengthened and increased by the thoroughness which we manifest. It is only the great man who appears to know how to do the smallest thing with thoroughness. He surmounts difficulty with care, and regards an obstacle not as something to shirk or avoid, but simply as a difficulty to be overcome. In the face of his thoroughness the insurmountable often melts like snow under a spring sun. The man who has accepted thoroughness as his gospel in life is a hard man to beat. He is well-nigh unconquerable.

FOREST EXPERIMENT STATIONS

Washington Office

The new year started out with a bang, and if the first month is any indication of what the remaining eleven are to be like, the year will be a busy one for all concerned.

Early in January the combined meeting of the American Forestry Association, Southern Forest Congress, and the Appalachian Section of the Societ of American Foresters, together with the meeting of the Appalachian Research Council at Richmond, Va., brought together members of the Southern and Appalachian Stations. Following this meeting, Forbes, Frothingham, and Wyman came to Washington to discuss various and sundry matters pertaining to the work of the stations. A few days later Dana arrived, and, with McArdle, completed the demoralization of the regular work of the office. This was further supplemented by the meeting of the state extension foresters in

Washington. The presence of three experiment station directors gave us an opportunity to discuss with them their programs and plans for the coming year.

Congress has taken action upon the Department of Agriculture Supply Bill and the House has passed the bill, increasing the amount available for silvical investigative work in the current appropriation by $29,980 for the California station. This action also restored the $7,000 cut which had previously been made in the SI item by the Bureau of the Budget.

Washington Office

Mr. Clapp has devoted a considerable part of his available time to the revision of his "Forest Research" report, which went to the stations during the past summer. However, both Laboratory men and the experiment station visitors have not permitted him much spare time for this activity.

Reineke undertook to help out the Appalachian Station, and left the middle of the month for a two weeks' trip with Frothingham to remeasure the sample plots on the eastern shore of Maryland.

Grazing Research

The Branch of Research is expanding once again and, under the direction of the Forester, is now taking under its wing the grazing research which has been centralized heretofore in the Branch of Grazing. The transfer will be effective March 1, at which time the three grazing experiment stations and the grazing studies work in the various Districts will be centralized in the Branch. In Washington the change involves the transfer of Chapline and Dayton, together with the herbarium activities of the Service, to the Branch. Four units are now recognized: Silviculture, Products, Economics, and Grazing.

Foreign Silvical Research

As a means of determining what investigative work is under way in foreign countries, copies of the Investigative Program of the Experiment Stations for 1925 were sent to foreign countries and a statement requested as to their research activities. (This was handled through the cooperation of Mr. J. C. Mellis, of the Department of Commerce and the Consular Service.) As a result, replies have been received from every continent. Some of these were accompanied by printed publications which indicate the line of activities that the countries are following. Of particular interest to us is the work of the Netherlands, Jugoslavia and Czechoslovakia, Finland, Sweden and Norway, and several German states. Extracts from the statements so far have appeared in the SERVICE BULLETIN and in the Forest Worker, and further summaries will be prepared from time to time. The complete summary will appear in the revised copy of the "Forest Research" report. It is quite apparent that the organization of our own station activity has been along the same general lines as those elsewhere, but that

our activities need strengthening along fundamental lines in the allied fields of physiology, soils, pathology, and entomology. The latter two are, of course, being strengthened by other offices in the Department.

Committee Activities

The Committee on Growth and Yield has practically completed its report as far as deciding upon the material to go into the recognized methods is concerned. At the present time the entire vote of the committee is being correlated so that a unified statement may be sent out for final discussion. It is expected that this will be ready early in March. A new committee is in the process of organization to undertake the standardization of field methods in sample plot work. This will follow in part the outline submitted to the Madison Conference in March of 1924. As before, the committee will consist of representatives of the Society of American Foresters, State Foresters and of the Forest Service.

Measurements

Getting at the bottom of McArdle's Douglas fir study was like digging up a boulder; the farther down he went, the deeper and larger the rock seemed to be buried. As a result, about three-fourths of the time of the Section has been spent on the study during the month, including about a quarter of the time of both Bruce and Reineke. Bruce has about completed his part of a paper on "Multiple Correlation Technique," to which he has devoted about half his time this month.

In the Tabulating Section, a great variety of work was handled, including the Northeastern and Lake States fire studies, naval stores correlation, Douglas fir volume and yield tables, methods of cutting studies in both District 5 and the Northeast, the Districts' lightning study, and Accounts.

A summary of the 1925 work indicates that the machine sorter was busy 70 per cent of the total possible time, and the machine tabulator nearly 80 per cent. This takes no cognizance of the repairs, overhauling, or breakdowns in the equipment. This amounts to the equivalent of about two million cards.

Library

Last month there were 886 books and periodicals loaned from the library, and 146 members of the Service and others consulted the library in person.

The number of books and articles indexed for the card catalogue during the month was 149.

"CLEAR, EFFECTIVE WRITING"

The relation between properly constructed tables and clear, effective writing, which we have been attempting to make clear these past two months, is fairly well shown by a table appearing recently in the Journal of Agricultural Research. The writers, studying the relation between weights of eggs, weights of chicks, age of hen, and sex of chicks, wished to express this relationship in terms of chick-weight percentage of egg weight. For a table comprising only 24 quantities they employed the following title:

> TABLE 3.--Relationship between the mean percentage chick weight of egg weight in eggs producing males and the mean percentage chick weight of egg weight in eggs producing females, in each of four groups; and the relationship between the mean percentage chick weight of egg weight in eggs producing males and females, respectively, in each breed.

This was followed by twin column headings for male and female chicks, of which one read:

> Mean percentage chick weight of egg weight in eggs from which males were hatched.

The table made up this way expressed just what the authors wished it to express, and neither title nor heading is wrong. The Journal editors very wisely allowed the writers' version of it to stand. Yet perhaps all would agree that this manner of introducing data might be simplified. It is probable that nothing would have been lost to the reader, and even something gained in ease of comprehension, if the authors had simplified their table in some such way as this:

> TABLE 3.--Mean ratios of chick weight to egg weight compared for eggs of two breeds producing male and female chicks.

with column headings reading:

> Male chicks Female chicks

and, below, the unit "Per cent."

