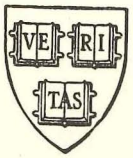
HARVARD FOREST
HARVARD UNIVERSITY



PETERSHAM, MASSACHUSETTS

AFTER thirty years of fruitful experiment and practice in the science of forestry, the Harvard Forest is planning to analyze and publish the results of this work. This study, based on a case by case analysis of a very large number of diverse forest cultural operations, will be a unique and valuable contribution to the growing science of silviculture — the science by which our great American forests can be made to contribute permanently to our economic welfare and to the beauty of our land.

This study will also form a scientific memorial to the late Richard Thornton Fisher, founder and director of the Harvard Forest until his death in 1934, for it will present the cumulative results of his years of patient experiment and of his deep insight into the complex nature of the forest as a living organism. Such experiment does require patience, for the life-span of trees is greater than that of men; and any experiment covering that span must be carried on by successive generations of scientists.

The Harvard Forest is the oldest experimental forest in the United States. For thirty years it has been studying the complex laws of forest reproduction and growth, demonstrating practical continuous forest management, and at the same time training postgraduate students in these and allied aspects of the forest problem. It is now high time to pause and gather the fruits of this generation of work. There is a growing public recognition of the urgent need of wisely managing our forest resources. Such management requires a sound technical basis of scientific silviculture, and to make available the proposed case study of Harvard Forest silvicultural experiments will be a signal contribution in this field. It will also be most helpful in guiding the future experimental work of the Forest for years to come.

Much detailed work is required in assembling and analyzing all the written records and in following them up with field analysis. A beginning has been made this summer, but to carry the work forward during the coming academic year, financial help is needed to employ technical and clerical help.

The Harvard Forest, therefore, appeals to you and all other friends of the Forest and of American forestry for contributions toward a fund of $2,500 for this purpose.

Checks may be made payable to William H. Claflin, Jr., Treasurer of Harvard College, but should be mailed to the Director of the Harvard Forest, Petersham, Massachusetts, together with the enclosed card.

HENRY S. MORGAN, *Chairman*
JOHN S. AMES
LAIRD BELL
DR. GODFREY L. CABOT
MRS. R. T. FISHER
HENRY S. GRAVES
GEORGE JEWETT
T. CATESBY JONES
DR. ROGER KINNICUTT
RANDOLPH PACK
LAWRANCE W. RATHBUN
WILLIAM P. WHARTON
FREDERICK WINSOR

Committee appointed by the Overseers of Harvard University to visit the Harvard Forest.

ELMER D. MERRILL
Administrator of Botanical Collections Harvard University

WARD SHEPARD
Director of the Harvard Forest

Moose Hill Farm
Sharon, Mass.

Oct. 15, 1940.

Dear Dr. Merrill:

I am returning herewith your Foreword to the 30-yr. report. I regret the delay but my farm duties have been all time consuming of recent date.

There is nothing I can offer to the present draft by way of criticism or additions. You have covered the field adequately and have done an admirable job in composition.

Many thanks for the complimentary copy of 'Merrilliana' I am reading it in my spare time with great interest.

I am planning a trip to Boston within a few days and I will call on you at the Arboretum.

Sincerely

Lutz

MOOSE HILL FARM
Sharon, Massachusetts

HENRY P. KENDALL
Proprietor

RUSSELL J. LUTZ
Manager

Farm Office
562 SOUTH MAIN STREET

23 Oct. 1946

Dear Dr. Merrill:-

Enclosed is a reasonably clean copy of "Authors Acknowledgements" for the 30-yr Report. Cline made rather drastic changes on my original, but I think -- all for the best. At best, it was a difficult thing to write & I do hope there are no omissions. If you consider it acceptable, please attach it to the manuscript.

I will be available at any time if my help is needed to push the publishing of the Report.

Dr Roach
This showed to
have been sent to
you direct. So it is OK
as far as
concerned. I have
acknowledged receipt — J.L.

Sincerely
Lutz

FOREWORD

The land holdings that form the Harvard Forest were acquired in 1907, and ~~frustry~~ forestry operations were commenced in 1908. This document was originally planned to summarize the results of silvicultural practice in the form of a thirty-year report, but here we have an illustration of the proverbial saying: "Man proposes but God disposes."

In September 1938, the end of the thirty-year period, the Harvard Forest was subjected to the most destructive hurricane in the recorded history of central New England. At least two-thirds of the merchantable sawtimber on the Harvard Forest holdings was completely uprooted or left as broken stubs. It is here recorded that from the fallen trees, within the following two-year period, about 6,500,000 board feet of lumber was salvaged and sold, the equivalent of the allowable annual cuts of nearly fifteen years, and about 2,000 cords of fire wood. Thus it was that many years of lumbering operations were telescoped into a single year. It may be mentioned that as originally projected the Harvard Forest was, in part, to be supported on the basis of sustained production which involved the annual cutting and sale of a predetermined amount of timber approximately equal

to the growth. While in the beginning the Forest was preponderantly white pine, which had seeded in on abandoned farm land, thirty years later there remained only two small remnants of this cover type. Such were the cumulative results of systematic cutting over a period of thirty years under a policy of sustained yield management, and the onslaught of a most destructive hurricane. It is now believed that the hurricane destruction was not actually so catastrophic as it at first appeared, but that rather, in the long run, it may prove to have been a blessing in disguise. Fortunately, none of the young stands following the removal of old field white pine or old field hardwoods, which form the basis of this report, suffered heavy damage. Even the oldest stand, described in case No. 1, resulting from the first cutting in the forest under Harvard University ownership and management, was only slightly harmed.

