

1917-18 Report

THE HARVARD FOREST

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A notable contribution to the resources of the Institution was made by Professor Oakes Ames in his donation of his collection of economic plants to the University. This collection, brought together by Professor Ames from all parts of the world with great enthusiasm and at considerable expenditure of time and money, comprises a surprising number of specimens very compactly arranged and carefully labelled. The student of economic botany is thus enabled to study not only the plants from which our foods, textiles and building materials are derived but also the products themselves.

The activities of the teaching staff of the Bussey Institution have been largely a continuation of those recorded in my report for 1916-17, but the publication of results, notwithstanding the shortage of paper and dearth of labor in printing establishments since the beginning of the war, has been more extensive than during any previous year of the Institution's history. Professor Castle has continued his genetic researches on the small mammals with the aid of a grant from the Carnegie Institution and on the dairy cattle of the late Mr. T. J. Bowlker at South Framingham, Mass. For reasons of economy Professor East discontinued his experiments on the hybridization of *Nicotiana* species and devoted part of his time to writing and publishing several important papers on sterility in plants. Professors East, Ames, and Bailey continued and amplified their work in connection with the Botanical Raw Products Committee of the National Research Council. Dr. R. W. Glaser made progress in his investigations in insect diseases in coöperation with the Federal Bureau of Entomology. Professor Brues published several papers on parasitic Hymenoptera and was of invaluable service in assisting the students in their laboratory work. Much of my time was devoted to completing the manuscript for two volumes, one on the behavior of insects and one on the ants of the Belgian Congo.

In conclusion I beg leave to include Professor Fisher's report on the work carried on under his supervision in the Harvard Forest at Petersham, Mass.

WILLIAM MORTON WHEELER, *Dean.*

REPORT ON THE HARVARD FOREST

During the past year the exigencies of war time have continued to restrict the functions of the Forest. The work of organizing farm production for the town of Petersham, undertaken for the Committee of Safety in April, 1917, has expanded considerably and

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during the present crop season has taken the greater part of the Director's time. There was an increase of over eight hundred bushels of grain over last year's yield, of which nearly three hundred were wheat. On the Harvard land itself, more acreage than last year was devoted to farm crops, principally beans, wheat and potatoes. The Milton Boys' Camp repeated its service of 1917 with still greater satisfaction to its employers; and for the town as a whole the production of staples, particularly grains, was more than doubled.

In forestry proper, the work of the year has been limited to the necessary routine of woods operations, maintenance of records, etc. With the end of the fiscal year 1917-18, the forest found itself for the first time with its equipment all paid for and a cash surplus on the Treasurer's books. This will go partly into repairs to buildings and partly to improvements and experiment in the woods. In addition to its own investigations, the Forest was able to offer the Government material for a field study relating to the control of the white pine blister rust; and the Bureau of Pathology has covered nearly an acre with experimental chemical treatments for the eradication of wild currant. Also, during the summer the elimination of all *Ribes* (wild and cultivated) in the town has been about half completed. The technical records of forest work, always difficult to keep up with and always expanding, have been brought very nearly up to date. In this task, great assistance has been rendered by Mr. E. I. Terry, exchange professor and research student from the University of Colorado, who is still at the Forest completing his investigation of last year. Two other students are pursuing research in forestry, one working in Silviculture and Management at Petersham, and the other in Dendrology at the Arboretum. The character of the positions offered students upon leaving continues to demonstrate the value of advanced training and specialization.

The Director has published during the year the following papers:
"Silviculture for Country Roadsides." Bulletin 123 of the Massachusetts Forestry Association.

"The Yield of Volunteer Second Growth as Affected by Improvement Cutting and Early Weeding." *Journal of Forestry*, May, 1918.

R. T. FISHER, *Director*.

REPORT ON THE HARVARD FOREST

On the organized forests of Europe it has been customary to revise the figures upon which the management is based once in ten years. This period having now elapsed since work began at Petersham, it is timely to make a summary not only of results in respect to accomplishments on the Forest itself, but also as regards research and the professional progress of graduates.

The job of revising the working plan is now nearing completion. It involves remapping the whole tract so as to show, for comparison with the conditions of ten years ago, the location, area, and age, of each forest type (or kind of growth). Additional computations furnish the present total volume of standing timber and the amount of wood increment now annually produced by the whole Forest. Final figures are not yet ready but the following are approximate statements of results: by the planting of eighty (80) acres of waste or vacant land, and improvement cutting on about one hundred and twenty (120) acres of inferior young growth, two hundred (200) acres of productive forest have been added to the property. Since ninety per cent of all areas from which mature timber has been cut have been satisfactorily reproduced to young crops, this means that without impairing the forest capital, the total annual wood production has been increased by at least seventy-five thousand (75,000) board feet.

Financially, the Forest has been self-supporting. A loan of four thousand dollars (\$4000) for initial operating expenses has been repaid, equipment, including horses, machinery, tools, etc., has been bought and maintained, and the upkeep of the dormitory and headquarters building has been met. A small surplus also has recently been available for experimental work and permanent improvements in the Forest. A great many expenses have to be provided for that are not properly chargeable to the woods operations; if these are deducted, the average net income would be from two to three thousand dollars a year.