If this excursion into the poultry yard seems far afield from forestry, consider that a study of seed, its source, weight of cones, method of extraction, etc., might well involve a similar correlation of factors. The point of the illustration, which applies as justly to forestry research reports as to those from any other field of scientific investigation, is that the descriptive portions of a table should be so nicely adjusted and correlated that repetition is reduced to a minimum, that the information given is complete and sufficient for a proper comprehension

of the significance of the data presented, and that as little white space as possible is taken by towering headings.

In another issue of the Journal of Agricultural Research appears Larsen's article "Natural Reproduction after Forest Fires in Northern Idaho," which has been reprinted and of which a copy is probably available in each station library. Table 4 here bears the following simple title:

> Effective seed dispersion from groups of live trees, double burns of 1910 and 1919, 1923,

and over all columns but the stub the column heading:

> Greatest distance of seed distribution from parent trees, and average number of seedlings per acre, by seed-tree groups and count strips.

The editing of this table can be criticized without apology, for the editor has only himself to blame for it. His criticism is that a column heading that is stretched across a whole table, or across all columns but the stub, is probably part of the title gone astray, and this seems to be true in this instance. If the editor could have a second chance at this table, he would perhaps recommend the following title, with the long column heading entirely omitted:

> TABLE 4.--Effective seed dispersion: Greatest distance of seed distribution from parent trees, and average number of seedlings per acre (1923), following double burns of 1910 and 1919, recorded by seed-tree groups and count strips.

This is a long title, and might be shortened by deleting the first three words, but it does not seem unduly complex to the reader, and greatly simplifies the appearance of the table, particularly as, in this instance, the table had to be broken in two, and the elongated heading repeated for the lower section.

A very good way to find the most economical and effective descriptive matter for a table, is to plan it out, so to say, from the bottom up. Beginning with the necessary units, consider the subheadings needed to cover them. Sometimes units take the place of subheadings, as in example (A); sometimes subheadings make any expression of unit unnecessary, as in example (B):

(A)	Area heavily damaged:		(B)	Trees per acre:
	Acres	P. ct.		1,047
	1,649	37.4		983
				1,006

Continuing on up to the main headings, and thence to the title, it is not difficult to keep subheadings and headings brief, leaving finally for the title, or at worst for a footnote to the title, the details that would otherwise clog the headings.

DENDROLOGY

Common Forest Trees of Ohio

The forest department of the Ohio Agricultural Experiment Station is preparing a popular manual of the common trees of the state. Recently Prof. L. I. Barrett, Assistant Forester, submitted the list of trees selected and asked that it be revised in accordance with the Service's forthcoming new Check List. This has been done. It is gratifying to note the desire on the part of the Ohio Station officials to be guided by the Forest Service usages.

Forestry Almanac

Following the publication of the first edition of the Forestry Almanac, the American Tree Association is preparing to publich a new edition for 1926. A rather important chapter in the Almanac is a "Selected List of Trees" suitable for planting in various sections of the United States. Desiring to bring this "List" up to date, the editors of the Almanac recently requested the Office of Dendrology to revise and extend the list in the light of new developments. As originally published the "List" was a transcript of an article printed in "Scouting," as a guide for the Boy Scouts of America in their tree planting activities, especially in memorial planting. Since its appearance in the Forestry Almanac one excellent review with suggested additions was received from Mr. Cobb of North Dakota, long associated with the state's experiment station work in the testing of trees suitable for the northern prairie region.

The "List" divides the country into seven climatically different regions and recommends for each region lists of deciduous and evergreen trees believed to be suitable for planting for various purposes. In all about 125 different native and foreign trees are recommended. Sections of the country most difficult to provide for are the Great Plains country, portions of the Southwest, and the Central and Southern Rocky Mountain regions. In the absence of extensive trials of but a few native cottonwoods, it is necessary, in offering extended lists of trees, to rely almost entirely upon a careful selection of foreign and native trees, not hitherto tried out in these trying regions, but trees whose native environments seem to make them suitable. The problem is an exceedingly difficult one to solve without painstaking trials. Deficient rainfall, high temperatures, and drying winds increase the difficulties.

Washington Barracks Trees

The Commanding Officer of Washington Barracks, Major Hansen E. Ely, called on the Forest Service for advice regarding the treatment and extension of the tree growth within the Barracks Grounds, which comprise approximately ten acres. The grounds were carefully gone over and instructions were given on the ground for the treatment of existing trees, and suggestions of trees for additional planting were made where needed. Recommendations were also made for the removal of decrepit trees and of others now suppressed or crowding useful associates. At the request of Major Ely, Mr. Sudworth appeared before the Barracks Board of Advisors in order to present the need of removing certain trees. The recommendations were approved.

An officer of the Quartermaster's Department has been given charge of carrying out the suggestions made, so that from now on a uniform policy of treatment will be applied. In the past no uniform policy of continuous care was adopted; in fact, little interest had been taken in the trees since they were planted, some time at the close of the Civil War. Some of the finest and largest silver maples are to be seen in these grounds.

ROCKY MOUNTAIN

January Activities

Roeser and Bates attended the meeting of the District Investigative Committee in Denver, January 18 and 19. This was attended by the District Forester, three representatives of Management, two of Operation, and two Supervisors who were in the office on details. The time was largely devoted to general discussions rather than the details of individual projects. Fire studies received considerable attention, Bates' proposal for an historical study as a basis for predicting probable bad years or cycles in the future, receiving no support, while Mr. Headley's suggestion of a thorough study of brush disposal in relation to fire hazard and to silviculture "went over strong." The Forester's suggestion of keeping the program down to a limited number of projects was also discussed at length, but it appears so obvious that many lines must be pursued, even though some are of less importance than others, that no change in the policy of the District need be considered. While in Denver, Bates broke over the fence and into the field of forest economics by participating in a debate on the forest taxation question.

Bates spent the greater part of the month on the program of work, but was able to get back on to the growth-study report during the last third.

Roeser made very substantial progress on the mapping of the station Forest. It has been found that the space on the map is not large enough to show more than the broadest features of the history of each plot or subplot, and that even for use in the field the map must, therefore, be accompanied by plot histories and facts in greater detail. For this purpose a complete

set of Forms 279 is being prepared, although this form is not well adapted to the purposes of a cumulative record. Compilation of the data on cut from the Forest shows that the station's fuel needs, and a very few ties made in one year, have required about 2,500 cubic feet per annum, and since the increment is at least 25 cubic feet per acre, it is evident that we should be selling more ties in order to use the increment from even the main 160 acres. However, the cutting policy will not be changed in this direction appreciably until better increment figures are available, there being as yet practically nothing for the south slope yellow pine stands.

