

## A NOTE ON HARVARD FOREST SILVICULTURE

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Messrs. Preston and Woolsey in their debate on American silvicultural practice during the past quarter century have made some stimulating points. Such in my case are the references to the Harvard Forest (May and June Journal, pp. 497 and 501), which suggests in the first place that an intelligible summary of what Woolsey calls "the most intensive attempt at intensive silviculture" has never been set forth, and second, that certain regional and strictly local factors in the problem have not been sufficiently appreciated.

At Petersham in sixteen years of experimental groping we have reached the conclusion that the principal cover (present) types must usually be converted into a different composition before any consistent and enduring method of natural reproduction can be defined. Especially does this apply to the white pine type. *Temporarily*, and because of its usual old-field origin, the most uniform type in the region, it exhibits as it nears merchantability a wide range of tendencies toward altered composition and productiveness. Our struggles with this type very forcibly indicate how elusive is silvicultural practice in man-made types.

Woolsey's friendly references to Harvard Forest policy do not quite give the whole story. He says that "the main lesson from the Harvard Forest is that the practice of silviculture means living with the forest, learning its several stands,—” Yet he does not seem to interpret our varying treatment of the pine type as a consequence of this observed variability in the individual stand, nor does he appear to realize that we are aiming at the very thing that he advises, namely, mixtures of softwood with the more desirable species of hardwood in proportions varying with the character of the site. The following are his comments on our methods: "—the attempts there to get natural regeneration of softwoods have been made successful by *planting!* Probably this was poor silviculture—should not the Harvard Forest have been content with hardwoods with a sprinkling of softwoods? At Harvard, there is some silviculture to be seen, but I wonder if the real cost of such intensive work is appreciated. Couldn't relatively satisfactory results have been secured with less planting and more natural regeneration? For a time at least the objective was to get

conifers in opposition to hardwoods. Perhaps today Fisher would welcome more hardwoods."

In Harvard Forest Bulletin No. 1, published in 1921, the following sentence occurs: "It has now come to be the settled silvicultural policy to reproduce the pine type with a stand of mixed pine and hardwood." In arriving at and developing this main purpose we have cut some three million feet of pine sawtimber. For a time, as Woolsey says, "the objective was to get softwoods in opposition to hardwoods." From this point of view and in earlier years we made many and instructive failures, but in sum total we have got over ninety per cent of our annual cutting areas reproduced to sawtimber species either mixed pine and hardwood, or pure hardwoods, in the proportion of about four acres of the former type to one of the latter.

It is true that on about half of the areas reproduced to mixtures of pine and hardwood we have secured the pine by planting. This, however, is not because we have failed to get natural reproduction, but because we have found that in certain conditions of stand and on the heavier soils it is cheaper and surer to start pine by planting in groups than by the shelter-wood method, which has proved successful on the lighter soils where hardwood advance growth is not abundantly present.

As to the hardwoods, we do welcome them, not only for the excellent reasons that Woolsey gives elsewhere in his article, but because on the sites where hardwood reproduction is already plentiful under pine and therefore obtainable with the minimum cost, it would be folly to try to reproduce pine. What our silviculture has boiled down to in sixteen years of experiment is first, the determination of the desirable type or species for the land, and second, the selection of the methods which for a given set of conditions will most cheaply and effectively create it.

It is a fair question which Woolsey raises, whether the "real cost of such intensive work is appreciated" and therefore justified. Intensiveness in forest management is a purely relative term. Whether a given method is too intensive or not depends upon the value of the yield which is brought about. A well stocked acre of the type the Harvard Forest is aiming to produce is worth even at present prices from \$600 to \$800. With such a gross return in prospect and not considering the probable higher stumpage of a generation hence, it seems to us that, here and for these conditions, to pay the cost of intensive silviculture is merely good business.

My justification for offering these amendments to Woolsey's comments is that I think our experience at Petersham begins to show what the development of real silviculture in a new country actually means. In the first place, it is plainly and first of all a regional problem, and beyond that it is even a problem of minor localities, of individual stands. The importance of economic factors is obvious and for the moment can be set aside. The natural factors which alone concern the technique of silviculture are in central New England obscured and modified or temporarily altered by two centuries of human influence and varying use and abuse of the lands on which the bulk of the forests now stand. Roughly speaking, all our forests are either transitional or undesirable as to composition. They do not represent the free play of silvical factors, but rather the accidental result of past treatment of the land. The pure pine type, for example, occurs on every type of soil, but can be maintained by natural reproduction on relatively few. In short, if silviculture means the maintenance of desirable timber crops, then its proper development presupposes a preparatory stage, a period during which in all the complexities of temporary factors and accidental compositions, the desirable type must first be identified and then brought into existence. Many of the most valuable of our present cover types can not profitably be perpetuated because they do not belong where they are and because other types do. You can not talk about silviculture in the sense of controlled natural reproduction until you know that the type in question can actually maintain itself without undue assistance under management.

If it is true, as seems to be the general impression, that silviculture even for New England is still relatively undeveloped, then it is time that foresters should more clearly appreciate the nature of the problem. In New England we face a condition, not a theory, a condition of forests which will not behave consistently under treatment, which are full of undesirable elements, which exhibit contrary tendencies with the same composition, in short, forests that have got to be altered, converted, or got rid of. That is the first part of the problem, and that is the part which compels most first steps in silviculture to be compromises and makeshifts. The second part of the problem is to find out by experience in management and ultimately by more fundamental research, as we believe we have found out for certain sites on the Harvard Forest, what in fact are the desirable, the permanent, the self-maintaining types of forest. Inevitably this second phase of the problem has had but little attention because of the pressure for results,

the necessity for methods that will pay *now* on a particular property. There is a third and final problem in the life history of our silviculture that most of us today will hardly live to see. That will come when we have converted our present types into the ultimate or ideal types. It is then if our fundamental determinations have been sound, and if our woods experience has been sufficiently prolonged and localized, that we may hope to possess and apply a roughly standardized system of natural reproduction to a relatively standardized forest type.

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COMMENT BY T. S. WOOLSEY, JR.

I have read Fisher's statement on Harvard Forest Silviculture. I am thoroughly in sympathy with his "Varying treatment of the pine type as a consequence of this observed variability in the individual stand," but I am not convinced that it is the most profitable method. I still want to be shown one thing. The actual honest-to-goodness cost of artificially introducing and *retaining* pine during the coming rotation on land which would otherwise probably carry pure hardwoods with perhaps a few white pine per acre. The interesting feature of Fisher's artificial introduction of white pine as compared with sound European practice is this: In Europe, pine is usually sown or planted on soils that *will not grow* first-class hardwoods. At Petersham, as I recall it, Fisher is introducing his pine on soils that *would grow* hardwoods. It is all right to speak of having timber worth six or seven hundred dollars an acre. That is a fine thing, but can the private owner afford to spend \$5 to \$30 an acre to secure these pine stands where nature would give them hardwoods if left alone, and will an acre of pine be worth so much more than hardwoods 80 years from now? (2) I wish there were more foresters in the United States doing exactly what Fisher is doing at Petersham. We need more of this sort of "research."