Thus it was that a natural phenomenon emphasized the end of a thirty-year period in no uncertain manner. In spite of the fact that for two years the limited resources of the institution had to be devoted to the tasks of salvage and rehabilitation, and the solution of problems raised by the hurricane devastation, this report was well

advanced when the catastrophe of the world war broke upon us. During the war period, with key members of the staff absent on special war duties or actually in the service, all work had to be suspended. It was these two factors, a hurricane and a war, that delayed the completion of the manuscript, work on which had to be deferred until well after the close of hostilities in 1945.

This report has been prepared and is presented for the purpose of showing what was done and what happened in a series of specific cases. The experience of over thirty years has amply shown that silvicultural practice, even in a single region, cannot be reduced to a manual of rules for general use. Once a firm ecological basis has been established, most rapid progress in an understanding of the art of silviculture, as locally applied, follows from an intensive study of actual cases of treatment applied and results obtained.

In the ~~fifteen~~ fourteen case histories covered in Part I, silvicultural treatments have been carried through the establishment period, thus bringing into play planting, weeding, improvement cutting, early thinning, and special insect and disease control measures, as well as methods of natural reproduction, applied under varying conditions of local

climate, soil, and land history. The cases were chosen as being representative of stands of old field origin ocurring in the Harvard Forest and the treatments applied in their conversion. They do not cover all the old field conditions found in the region, and the results therefore cannot be elsewhere applied without due modification based on an understanding of different environmental and historical factors.

In 1907 nearly two-thirds of the Harvard Forest supported stands of old field pine; and the equally common occurrence of this forest type throughout the region gave rise to a large and profitable outlet for pine lumber. Thus practically all early silviculture centered around the cutting and conversion of second-growth pine. The Harvard Forest was one of the very few places where methods other than clear-cuttings were tried and records of the results preserved. Here may be emphasized the importance of keeping accurate and detailed records, for if this had not been done from the beginning, the cases that are considered in detail in this document could not have been presented.

These cases illustrate the ease with which mistakes can be made in the beginning stages of forestry practice. The pioneer American

foresters could not be expected to know all the answers, having no factual background on which to rely other than their observations abroad. They had to learn by trial and error. That silviculture is an exceedingly complex and exacting art when properly applied in the transition zone of central New England will be obvious. It is easily understood why the undertakings of amateurs have in so many instances turned out unfavorably. The results herein recorded will serve best as guides to trained foresters who are endeavoring to develop sound silvicultural practices under conditions that are more or less similar to the Harvard Forest area.

Also illustrated, most strikingly and convincingly, is the soundness of the basic philosophy of working in harmony with nature, so ably developped and championed by Richard Thornton Fisher, first director of the Harvard Forest (1907 - 1934), in laying down an ecological foundation as the only secure base on which to erect a structure of silviculture which will stand the tests of time and economic practicability. Almost without exception, the success or failure of the treatments carried out may be directly measured against the extent to which they departed from this basic philosophy. The

costly and futile efforts to establish coniferous plantations following the clear cutting of old field white pine on heavy upland soils bring into sharp focus the disappointing outdome of a one common silvicultural practice which failed to take into account the natural succession in the basic vegetation. It is demonstrated over and over again that white pine does not naturally follow itself on certain types of soil, but that the succession is pine to hardwoods.

While old field white pine is largely a thing of the past, the experience gained at the Harvard Forest in its conversion to stands of mixed composition and greater stability will find wide application to many pure coniferous plantations which have been established in New England and elsewhere, on both cut over and open land, particularly where these plantations occur on the heavier upland soils naturally adapted to hardwoods. Furthermore, much of the knowledge gained in the silvicultural treatment of the volunteer stands following the cutting of old field pine will be directly applicable to thousands of acres of forest of similar origin now composed of varying mixtures of pine and hardwoods in the formative stage, when weedings, thinnings

and similar cultural operations are most effective and profitable.

In this report the costs of cultural treatments applied to young stands following the harvesting of old field stands are given in man-hours per acre. Final costs and returns cannot be determined because the stands have not been carried beyond the formative period, approximately the first 25 years. Time alone will tell how well such treatments as weeding and thinning will pay under the conditions prevailing in central New England in the twentieth century.

Thus it was that the year 1938 marked the end of the first thirty-years of forest management and experimentation in silviculture at the Harvard Forest, and, coincidentally, a major natural catastrophe, the hurricane, followed by the most devasting war in history. Because of the extraordinary damage, this thirty-year period may now properly be looked upon as an era in itself, characterized by the gradual development of a basic philosophy and the testing out, largely on a trial and error basis, of theories founded for the most part on European forestry experience. It is singularly timely to bring together, in the form of what might be termed a progress report, the results of some of the more significant experimentation in silviculture obtained in this thirty-

year period.

This thirty-year report will be published in three parts. The first part, the present bulletin deals with fourteen selected cases appertaining largely to problems associated with the white pine. Parts two and three, both nearly ready for publication will deal with (1) the application of shelterwood and selection methods of cutting to stands on land continuously in forest, and (2) the Harvard Forest plantations.

The authors are well-qualified for this difficult assignment. Albert C. Cline became a member of the Harvard Forest staff in 1924, serving as assistant to Director Fisher until the latter's death in 1934, and later becoming director of the Forest. Russell J. Lutz joined the Forest staff in 1938 as assistant to the director, and was responsible for compiling the case histories and bringing them up to date by field observations and measurements.

June 30, 1946

E. D. Merrill
Administrator of
Botanical Collections,
Harvard University