February Plans

Bates will just about finish the growth-study report during the month, with some assistance from Roeser on the drafting of the necessary diagrams.

Roeser will complete his maps and cutting plan for the station Forest and may reach the project of working up all of the evaporation data collected, to show, primarily, the variation between different years.

SOUTHWESTERN

Pearson gave the greater portion of his time during the month to the meeting of the District Investigative Committee and to preparing the annual report of the committee. The session of the committee occupied four days, January 6 to 9. Most of the discussion centered around grazing, erosion, smelter smoke and brush disposal. Studies by both Forest and Grazing Research furnished parallel examples of the destruction of resources by continued overgrazing. Damage to watersheds and possibly to timber on the Coconino and Prescott Forests by smelter smoke came up for thorough going discussion. Preliminary investigations of both the erosion problem and the smoke problem were projected. Some interesting new data on the administrative aspects of brush disposal were presented by Junior Forester MacIntyre of the Coconino. This study will be continued another year. Reproduction of western yellow pine which has been a major project at the experiment station for eighteen years is now listed as a minor project, it being felt that the handling of this problem is now primarily a matter of administration. A yield study of western yellow pine was proposed as a new project.

Krauch is compiling data on the acceleration in growth of western yellow pine after cutting, with the object primarily in view of devising a method of applying this factor in determining the length of cutting cycles. It is believed that once the forests become well stocked with advance reproduction, acceleration after cutting will become less than at present, but it is likely to be an important factor in this District for many years to come.

PACIFIC NORTHWEST

January has been a time of practically uninterrupted office work for all hands. On one day all in the office, together with four volunteers from the District office, conducted an experiment on the aviation field at Vancouver Barracks in liberating some winged Douglas fir and hemlock seeds from a kite, 175 feet above the ground. A series of 20 large new canvases were spread at intervals to leeward to a distance of 1,600 feet from the kite. Three tests of about 25,000 seeds each were run, while the surface wind was 8-10 miles per hour. After each test the seed was gathered by men stationed at the canvases, and later counted. In two tests the most seed fell on the 850-foot canvas, in the other test which was probably the most successfully conducted, the greatest seedfall was on the 1,100-foot canvas,- and here it was at the rate of 80,000 per acre. Cutting tests showed that the proportion of sound seed was higher than normal closer in than 1,000 feet, and lower than normal farther away from the point of release. Publicity was given to this experiment because of its novelty and it has attracted some interest. A commercial airplane company offered to release some seed for us at any height desired and to loan us the use of their aerial photographic apparatus, without cost; we might have accepted the offer had we a greater supply of winged seed.

Isaac made the monthly examination of the seed catchers at Scappoose and still found freshly caught seed. A climb to the top of one of the big white firs revealed seed held by the stiff upturned needles and explained why this seed is still falling to the ground long after the cones have shattered.

Aside from a couple of days with Isaac on the Douglas fir seed dissemination experiments, Westveld devoted most of his time on the computation of the brush disposal data. A few days more will see the completion of the computations and the progress report under way.

In the early part of the month Simson spent a day at Wind River and found buildings and equipment in good shape except that several transmission wires from the weather station had been broken down by sleet.

The Wind River cooperative weather station celebrated its fifteenth birthday by getting out a climatological summary. It consists of thirteen pertinent tables and a few explanatory words by Simson, the compiler. A dozen or so copies have been sent to interested parties.

Simson completed a short report on the use of railway signal fuses in backfiring and burning out moss-covered trees. The fuses are convenient, safe and easy to transport, and moderately priced. Judging by the few experiments made last year they are of real value in certain phases of fire fighting. In any event it is felt they warrant further investigation.

After Simson's success in working out values to be applied in the minimum temperature forecast formula for Wind River Nursery he felt encouraged to attempt the development of a minimum relative humidity forecast formula. He spent a considerable part of the month on this formula using as a basis the 5 P. M. hygrometric data for the preceding day, thus trying for a 20-hour forecast. The office work is completed and thus far the formula gives promise of being of real value. It only remains necessary to run the formula through the coming summer's data and make corrections for certain minor factors.

McArdle was in Washington all the month, save two or three days on leave, and reports great progress in the final computations of the Douglas fir volume and yield table data.

The Minimum Requirements Report for the Douglas fir region (with a very brief section on Desirable Practice) was put in final shape by Munger, after review by several in the District office and one outsider, and sent back to Washington.

At the dedication of the 340-acre tract of woodland recently purchased for the O.A.C. Forest School, Munger gave an address on "The Forester's Laboratory." This school forest is to be called the Peavy Arboretum.

All existing experimental areas have been checked over and the District Forester has been requested to post on the Supervisors' tract books 10 areas on five Forests which contain long-time experiments. This will give the effect of an administrative withdrawal.

A memorandum on brush burning in the fog belt was furnished the District office on account of a problem arising in a pending timber sale. A 13-page very condensed statement regarding the organization, purpose and program of the station was prepared for the Advisory Council, which is now appointed and will meet February 12 in Portland.

All in the office have had a share in writing the annual memorandum for the Investigative Committee concerning the accomplishments of the past year and plans for the next. The committee meets February 15.

Miss Wertz has spent considerable time in certain clerical jobs incident to the New Year. She reports a minimum of equipment and books missing. Our automobile cost statement is particularly gratifying. Our two-year-old Dodge went 10,521 miles in 1925 at a cost of $.028 per mile. The new Ford ran 5,485 miles for $.019 per mile. Neither got particularly good mileage per gallon of gas - 14.0 for the Dodge and 16.6 for the Ford, but neither had any wrecks, major repairs or much tire renewal.

NORTHERN ROCKY MOUNTAIN

The annual meeting of the District Investigative Committee was held on January 11, 12, and 13. In addition to the regular committee composed of chiefs of offices, or their assistants, representatives were invited this year from the two forest schools of the region and from the western office of Blister Rust Control and the Forest Insect Station at Coeur d'Alene, Idaho. Dean Miller and Dr. Hubert represented the University of Idaho, Dean Spaulding together with Messrs. Skeels and Ramskill the University of Montana. Mr. Wyckoff and Mr. Evenden represented Blister Rust and Entomology respectively. It was not considered advisable to invite the state foresters of Idaho and Montana to the meeting this year. The committee and those that sat with it made up between 18 and 20 men. District Forester Morrell was chairman and Gisborne secretary.

