The Harvard Forest

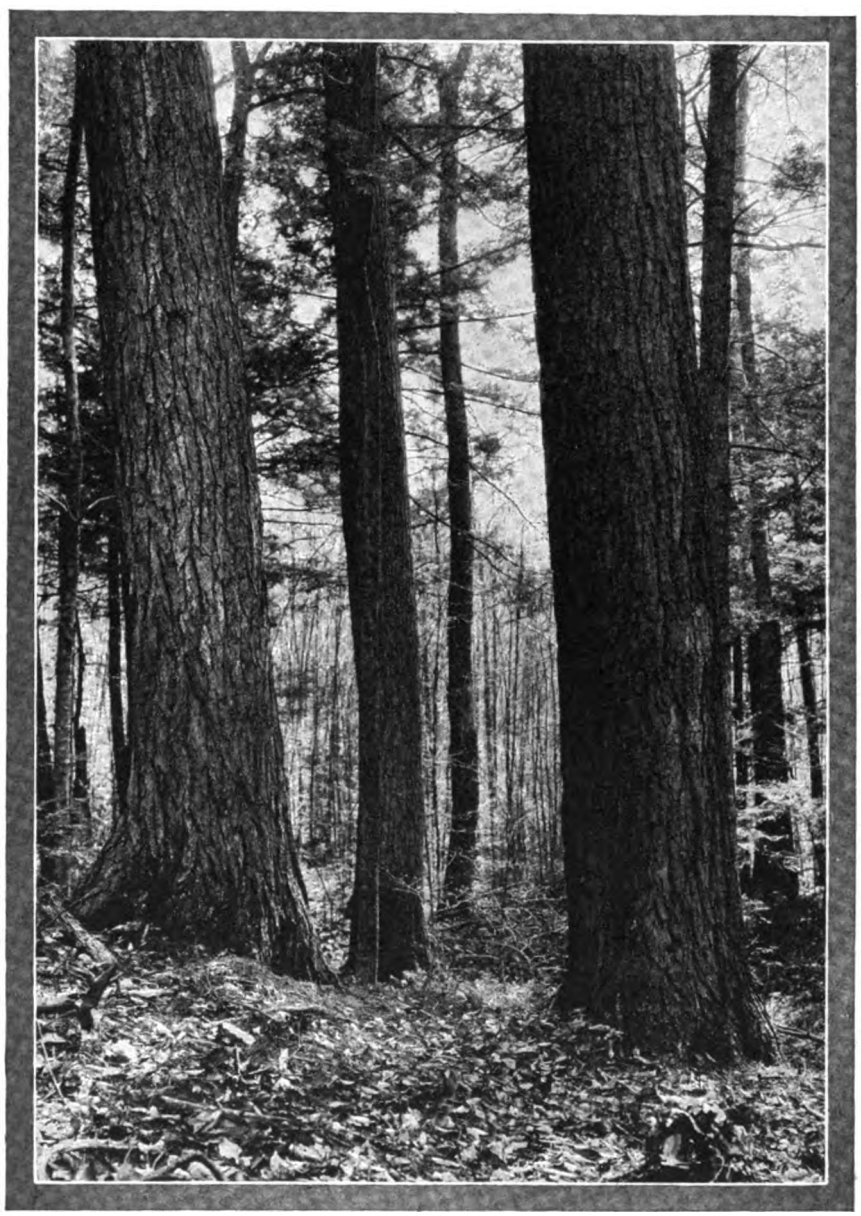
A Two-Thousand-Acre Textbook

By TOM GILL

PARADISE? Not quite perhaps, and yet to me who had just come from the forests of our Northern Rockies, where fires, far-off markets, and slow growth are the rule,—well, I shouldn't be blamed too much if those 2,000 acres of the Harvard Forest did seem quite literally paradise. And you must remember, too, that the word *paradise* originally meant *a place where trees are,* and this old meaning still hovers as an aura about the word itself. For surely no forester, at least, will ever concede his paradise to be treeless.

Yet here was Cline, assistant director of the Forest, telling me of trees that could be brought to maturity in sixty years and sold for as much as twenty dollars a thousand feet. And I had just come from a country where it takes sometimes two hundred years to grow a railroad tie, and no railroad to buy it! Small wonder, I thought, as we rambled through the woods that pleasant morning, that wherever foresters foregather, be it in New Mexico or British Columbia, sooner or later the talk turns to this Harvard Forest and what they are doing there.