As regards contributions to the knowledge of forestry, the Harvard Forest is beginning clearly to show the fruits of that continuity of experience which is essential to sound conclusions. Aside from a number of investigations of special problems, the results of many of which have already been published, the chief aim has been to find out by actual test the most effective and practical means of renewing a forest crop. Until such a method is defined

and proved, for each region of similar forest conditions, the adoption of forestry by private owners cannot be looked for. Ten years of experimental work in Petersham have produced a scheme of cuttings that is successful and reasonable in cost; and the Federal Forest Service, now making a special effort to stimulate forestry among timberland owners, has asked for a statement of methods and results in use on the Harvard Forest. This material will shortly be published under the title, "The Management of Second Growth White Pine in Central New England."

Investigative work now being conducted by students at the Forest relates to the following problems: the yield of second growth hardwood timber; the results of forest planting in New England; the life history of a destructive snout beetle, *Hylobius pales*. In all of these studies much of the material, hitherto unused, has accumulated incidentally to the recorded operations on the Forest.

The progress of former students in their professional work has shown not only the value of an organized forest as a training ground, but also the added importance of the research which has now replaced the general course. The distribution of employment among the graduates indicates the result of the special emphasis which has been placed upon the use of the Forest as a laboratory. Nearly half of these graduates are in the service of lumber companies or in consulting work; the rest are employed by the United States Forest Service, State Departments, Forest Schools, and City Governments. Of the Harvard foresters who enlisted for service in the Forestry regiments in France, nearly all were detailed to the important Department of Acquisition which located the logging operations in advance for the saw mills. Those men who have taken the specialized work of the last three years have all obtained notably better paid and more responsible positions at the start than did the graduates under the old plan. At the beginning of 1918, men who got their training at Petersham were collectively in charge of approximately five million acres of timber land in the United States.

During the past summer an important piece of protective work was carried out on the Forest. In view of the possible spread of the White Pine Blister Rust, the Federal Government, the State Department of Agriculture, and the Harvard Forest coöperated to eradicate from the woods all currant and gooseberry plants which are the alternate hosts of the disease. A fund of \$2000 was appropriated for the work, \$1000 from the Government, \$500 from the

State, and \$500 from a donation on behalf of the Harvard Forest. The fieldwork was in charge of C. C. Perry, M. F. 1914. At the close of the season the eradication had been completed over the whole of the Harvard land, which is thus reasonably insured against extensive infection.

R. T. FISHER, *Director.*

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During the past year, the public relations of the Harvard Forest have been considerably widened. More than fifty persons, mostly foresters and lumbermen, have visited Petersham to study the methods and results of applied forestry. The Director is serving the following outside organizations: Chairman of the Committee on Research of the National Conference of Forest Schools; Committee of the New England Section of the Society of American Foresters on Methods of Growth Measurement for the Forests of New England; Chairman of Sub-Committee on Trees of Mayor Peters' Committee on the Expenditure of the Parkman Fund; Committee on Forestry of the Boston Chamber of Commerce; in charge for the U. S. Forest Service of permanent sample plots at South Lancaster, Mass.

In addition to these general enterprises, an arrangement has been made with the State Forester of Massachusetts, Mr. William A. L. Bazeley, for a coöperative study of the white pine weevil in relation to forest management. In spite of the wide prevalence of this insect, especially on plantations, there is little exact information, either as to the ultimate damage it produces in a timber crop, its distribution as affected by the composition of the forest and other natural factors, or any silvicultural measures by which its depredations may be controlled or minimized. It is possible that the damage to the final yield in timber has been overestimated; possibly, too, the spread of the beetle can be checked by regulation of the species represented in the stand. To investigate these questions, Mr. H. B. Peirson, a forest entomologist, now working on the Harvard Forest, has been appointed by the State Forester, a Collaborator of the Division of Forestry. He will carry on a considerable part of the work at Petersham, but the State Forester has provided means for him to visit also a large number of localities throughout the state, so that the infestations of the weevil can be studied under all conditions. In view of the large program of reforestation which the state is undertaking, it is highly important to find out in advance to what extent planting plans and methods of treating existing young woods can or should be modified to meet so apparently destructive a pest.

Other new projects now being carried on by research students at the Forest are the following: The mound building ant as affecting coniferous plantations; the yield of red oak and white ash under

intensive management; quality increment in white pine as related to utilization and market value. "The Life History and Control of the Pales Weevil," by H. B. Peirson, is now in press; "A Growth Study and Normal Yield Tables for Mixed Hardwoods in Central New England," by J. N. Spaeth, was published in November of the present year. These and subsequent publications are being brought out through the Harvard University Press as bulletins of the Harvard Forest.

The physical development of the Forest and its display of varied phases of applied silviculture have now reached the point of warranting an adequate description in print. With the figures and results available from the remeasurement of the volume and growth of the Forest, completed in 1919 and summarized in the last report, a booklet is being prepared on the history of management for the first ten years. With maps and photographs, this will serve also as a guide to all phases of technical forestry which are being conducted on the Forest.

R. T. FISHER, *Director.*