The committee proposed no new projects for the experiment station. In accordance with the Branch policy of concentrating on a limited number of projects, it approved the experiment station's plan of confining its efforts in 1926 to the yield, methods-of-cutting, forestation, and fire studies.

The purpose of having representation on the committee from outside the Forest Service, of course, was to learn definitely what sort of forest research was being carried on by other agencies in the region, and to ascertain whether it would not be possible to secure better coordination and cooperation in the work. As we have known, the University of Idaho has been doing excellent work on the part of its faculty in the study of growth and yield of young stands and residual stands after cutting in several types in northern Idaho. There has already been cooperation between the Idaho Forest School and the Experiment Station to the extent of conferences in the field and in exchange of data. It developed that this work is not duplicating seriously the yield and methods-of-cutting studies of the Experiment Station, but rather supplements that work in quite an effective way. In the white pine yield study, for example, our efforts are devoted almost entirely to selecting fully stocked plots for a normal yield table. This is a big job in itself. The Idaho Forest School's efforts in this direction are devoted almost entirely to the taking of empirical strips and plots to determine the stand and yield data for conditions as they exist over large areas, such as watersheds. Moreover, this work is conducted entirely on state and private lands. This is also a big job and a very useful one, for it is as important to have accurate and detailed empirical information as it is to have the information for normal conditions. In the case of the University of Montana, such forest research as is carried on takes the form chiefly, of problems assigned to advanced students. The work here is not done on a very large scale so far as field work is concerned, and therefore cannot be considered in the same category as that of the Idaho Forest School.

In connection with Blister Rust Control, Mr. Wyckoff outlined a forest research project of considerable importance which he feels should be undertaken this year. His organization is charged with the administrative work of eradicating Ribes in the white pine type of northern Idaho. The problem is to know under what conditions of density and composition Ribes should be eradicated in young stands. Specifically, if a stand 20 years old has 15 per cent white pine, will the proportion be greater or less at 80, 90, or 100 years? What amount of white pine in young stands indicates an amount and value at maturity which will justify several costly eradication operations? This is really a considerable problem when it is realized that the so-called western white pine type contains 10 or more species in mixture, with white pine making up anywhere from 5 to 90 per cent of the composition.

Although it is recognized that the only certain way to study changing proportions of species in young stands is by permanent sample plots, the blister rust situation here is such as to demand the use of temporary methods giving the best information at the earliest date possible. As the Forest Service has not the money needed to undertake the study on the desired scale immediately, Mr. Wyckoff asked if the Experiment Station could not conduct it if Blister Rust Control furnished the greater part of the funds. At a meeting in Spokane two weeks later attended by Messrs. Morrell, Weidman, Wyckoff, and representatives of the two forest schools, it was decided that the proposal should be carried out. A recommendation to this effect was sent to the Executive Committee of the Western Blister Rust Conference (an advisory body of lumbermen and others) and to the Office of Blister Rust Control in Washington. This step was necessary to secure approval for the expenditure of funds in this way. Preliminary plans, methods, and estimates were also discussed. If these arrangements go through, the plan will be to begin the study next field season with one permanent man and about six field assistants. The cost the first year is estimated at $8,000 for field and office work.

Another matter decided upon at the time of the District Investigative meeting was to recommend the appointment of Dr. Hubert as a Forest Service collaborator to serve in the capacity of forest pathologist when needed for short consultations and field examinations. Steps have already been taken to secure the appointment through the Secretary of Agriculture. The basis is to be that of collaborator-without-compensation and with field expenses paid by the Forest Service. This arrangement is being made in lieu of the need of a full-time forest pathologist for this region. During three or four years efforts have been made, without success, to secure a full-time forest pathologist to take the place of Dr. Weir, who was formerly assigned to District 1. The present arrangement is made possible through a fine spirit of cooperation on the part of Dean Miller and Dr. Hubert of the University of Idaho. Dr. Hubert is especially qualified to act as a consulting pathologist here for the reason that he had a number of years' experience here as Dr. Weir's assistant, and, following that, valuable experience in the Forest Products Laboratory at Madison.

The office work in connection with the white pine yield study is now receiving Haig's attention. The phase of this that will require most time this winter is that dealing with volume tables to be used in the computation of the final yield tables. Unfortunately, it was found that the existing volume tables for practically all the species in the white pine type are very unsatisfactory for the purpose. For example, a preliminary check of the two most used white pine volume tables gave the following information: The volume table made by Miller in 1908 checked within 1 per cent on the Kaniksu Forest but was 16 per cent low for the Coeur d'Alene, 20 per cent low for the Lolo, and 25 per cent low for the St. Joe. The District 1 multiple volume table, by localities, checked out 11 per cent high for the Kaniksu, 3 per cent high for the Lolo, 6 per cent low for the Coeur d'Alene, and within 1 per cent for the St. Joe. By sites the multiple table checked out over 6 per cent high for Site I, and varied less than 2 per cent for Sites II and III. By age classes this same table checked out almost exactly correct for stands under 120 years, but was nearly 5 per cent high for stands over 120 years. The tables for larch and Douglas fir are based on a sufficient number of trees in each case, but checks have not been made as to their application in different localities and on different sites. There is no hemlock table, and the only spruce and white fir tables in the District have such a very small basis in number of measurements that volumes for research purposes in the case of these two species have been compiled by the use of District 4 tables. As a result of this situation, with regard to volume tables, it has become necessary to make a rather thorough investigation of all the volume tables before going on with the yield study. This will mean careful checking of all the tables by localities, sites, and age classes, and the remaking of tables where the study shows this to be necessary. This is the job ahead of us this winter. It is a satisfaction to report that the District is contributing two months of a ranger's time to help Haig on this work.

As secretary of the District Investigative Committee, Gisborne has been spending considerable time in the preparation of the annual investigative report and program. His activity on fire studies has been largely devoted to compilation and coding of the lightning storm data for 1925.

Wahlenberg arrived in Missoula this month for his winter detail in the office. He has already compiled his data on last year's field examinations and is now working on reports for publication covering several rather long-standing projects. One of these is to deal with the chemical weed eradication project. In this connection it is interesting to mention that Wahlenberg recently received a published report on the subject by Mr. Juhlin Danfelt, a Swedish forester, who visited the Savenac Nursery in 1924, and as a result of seeing our chemical weed eradication experiments there initiated similar experiments with zinc sulphate on his return to Sweden. It is significant to know that the results of one season's work have already been published by him. The Savenac treatment did not work out quite as well in Sweden as with us, and the moister summer climate is given as the reason therefor. The method, however, is believed by Mr. Danfelt to be well worth further trials, and the experiments are to be continued.