The reasons that made the Harvard Forest unique among the timber tracts of the United States are almost as interesting as the Forest itself. For in the first place it is located at a point in northern Massachusetts cold enough to support many of the most important trees of the north woods yet near enough to the central hardwood regions to contain a number of trees more characteristic of southern Connecticut and the Middle States. So in this area of overlap or transition zone both northern and central species find common meeting ground. Then, in the second place, the Forest is particularly fortunate in having varied markets conveniently close to its boundaries. That, of course, is the most fortunate thing any forest can have.



VETERANS OF THE FOREST

This virgin hemlock and white pine is about two centuries old. There is not much of it left, however.

Broadly speaking, the intensity to which one can practice forestry is limited very definitely by the species and sizes you can find a market for. Here there are no species and practically no size of timber that cannot be sold profitably. That menacing Scylla and Charybdis of economic difficulties and silvicultural needs between which foresters so often find difficult steerage way have no terrors on the Harvard Forest. Yes; that, too, was probably one of

the reasons that made me think of paradise, coming as I had from a land where it would be many years before forestry on the intensive scale I saw before me could ever be more than a hope. And the reason, as I say, lay in the absence of markets.

Didn't there exist once a philosophic school whose belief was that if your need is great enough the gods will always grant it? Well, back in 1907 Professor Fisher of Harvard felt that he needed a forest, needed it badly, and so in that same year those 2,000 acres were donated the university. Of course, Professor Fisher may have helped the gods by a judicious suggestion or two—but that's beside the point.

The Forest consists of three separate tracts located in the town of Petersham in northern Massachusetts. One year after its acceptance it was put under management, and today we have before us here the results of sixteen years intensive forest practice. They are results that tell us much.

Now forestry, you know, is with us a young profession, and the working out of its processes are matters of years, decades, and sometimes centuries. Even up to a comparatively few years ago the methods involved in actually growing and maintaining timber crops had been scantily developed in this country, and to find an organized forest where the various methods of silviculture were in successful operation it was necessary to go to the old world. It is because today the Harvard Forest is very close to that unique condition that it so admirably serves as a model forest to demonstrate the practice of forestry.

It serves, too, as an experiment station for forest research, and forestry has great need of these. For each forest region has its own problems, and when you come right down to it there is a deal of fundamental knowledge regarding the growing of various tree species that we do not possess. Acquiring such knowledge requires time. Obviously, it

SLACKER ACRES. THERE ARE SOME EIGHTY MILLION OF THEM

Abandoned and unproductive. This land has exactly the same potentialities for growing timber as the plantation of pine shown on the next page.

requires more time in the case of forest crops than in any other. A year will often serve to prove the wisdom or folly of your practice in, let's say, the growing of wheat or onions. But fifty or a hundred and fifty must roll by before we can test many phases of our forest practice. So in its rôle of forest laboratory the Harvard Forest is helping to supply just this kind of information for the region that it represents. Its large plantations, its methods of practical woods culture are giving to the profession fundamental data for the practice of forestry.

The first bit of the Forest's history was told me by a hemlock stump. It had reached the patriarchal age of one hundred and eighty-eight years when cut. Now it may have seemed merely a rather large stump, which, during the first hundred and eight years of its life had grown in diameter exactly four inches; it was, you see, almost standing still. And at the hundred and eighth growth ring was a scar. After this the tree had grown with such amazing rapidity that in the next eighty years it had put on twenty-four additional inches. Its growth rate since the scar had leaped almost ten times!

That's all one could see, but what the stump actually said was this: "I stood here for over a hundred years overtopped and shaded by my fellow hemlocks, and by the tall pines, getting no light from above and little water from the crowded root space beneath. So I was dwarfed and feeble, and it was a question at times whether I should ever pull through. Then eighty years ago men things came and cut all the trees about me. Once, in pulling out a log they bruised me and the scar still remains. But now at last I was able to reach the sunlight and get my share of food from the soil, and I grew rapidly for the next eighty years. Then last year again came the men things and felled me."

