

MARKING BY C. HEIMBURGER

Forest Geneticist  
Southern Forest Experiment Station  
Maple, Ontario, Canada

What we want is to grow the best type of trees on this site and I considered this from the standpoint of site first. When I came here yesterday I thought this site was far below the quality that we had seen before we visited this plot. I think this is only a fair hardwood site. I think the soil is very shallow, you see all the holes. There have been wind storms here and even if the trees have relatively good height growth at present, I don't think that they will continue. Therefore, I refuse to take the crop trees very seriously. I even marked one of them. I saw a cherry marked as a crop tree beginning to get stag-headed. I left it to see how stag-headed it would become the next time we come here. Probably it will be taken then.

I would certainly favor soft maple, which apparently does very well here, and cut heavy so as to inhibit the reproduction of current species, such as hemlock, which I think will not give us as good a growth on this site as soft maple will. Also I think there is a good deal of cherry that should have been taken out the last time they cut here. I suppose they were thinking in terms of dollars and cents and not in terms of site. Consequently the cherries are much poorer now than they were when they cut here the last time, and I think they will be still lower in quality if you leave them.

I haven't summarized my volumes, etc.; it is just from a general genetic standpoint that I make these remarks.

I would like to see the production of soft maple here because I believe we should grow the species best adapted to the site and not be satisfied with fair cherry, or fair sugar maple, but try to produce the very best possible. I think we can get that from soft maple and we can probably grow much better cherry and hard maple on the sites we saw before we came to this plot yesterday. This is not nearly as good a site as the plots we saw before.

Of course, all the dead trees are being marked by me. If I have omitted one, I would have that corrected. I would like all the dead trees removed. The cut is approximately one-half of the present volume. I think we should make a very heavy cut now and then another just as heavy cut the next time we come here in fifteen years to get the production of soft maple and cherry. I believe, as I have already said, that the height growth will flatten out very quickly and that crop trees here are of questionable value. That, of course, is quite contrary to the silviculturists.

From the genetic standpoint, there are a few good cherries here that I have left so that they can contribute their genes to the next crop, and I left all of the yellow birch. I don't know how yellow birch will grow on this site because I have not seen any large yellow birch and I assume that we can simply hold on to them until the next time we come to cut. They can then act as seed trees and there will be enough light for the seedlings to come through. Whether birch is desirable on this site is still an open question to me. I still don't know whether yellow birch will reach large sizes on this site, or whether it will simply be a nurse crop for cherry and other species. That is about all I have to say.

#### Discussion

Bower Do I understand that in your opinion this is a rather poor site, and by that do you mean the site quality?

Heimbürger Yes.

Bower Those of us who work here in Pennsylvania consider this to be a pretty good site. As a matter of fact I would classify it as a high Site II or a low Site I. We would be well satisfied if all our Pennsylvania forest sites were as good as this. Perhaps some of the other Pennsylvania foresters here would care to comment on this?

Bennett As stated in the information sheet the soil is classed as a good DeKalb soil. I would say the tree heights are average to good for this section of Pennsylvania.

Spaeth I believe the abundant evidence of windfalls (depressions and hummocks) indicate a shallow soil or impermeable layer which will limit the downward penetration of roots. The root zone and amount of storage available for soil moisture are therefore quite limited. In the growing season the stored soil moisture in the root zone will therefore soon be exhausted with resultant cessation of diameter growth. On such soils height growth of young trees is not a good index of site. While trees are small and the stand is open, height and diameter growth are rapid, but as the stand closes and the larger trees draw more water, exhausting the available supply earlier in the growing season, growth falls off. Site index, determined on the basis of early height growth, proves not to be a good long-term index of site. I wish to support Dr. Heimbürger's view that this is not a high-quality site. Shallow-rooted, drought-resistant trees on a relatively short rotation for pulpwood seem best adapted to this site.

Chisman Which of these species that are growing here do you consider to be shallow-rooted species?

Spaeth Yellow birch and red maple are capable of adapting themselves to shallow soils.

Chisman That is a new concept to me. I have rather thought that the species here are shallow rooted and that they have found an ecological niche where the deeper-rooted species couldn't compete with them. I would include sugar maple as being shallow rooted on these sites although most people look upon this species as being deep rooted.

Bennett I am inclined to agree with Mr. Chisman. Perhaps by next year when we have analyzed our soil survey, we will know more about it. I made a statement yesterday which I think is significant. Approximately 50 percent of this area is underlain with either a clay or a hardpan that perches the water table, and I believe when we are talking about soils, water holding capacity is of primary importance. I have an idea that if we get the hardpan too near the surface our growth is going to drop off but if that hardpan is down 30 inches, which it is in many places here, we have excellent growth.

Gabriel How long does the hardpan perch the water?

Bennett I would say that there is ample water supply most of the season, perched on the impermeable hardpan. Now if you have a drought-year, like we have had on several occasions, the hardpan works to your disadvantage because the roots will not go below that hardpan and the perched water is exhausted. The soil survey man said that tree roots absolutely will not go through this hardpan.

Bromley Are there any classifications of site in Pennsylvania which show or consider the depth of soil?

Bennett Not with respect to forest soils. What little I have studied the soils here so far, I am inclined to agree with Weitzman at the Fernow Forest except his fourth item. He said the most important factor is aspect or exposure, second, position on the slope, third steepness of slope. Fourth, he lists soil depth--soil depth to bed-rock. I would be more apt to say here effective soil depth which in most cases is to hardpan or claypan.

Bromley I was trained as a mensurationist, and in college they taught us that site index was determined by height of trees at age 50. What became of the concept?

Bennett We are going to make a study that I hope will answer that question. In the next year we are actually going to go through where we have had these soils typed and check the height of some dominant trees.

Bromley Are you going to test depth of soil too?

Bennett We have that now in the soil survey.

Haut Is there any record of the age of the trees that are represented by the 2.5-foot stumps you have here? Don't you have a partial answer in the stumps that still remain?

Bennett I think you do, maybe Ash Hough can answer that.

Hough You mean the hemlock stumps? Those would probably cover a wide range of ages, but mature hemlock in the virgin forest would run 200 to 400 years of age. I think that was the case here prior to the first cutting that brought in this 59-year-old second-growth stand.

Haut What I am getting at, don't you have a record to some extent of annual increment on these older trees and doesn't that answer part of your site question?

Hough We have some data on the increment of hemlock but I don't see how you could relate that to site.