Another interesting item reported by Wahlenberg is the results of a planting experiment on different sites. In the spring of 1925 there were planted on the Big Creek burn of 1924, Lolo National Forest, 7,272 white pine trees of 1-2 stock. Not less than 465 trees represented each of eight aspects. The September field examination showed that the results ranked as follows in respect to survival on the different aspects: N 95%, NW 93%, NE 89%, W 86%, E 72%, SW 68%, SE 57%, and S 50%. So far as this particular experiment is concerned, these figures reverse our usual conception of survival on easterly and westerly aspects. Wahlenberg does not speculate as to the reason for this.

Marshall returned to Missoula from the Priest River Branch early in January. He is now engaged on a number of smaller but important office jobs which have had to be postponed for a long time.

Kempff spent most of the month in outdoor work connected with timber sales and felling and slash disposal operations on sample plots. The material removed and the costs in connection with one of these sample plots is worth mention here. This is a 1-acre plot in a 70-year-old stand on Site Quality I. The condition here was that of a thrifty stand with the bulk of the stems per acre in a general codominant crown level, but with a number of very large dominants standing 25 or 35 feet above the general crown canopy. Although these trees were not strictly wolf trees, they were what we might call super-dominants. In marking this plot for thinning last summer, it was decided to remove these trees, attempting thereby one of the objectives of Borggreve's method, namely, realizing the most profitable intermediate harvest and at the same time releasing a large number of valuable trees in the codominant stand to increase the value of the final cut at maturity.

The logging operation on this area, except for a 2-mile haul of the logs to the river, was done by men hired directly by the Experiment Station. The logs were sold on skidways, the buyer making deposits to both a stumpage and cooperative work fund; the latter fund covered the cost of the operation. The plot and its isolation strips 25 feet wide yielded a total of 15 M board feet cut from 99 trees. This averaged 9 M board feet per acre and 22 logs per M under present District standards of utilization. With New England or Lake States standards, the cut would probably have reached 12 M board feet per acre, using the Scribner Decimal C rule. A total of 47 per cent of the cut came from white pine, 33 per cent from larch, 8 per cent from white fir, 4 per cent from Douglas fir, and the remaining 8 per cent from miscellaneous species. The total receipts were $138.93.

Due to the precautions taken to secure as near a perfect experimental plot as possible, the cost of the operation was much higher than it would have been if it had been carried out on a larger scale. If this sort of thinning operation were to be conducted on a practical scale, it is believed that an operator could unquestionably realize a very fair profit and at the same time attain for the timber owner all the silvicultural advantages of

such a thinning. In the case of this plot there are still about 400 promising trees left in the dominant and codominant stand. The object, of course, is to learn whether these trees will so increase in growth as to make the combined value of this thinning and the final cut greater than would be the case if no intermediate cut had been made in the stand. Final cutting in either case would probably take place at about 100 years.

DISTRICT 5 - CALIFORNIA DISTRICT

January was largely a continuation of work begun earlier. Dunning worked on the data from the third remeasurement of the permanent plots, methods of cutting project. Show worked on the hazard and liability fire study, the summary of past nursery and planting experiments, and revised the logging and silviculture circular.

The District Investigative Committee met on January 12 and 13, with a large attendance. The two days were full of profitable discussion of the proposals for the program for the probable new station. In addition, the efforts of previous years were continued to correlate the programs of all offices doing research. Show prepared the final program, which was mailed well ahead of the closing date.

The usual amount of time was devoted to advising various administrative offices, furnishing information to various agencies, and trying to get help for the office work. At odd moments an article on fire damage was prepared for "Nature" magazine. Show spoke at a meeting of the California section of the society on the results of some of the fire studies.

At the close of the month Show and Kotok retired to write volume four - or thereabouts - of their fire studies.

NORTHEASTERN

A conference of state foresters and others interested in securing more complete and uniform reports of forest fires for the Northeastern states was held at Boston on January 26, and was attended by Dana and Stickel from the Experiment Station. There were about twenty at the conference, including representatives of the state forestry departments of New Hampshire, Vermont, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, and Ohio; representatives of the Branches of Forest Management and Research in the Forest Service; and a representative of the Home Fire Insurance Company. The entire day was spent going over in detail the recommendations made about two years ago by the joint committee from the Society of American Foresters and the Association of State Foresters, with special reference to the applicability of these recommendations to conditions in the Northeast, and to the report forms now in use. Substantial agreement was finally reached as to the items of fundamental importance which should be included in all forest fire reports, and Dana and Tillotson were asked to put these in shape for further consideration and criticism

by the state foresters with a view to their eventual adoption by the states concerned. In addition to these essential items, there are, of course, others of local interest which each state will undoubtedly desire to secure for its own information, and no attempt will be made to bring about the adoption of any standard form, the main object being to make sure that the really essential items are included by all of the states, and that all terms are used with the same meaning. It is believed that accomplishment of this object, which seems to meet with general approval, will greatly increase the value of fire reports for the region.

On the evening of the same day a conference of state foresters and Forest Service representatives was held under Mr. Peters' leadership to consider cooperation under Section I of the Clarke-McNary Act. The winter meeting of the New England section of the Society of American Foresters was held the next day and was attended by Dana, Behre, Westveld, and Stickel from the Experiment Station. The principal speaker was Mr. Headley, who gave a very comprehensive talk on the administration of the National Forests with special reference to the development of personnel.

During the month Dana spoke at the University of Michigan on "The Place of Research in the National Forest Program." He also attended the annual meeting of the Canadian Society of Forest Engineers at Toronto, where he gave an address on "The Aims and Opportunities of Professional Forestry Organizations." He also spent several days in Washington on matters connected with the administration of the station.

Behre devoted the entire month to the completion of material for preliminary volume tables for red and white spruce and balsam fir, and to the revision of his manuscript on the form class system. Preliminary computations on the data collected last summer were nearly completed by MacKinney, so that they can soon be combined with the 1924 material for final study. The preliminary analysis of the 1924 material as the basis for the volume tables to be used in Meyer's yield project gave rise to several interesting points. It appears from multiple correlation that the sum of the thickness of bark and the amount of butt swell at breast height, which was expected to be influenced to a considerable degree by site, is practically independent of this factor. The possibility of estimating the average form of stands from the number of trees per acre and height was also indicated rather strongly, and will be investigated further.