When the little town of Petersham was first settled in 1720 the Forest must have appeared very different. For small fragments of the original For-

ACRES THAT HAVE GONE BACK TO WORK

These thrifty red pines were planted ten years ago on just such land as is shown on the preceding page. Director Fisher of the Harvard Forest is standing among these forest youngsters.

est still exist showing that beyond a doubt the virgin timber consisted of a mixed stand containing hardwoods, pine, and hemlock of many ages. A century later about 60 per cent of the Forest was in farms or pasture. Then immediately following the Civil War came a decrease in population. Large areas of cleared land were abandoned, and Nature, undisturbed by plow or ax, took up her task of bringing back the forests.

But Nature didn't bring back the original combination—the climax types, as foresters call them. Not at first. Instead, a number of temporary types seized the land. Large areas of pastures came up to pure white pine. Weed trees such as gray birch, pin cherry and red maple preempted the land. And when these Harvard Foresters first took the tract in hand they found everywhere a mixture of species not truly characteristic of the soil and not of the kind toward which Nature herself is slowly working—and, worst of all, not especially valuable. So it became part of the problem of management here to so handle these temporary transition types that they might be brought back as quickly, yet as economically, as possible to the species of greatest value.

"The test of the value of a tree is not its size, but how much value and utility it furnishes to the population. As I see this problem of conservation it is double barreled. Until we are able to utilize the tree with a return that will enable us to put some money back in the land we cannot have forestry. On the other hand, we cannot have the tree unless we know how to take advantage of and maintain the permanent productivity of the forest. In all the sixteen years the Forest has been in operation the thing that has been forced upon me over and over again is that we cannot have more silviculture, we cannot put more intensive treatment into the woods until we can find use for this or that unmerchantable species or waste product. So we have been constantly jumping from one end of the problem to the other."—RICHARD T. FISHER, DIRECTOR OF THE HARVARD FOREST.

The first step then was to determine just what they had to work with. A careful timber estimate showed a merchantable stand of 10,500,000 board-feet. This was the working capital. The yearly increase, in the form of new growth, amounted to 335,000 feet. This was the amount that theoretically could be cut yearly on the Forest for all time, if the Harvard Forest was to be a perpetual wood factory.

Now, sixteen years after the Forest's beginning, and after 2,500,000 feet have been sold, the working capital is increased to over 12,500,000 feet, and the annual growth approximates 400,000. Talk about eating your cake and having it, too! Yes, and every one of those cut-over acres has been successfully reproduced. More than that, the area of production has been actually increased by 150 acres.

Located as the Harvard Forest is with an average haul of less than six miles to the wood-working shops of Athol, and close to the great chair factories of Gardner, no species and no grade of lumber is unsalable. The better grades of pine go to sash and blinds. Pine of straight grain and long-jointed stock is in great demand for match blocks. Poorer quality pine is used for toys, cheap furniture and boxes. Ash and oak become high-grade furniture and bring almost double the price of pine. Less valuable hardwoods find markets as cheaper furniture, toys and novelties.

Once more before that memorable day was done the contrast between this Elysian Forest and others that I have known came to me. Assistant Director Cline had just told me that in the history of the Forest there had been exactly four fires, covering a total of about twelve acres, and destroying timber estimated at not more than seventy-five dollars. Tell that to any forester who has known for summer after summer the bitter taste of smoke on the fire line, and has seen thousands of acres of towering timber reduced to smoke and gray ashes before his eyes. It's probable he'll ask you wistfully if they need another forester back there.

Now timber management is not quite so simple a matter as cutting your trees and then waiting until more come up. Very often they won't come up. More often if they do come they are not what you wanted. This business of timber growing is something of a science. Also, it is something of an art. If you could treat a forest area like an algebraic computation or a chemical formula this forestry business could be reduced to a rather cut-and-dried basis. But you can't. Instead each situation provides its own problem.

Take, for example, the handling of stands in which different species are growing. We may know, let's say, just the right kind of management for a stand of pure red oak, or a stand of beech, or a stand of maple. But when you find an area in which all three of these are represented your knowledge of the behavior of the individual species won't help much. And here are a few of the problems confronting the managers of the Harvard Forest. How shall we handle these mixed stands? How can we develop types more permanent than pure pine? How can we convert our gray birch and other inferior hardwoods into valuable timber crops? What is the best way of reproducing pine?

Take that question as to the best way of reproducing pine, which is a mighty important one.