Since the counting of cores in connection with yield studies in both even-aged and cut-over stands is carried on in the office after the parties have returned from the field, Westveld desired to determine the amount of shrinkage in the cores due to moisture content. He therefore selected from his own and Meyer's collection fifty cores, varying widely in ring density, which were accurately measured at room temperature, weighed, and then placed in an oven for a period of 18 hours at a temperature of 208° F. The cores were again weighed and measured, and then immersed in water for a period of 48 hours, as it was assumed that saturating them would bring

them back to their original size. A remeasurement showed the shrinkage from saturation point to oven-dry condition to be 3.5 per cent; and from saturation point to room temperature and humidity conditions to be 2.4 per cent. However, the amount of shrinkage was so small that a modification of the calculations obtained by counting the cores at room temperature seemed unwarranted.

Dr. Spaulding finished his report on the preliminary investigations of the rotting of white pine slash, and perfected plans for cooperative experiments with entomologists with screened slash of spruce and balsam fir. The experiments will supplement the work started last season with white pine slash.

Dr. Spaulding spent ten days in Washington on manuscripts and library matters. Meyer was on leave the early part of the month, but made a brief visit to the Madison Laboratory and the Lake States Forest Experiment Station. Tillotson also spent the greater part of the month in the Washington office.

MacAloney completed a progress report on the white pine weevil study, and Stickel finished the chestnut replacement report.

Stickel spent part of his time on the ecology course which the station is carrying on for graduate students of the Massachusetts Agricultural College. The balance of his time was devoted to the fire studies which he is conducting with the assistance of Hall and Barrows.

SOUTHERN

General

Members of the staff were able to attend two distant meetings at great profit to themselves and to the work. Forbes returned from the annual meeting of the American Association for the Advancement of Science, at which he was the representative on the Council for the Society of American Foresters, full of enthusiasm and resolved not to miss another meeting of the association. He feels that the bringing together of scientific men in every field of endeavor, and from all over the United States results in a meeting of tremendous inspirational value. Attendance at this meeting cannot help but give the foresters a very valuable perspective, and make them feel that they are part of a single movement for the uplift of mankind through a study of the universe in which we all live. Forbes later attended the eighth Southern Forestry Congress at Richmond, Virginia, where he spoke on "Diameter Limit Cuttings in Southern Pine." He also attended in Richmond the meeting of the Appalachian Forest Research Advisory Committee and the Appalachian Section of the Society of American Foresters.

Wyman was at the Richmond Congress, in connection with a trip to Washington on other matters. He also attended the meeting of the Executive Committee of the Pine Institute of America at Jacksonville, where he was cordially received and promised certain rather expensive meteorological instruments for use in our 1926 work.

Going on from Richmond to Washington Forbes presented to the Branch the Station program for the current field season and obtained its approval with minor modifications. Lapsed salaries will permit us to employ two temporary men at Starke, and thus to hasten the completion of work under way. The chief modification in the program as a result of our conference with Mr. Clapp and Mr. Munns is a decision to establish a few additional permanent sample plots, probably in natural reproduction and fire studies, even at the expense of some of our extensive survey work.

Shivery prepared what we believe to be some very valuable contributions to the understanding of soils in our territory. These consist of a general introductory article on the soil classification of the Bureau of Soils, with special reference to the Southern Coastal Plain, a key to the soils of Louisiana, a key to the commoner soils of the Coastal Plain from North Carolina to Texas, and a key to all of the soils in that territory. It is a matter of deep regret to us that Mr. Shivery is leaving to become Extension Forester in Tennessee, but we feel he has left behind him a workable guide to future work in soils at this station. Wyman prepared an article for the agricultural journals and rural press containing a sample form of turpentine lease, modeled on that used on the Florida National Forest, and in which is embodied our latest knowledge of conservative chipping of second-growth timber. It was given a wide distribution from Washington. Forbes contributed a statement on the place of timber growing in the development of south Mississippi and east Louisiana to a publication of the Bureau of Agricultural Economics, which has been conducting a survey of the New Orleans trade territory with the object of quickening its development. Messrs. Critchfield and Johnson of the Bureau, who have conducted this survey, are fully alive to the possibilities of timber as a resource.

The annual property and library inventories have kept the clerical staff more than usually busy. However, Miss Spuhler found time to spend three profitable days at the Bogalusa-McNeill Branch Station, where she not only straightened out some matters relative to filing and administration, but had an opportunity to see on the ground some of the work with which she has become familiar through others during the past four years.

Student Assistant Hicks was compelled by ill health to leave us on the 19th. Mr. Roy A. Chapman, who has had considerable experience as a student assistant at the Pacific Northwest Station, took the place on January 1 of Mr. N. T. Barron, who had been offered a permanent position in the forestry department of the Great Southern Lumber Company. Both Barron and Hicks did excellent work for us, and we regretted to see them leave. Mr. W. W. Barnes, a student at the Syracuse Forest School, joined Wyman at Starke under the plans for expanded work in naval stores.

In the course of his northern trip Forbes called upon President Baldwin of the Missouri Pacific Railroad, a member of our Advisory Council. Mr. Baldwin is looking for a forester to encourage people in the territory of the railroad to grow trees, much as the agricultural agent of the line encourages them to grow farm crops and livestock. Forbes also spent a couple of days in Atlanta and LaGrange, Georgia, to discuss with officials of the Atlanta and West Point Railroad the possibility of establishing a branch station at LaGrange. The tract proposed for the branch site is 1500 acres of old fields owned by the Callaway interests, large manufacturers of cotton goods, whose mills center around LaGrange. This is in the Piedmont, and within 50 miles of Columbus, Georgia, which we are considering as location for a branch station.

Among a considerable number of callers have been Dr. A. E. Douglass of the University of Arizona, for whom we are endeavoring to locate sound stumps of very old cypress trees; Mr. W. F. Bond, who has charge of the state forests of Texas, and who spent some time both in the New Orleans office and at Bogalusa, getting acquainted with our work and that of the Great Southern Lumber Company; and Mr. John D. Rue of the Madison Laboratory. Mr. Wyman spent some time at Jacksonville and Starke with Mr. H. L. Baker of Mr. Peters' office, who at the request of the Florida Beautification and Forestry Society is making in Florida his first investigation of the forest fire situation in the South. The Bogalusa Branch was visited by the forestry class from the Louisiana State University by Dr. Austin Cary, and Mr. Bond.

Protection, fire

Demmon has been making a thorough examination of all of the extensive survey sheets to date, partly with the object of getting together available information for a press notice on damage by fires to mature timber, and partly as the basis for a systematic examination of what the surveys have shown to date, in all lines, and how we may improve upon them in the future.

Measurements

A little progress was made in gathering economic data for the pine bulletin. While in Washington Forbes assembled all empirical data which is likely to be of value and checked up on the present status of our computations for the pine study. Owing to his absence from the office and the necessity of devoting most of his time since his return to New Orleans to a consideration of Shivery's reports, Forbes has been unable to do any more actual writing on the bulletin.

Management

Demmon completed the compilation of the data on released growth on the Kaul tract, which was the meat of Forbes' paper at Richmond, and is working on the summarization of the extensive survey work to date, as has been mentioned elsewhere. Mr. Hicks made some progress on core measurements.

Shivery revised his report on the establishment of the Mc-1 study at Bogalusa, in the light of Forbes' comments. The preparation of this report has involved a great deal of hard work by both Mr. Shivery and Miss Regan. Owing to an unfortunate number of changes in personnel on this project there has been some wasted motion, and a post mortem by all available members of the staff was held in order to make sure that any future studies will benefit by our knowledge of the mistakes in this one.

Naval Stores

Wyman spent the first three weeks of the month in Washington, putting the great volume of data he has gathered this year on punch cards, and working out with the help of the Section of Computing and the punch card machine some very interesting correlations of yield with various tree factors. This is the first opportunity we have had to go to the bottom of the naval stores data, and has been made possible by the presence at Starke of a student assistant who could keep up the current work there. Mr. Barnes' arrival will make possible the prompt enlargement of our 1926 program, which will bring all our tests up to a size which statistical analysis shows to be necessary for reliable results, and which will involve the working of twice as many trees as we have ever had under observation before.

Forestation

This has been an extremely busy month for Wakeley and Chapman, under Hadley's general supervision. The beginning of our germinator seed tests has taken a great deal of time, both in and out of official hours. Wakeley is learning much about electrical apparatus which will stand us in good stead in the future. Seed testing with an artificially heated germinator such as the Jacobsen proves to be a very time consuming job, but we hope that the promptitude of germination which we are achieving will compensate for the time taken. Observation of the fall planted seed beds, and the lifting, measuring, drying, and weighing of 3,500 seedlings from last year's seed bed tests, have occupied the time between breakdowns of the germinators. Samples of seed for various collaborators in seed testing and for foresters in all parts of the world have been prepared.

Protection, others

Hadley spent the greater part of the month on the grazing project at McNeill, both in the field and office. He finds that the 1924 longleaf seedlings have survived in large numbers; the difficulty of distinguishing them on the ground has complicated the job of re-mapping the quadrats. Surer methods of protecting the Tate Lease from fire have been perfected at some expense.

APPALACHIAN FOREST EXPERIMENT STATION

General

The meeting of the Appalachian Forest Research Council at Richmond, Va., January 5, was well attended and much interest was shown in the station's proposed program for 1926. Frothingham and McCarthy represented the station, the latter presenting the plans for continuation of the station's two fire projects. The council endorsed, by resolution, the station's 1926 program, the work in forest pathology and entomology as outlined by Messrs. Gravatt and Craighead, and the Overman bill providing for an increase in the station's funds; requested the aid of the Secretary of Agriculture and of the Weather Bureau in the study of the prediction of forest fire weather in the Southern Appalachian region, and in the dissemination of these predictions; and recommended that a conference of timberland owners, operators, pulp and tanning extract manufacturers, shippers, and others interested in the industries using chestnut, be called to consider ways and means of salvaging blight-killed material.

The annual meeting of the Southern Appalachian Section of the Society of American Foresters was held at Richmond on the evening of January 5. "Forestry education in the grammar school grades" was the principal subject on the program. The officers of the section elected for 1926 are E. F. McCarthy, Chairman, R. S. Maddox, State Forester of Tennessee, Vice Chairman, and F. W. Haasis, Secretary-Treasurer.

Combined meetings of the American Forestry Association and the Southern Forestry Congress were held at Richmond on January 6 and 7. The Appalachian Station participated on the program by a paper on "The Regeneration of Southern Appalachian Hardwoods" by Frothingham.

At the conclusion of the Richmond meetings Frothingham spent two weeks in Washington and ten days on field work in Maryland. The annual report and program of the Appalachian Station was discussed in conference with the Washington office of the Branch of Research and District 7. In addition, it was agreed that a tract of about 1,000 acres in Bent Creek Valley, Pisgah National Forest, should be designated an experimental forest and withdrawn for this purpose.

Remeasurement of Loblolly Pine Sample Plots in Maryland, Mt-3

In cooperation with the Maryland State Board of Forestry, Frothingham, L. H. Reineke, of the Washington office, and J. M. Curry of the Maryland staff, made the fifth five-year measurement of permanent sample plots established in 1906 by G. H. Myers and W. D. Sterrett. About 72 plots were originally laid out, all but 13 of them in loblolly pine on the "Eastern Shore." The stands were even-aged and mostly young - from 3 to 18 years old when the plots were established - although a few were about 40 years old at that time.

The most interesting of the plots were those in which original densities of stocking were compared. From observations made during the measurement it appeared that up to the present time the stands which were originally densest had not developed as well as those of moderate density, though the trees in the originally thinly stocked plots were branchy and abruptly tapering. The size and vigor of the tree crowns when related to their diameter will doubtless throw considerable light upon the problem of the best initial spacing. Of the two important factors of crown development - crown length and crown width extension - the former is easily measured. Measurements of the lengths of the green crowns were accordingly made for samples of trees in the different crown classes, and these can be related to breast-high diameter when the notes on the plots are worked up for the successive diameter measurements. Since coniferous trees which have lost large parts of their crowns by crowding can regain rapid growth only by increasing their foliage, it is reasonable to suppose that quality increment of the stand can be forecasted from crown measurements, with reference both to the original stem density and to later thinnings.

A number of the plots were found to have been so badly cut into that remeasurement of the trees left was not considered practicable.