Imagine a block of pine and hemlock trees ripe and ready for cutting. Now the chances are that, if all the trees are cut, the area will immediately spring up to gray birch and other less valuable species which will prevent pine and hemlock from starting. Pine and hemlock is a desirable mixture because pine, when crowded by the hemlock, prunes its trunk early and produces a greater amount of clear, valuable lumber. It is also desirable that hemlock, a slower grower than pine, should get a few years' start. So our problem finally is: How shall we keep out undesirable species and secure a satisfactory stocking, first of hemlock, and then a few years later of pine?

Here's how they've solved it in the Harvard Forest. First a very moderate thinning which allows sufficient light to fall on the forest floor for the growth of hemlock. Pine seedlings will not come in at this stage, since they need more direct light. After the young hemlock trees have been well established—probably in five or six years—a second cutting is made, and this time the crown canopy is opened enough for pine seedlings to start. When these in turn are successfully established the rest of the older trees are removed, and so you have left a fully stocked and thrifty stand of pine coming up beneath the hemlock. This method is known among foresters as a shelter wood system.

In seeking reproduction of pine alone a simplified form of shelter wood is used. A thinning to reduce the crown canopy almost one-half is made a few years before the stand is to be cut. This results in a dense carpet of young pine, and when these are established the remainder of the stand is cut clear. Literally, thousands of seedlings to the acre are obtained by this method. I have seen as many as 25,000 young trees on some of the more densely reproduced acres. Not bad, when you consider that one-twentieth of this number is regarded as a fully stocked plantation when set out by hand.

But even now, with his young stand of pine well started, your forester may not sit back for sixty years and expect Mother Nature to do the rest. For, if left to shift for themselves, the pine would probably be crowded out by the faster-growing hardwoods within the first ten years. So the problem now becomes one of getting a good group mixture of hardwood and pine, and of preserving the best of the hardwood reproduction. If, as often happens, young hardwood growth exists before the older stand is removed, this advance reproduction is cut. In this manner our pine will be relieved of competition for two years at least. Then four years after cutting comes a first weeding. On the dryer areas pine is favored, and on the richer soils a stand of the better hardwood species is sought for. Usually, one more weeding is necessary before the stand can be turned over to Nature.

Before the sun set that day my guide had shown me many other forest problems, each intensely interesting, each requiring for its solution wisdom and foresight, and very patient investigation.

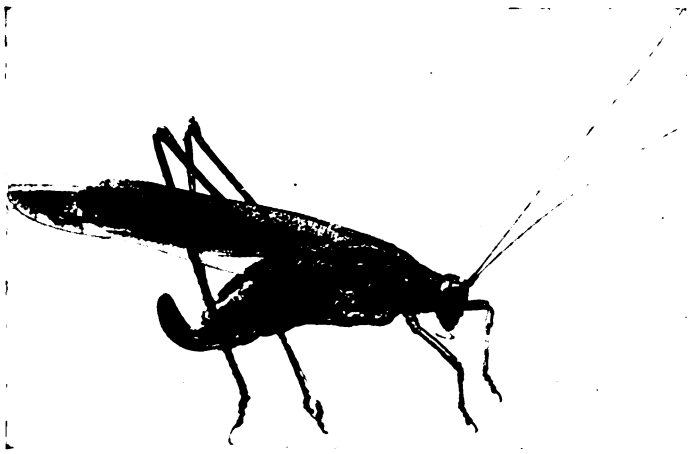
"You haven't seen half of it, you know," the assistant director said when I thanked him for his guidance.

Well, of course I hadn't. A 2,000-acre laboratory isn't to be absorbed in a day or a month. But I had seen a very real prophecy of what some day we can and will do with our woodlands.

The Insistent Katydid

By EDWARD A. PREBLE

THIS IS one of the soft, delicate, graceful insects so often seen about low bushes, and commonly called Katydids, though the entomologists tell us that the true Katydid, the one who so insistently reiterates through the night the doings of Katy, stays in the high trees and is very seldom seen. This one is usually of the most beautiful clear-green color that one can imagine, like the brightest of the green leaves on which it dwells, though brown or bright pink individuals are occasionally found.



They seem so gentle and good-natured that one is often tempted to form a closer acquaintance, and it gives us a distinct shock to find that the insect is capable of dealing a sharp nip. Since it is scarcely to be expected that the wood Katy should know our intentions were kind, one cannot do else than forgive her and let her live her short happy life in peace.

The eggs of this Katydid are deposited in holes in the ground, and from them hatch tiny young ones not differing greatly in shape from their parents.