Fire Weather and Fire Damage Studies (Pf, B-2 and A-1)

McCarthy completed and prepared a report upon the work on fire weather conducted during the fall of 1925. He also compiled the fire damage data obtained on the Bent Creek fire of April 2, 1925.

Results of this damage study supported previous findings as to relative injury to various size classes, and makes evident again the predominant importance of wounds to ultimate yield. The question that must be answered is at what size is a wounded tree a total loss or worse than a total loss?

Forest Insect Investigations in 1925

During the summer of 1925 a determined effort was made by a group of entomologists working under the direction of Dr. F. C. Craighead to learn more of the activities of the southern pine beetle. Considerable experimental work was undertaken in an effort to induce attack on certain trees, to learn something of the attractiveness of these attacked trees, and to study the effects upon brood development of various treatments of the trees after attack. Most of the work was done on the Bent Creek investigative area, near the station's field laboratory. Mr. R. A. St. George was directly in charge, assisted by Mr. A. H. MacAndrews and, during September by Mr. J. A. Beal. Dr. E. J. Kraus, of the University of Wisconsin, gave much valuable help on physiological problems, and Dr. Craighead participated in the work at intervals during the summer. Dr. Craighead has supplied the following account of these studies:

"Although the results obtained are not at all conclusive, due to the limited amount of data which it was possible to collect and the necessity of confirming them in another season, they are very suggestive and tend to confirm previous theories.

"Previous observations indicate that there is a decided correlation between the occurrence of epidemics of the southern pine beetle and drought periods. Fortunately for continuing observations on this relation an extreme drought prevailed between May and August.

"Several local outbreaks developed during midseason. Two of these, of some 50-100 trees each, were within a hundred yards of the experimental treatments and the laboratory site. It is significant that, on these plots, previous to any attack on the pines, the hardwoods withered and shed their foliage. Some of the shrubs such as alders are to all appearances dead. In each case species of Ips killed several of these pines before the southern pine beetle attacked the plots.

"Between April 15 and October 15, four generations of the southern pine beetle were completed. During midseason the development of a single generation required from 37-40 days. Considerable attention was given to determining the ratio between attacking beetles and emergence. An average of all counts indicates that about 35 beetles attack per square foot and approximately 300 emerge. Thus an increase of over 800 per cent was shown and in many trees this exceeded a thousand per cent. With such possibilities of multiplication, the phenomenal increase of this beetle during favorable seasons is not so difficult to understand. We learned little, however, as to where the beetles are breeding during intervals between epidemics. No epidemic infestation in standing trees occurs and the beetles are rarely found in felled material or slash.

"In an effort to induce attack, a series of trees was girdled by various methods and others felled throughout the season. Another series was scorched with a blow torch, a third treated with salt, but in no case were these trees attacked. Some overwintering beetles were found in logs cut the previous August. These trees had been defoliated by fire the preceding spring. Also one large tree which was felled near camp in mid-June was attacked. These are the only authentic records which we have of this beetle breeding in anything but standing trees.

"To study further the effects of drought in inducing attack a group of trees was selected on top of a knoll and a trench was dug around them. A tent was then erected about four feet above the ground which shed practically all the light rains during the summer. Late in the season during the height of the emergence from infested trees in the neighborhood, 3 of these trees were attacked - one was killed but on the other two the attack was unsuccessful. The selection of this plot is all the more significant since it occurred in mid-October after a month of normal rainfall, and although millions of beetles emerged from surrounding trees, no other green trees were attacked.

"Large numbers of living beetles were caged on 5 trees representing various degrees of vigor. No attraction for outside beetles was produced except in the case of one tree on the drought plots.

"Analysis and comparison of unattacked and attacked trees showed that at the time of attack the moisture content of the phloem and leaves was several per cent lower than on the checks. The sap density of the phloem of drought plot trees was also considerably higher than checks. Moisture determinations of cross sections of the stem of infested trees indicated that above 5 feet the wood rapidly dried while the water content increased below. A dendrograph operation during the summer showed a cessation in growth in late July and mid-August which period coincided with the concentrated attack in several group killings in the surrounding country.

"Several attacked trees were decapitated just above the infested length immediately after attack and others were severely pruned, removing all branches except the terminal whorls. Both these methods resulted in effective brood mortality and on adjacent unattacked trees which were severely pruned no attacks developed.

"Considerable attention was paid to the development of blue stains on the attacked trees. There is an interesting field for further study on this phase of the problem. It is quite probable that a close symbiotic relation exists between the development of the beetles and these blue stains and in fact it is suggested that the mycelium of these fungi which rapidly penetrate the sapwood may be an important agent in quickly killing the tree. Trees girdled and bark-stripped to simulate bark beetle girdling have as yet failed to succumb to the treatments."

MANUSCRIPT NEWS NOTES

Northern Rocky Mountain

Western Larch Nursery Practice. W. G. Wahlenberg (J.A.R.).

Lake States

Effect of Drainage of Swamps upon Forest Growth. Raphael Zon. (Delivered before National Drainage Congress at Oklahoma City, January 19, 1926)

Southwestern

Results of Nursery and Planting Experiments Conducted on the Santa Fe National Forest. Herman Krauch (Galley proof, J.A.R.)

Appalachian

Results of Damping-off and Weed Control Experiments, Fibreville Nursery, Canton, N. C., by F. W. Haasis. (Mss.)

Report on Work on Sample Plots 3, 4, 5, and 6, near Liberty Furnace, Virginia, in the fall of 1925, by F. W. Haasis. (Mss.)

The Regeneration of Southern Appalachian Hardwoods, E. H. Frothingham. Read before the American Forestry Association and the Southern Forestry Congress at Richmond, January 7. (Mss.)

The Influence of Weather on Inflammability of the Forest in the Southern Appalachian Region. E. F. McCarthy. (Mss.).

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Bates, C. G. Common sense in growth studies. (The Colorado Forester, 1925.)

Bruce, Donald. Some possible errors in the use of curves. (J.A.R. Nov. 15, 1925.)

Bruce, Donald. The need for a new log rule. (Timberman, Dec. 1925.)

Forbes, R. D. Diameter limit cutting in southern pine. (Southern Lumberman, Jan. 16, 1926.)

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Munns, E. N. Timber growing and protection from fire (Southern Lumberman, Dec. 19, 1925.)

Munger, T. T. Recent evidence affecting reforestation theories. (Timberman, Dec. 1925.)

Osborne, W. B. Fire weather forecasting and humidity studies. (Timbermen, Dec. 1925.)

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