THE TASK OF ESTABLISHING A SIGNIFICANT SUPPLY OF NEW AND BETTER TREES [1]

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While foresters look to our expanding activities in tree improvement for solutions to some problems, we seldom ponder the difficult task which awaits us when these costly programs bear fruit Once we have a tree in hand which beats the investor's bane, $(1 + p)^n$ by rapid growth, better quality, or by reduced costs, how will a significant supply be established?

In New Hampshire the "super-tree" is still a distant dream, but at this meeting we have seen Japanese and Dunkeld larch with outstanding attributes They are so good that I would like to use them as an example of the problem looming ahead.

Many of us might indeed accept the following attributes of our good Japanese and Dunkeld larch as preliminary goals for an elite tree selection program:

1. Height at age 25 of from 50 to 64 feet on fair to good sites;
2. Well-stocked stands have mean annual growth of from 1.5 to 2 cords per acre per year;
3. wood, with high specific gravity and high pulp yield;
4. Growth straight, with relatively small limbs;
5. Growth rates up to 1/2 inch in diameter per year, if desired
6. Capable of becoming established on cutover land, with early competition control;
7. Strong, durable wood
8 Large trees may be valuable for many uses as poles, piling, sawtimber, and veneer where extensively grown.

[1] Editors note This paper, apparently inspired by the author's observations and personal discussions during the Albany Conference, was submitted to me for review and comment. It is included in these Proceedings because of its timeliness and the authors use of the rapid growth-rate of Japanese and hybrid larch to illustrate the problem of introducing "super-trees" for which there is no present profitable market

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Because of their outstanding potential, the possibilities of establishing substantial plantations is worthy of more careful study. The objective here is to examine the size of the problem. Before embarking on such a program a full project appraisal should be developed.

Extensive southern pine plantations of progeny from selected parents are rapidly becoming a reality in the south. But the situation is somewhat simplified by the existing 9 million acres of plantations of the same species in the same region.

Perhaps a more comparable situation to larch establishment in New Hampshire would be the extensive establishment of hybrid poplars in localities where climate and soils are apparently suitable for their commercial culture but where there are presently no adequate markets for poplar wood., Dr. Schreiner has summarized the steps necessary to establish a profitable production program under such conditions.[3] "

"An essential first step in such new territory is the establishment of test and demonstration plantings. It would also be necessary to determine--

1, The economic limits of the proposed production area.
2. How much suitable poplar land would be available within the production area.
3. How many landowners would agree to plant poplar, and the acreage of suitable land the prospective growers would use for poplar production.
4. The possibility of agreement among prospective growers on a plan for continuous annual production (sustained yield)., This would require agreement on a minimum acreage to be planted annually.
5. Whether the estimated annual production would create a reliable market.
6. The need and desirability for a local poplar-growers organization for mutual protection, cooperation, and exchange of ideas and information,"

When a new tree is introduced to an area, the problems of creating a significant supply are compounded by the lack of existing markets. When we decide what a significant supply is, we must consider returns on the investments in improvement programs, local resource needs, and the size necessary to establish profitable and stable markets for the products grown.

The latter requires substantial volumes of the new wood. Ideally markets for intermediate cuttings of small material such as pulpwood, as well as markets for sawlog-sized pieces, are necessary for intensive forest management.

To provide a large enough volume of pulpwood for one mill to use regularly in its blends might require 20% to 25% or so of its supply. If the mill consumes 100,000 cords per year, a minimum annual cut of the new wood as thinnings, tops, etc. for pulpwood would be 20,000 cords or more per year.

Let us pursue this figuring further, to see just how large a task I am talking about. If this cut must be achieved by the time the first extensive plantations attain 35 years of age, a few assumptions permit an approximation of the annual planting job. Assuming (1) investors are in the business of managing large plantations intensively; (2) growth will average 1.5 cords per acre per year; and (3) thinning will start when the stand contains 30 cords and will, after age 20, remove the equivalent of one cord per acre per year.

[3] Production of poplar timber in Europe and its significance and application in the United States. U.S.D.A. Agricultural Handbook No. 150. 1959, 124 pp. illus,

if an equal area of plantation were established each year, the following table presents approximate harvests throughout the first fifty year rotation

Approximate cut per acre per decade in first larch rotation[1/]

Decade after planting	Decade when acre was planted					
	1		2		3	
	Cd	Mbf	Cd	Mbf	Cd	Mbf
1	--	--				
2	--	--	--	--		
3	10	--	--	--	--	--
4	10	7	10	--	--	--
5	10	15	10	7	10	--
Total cut Cd	30		20		10	
Mbf	22		7		0	

1/ Cd = cords per acre; Mbf = thousand board feet of sawlogs.

A planting rate of one acre per year would provide 20 cords per year after 35 years Thus, 1,000 acres of successfully established plantations would need to be planted each year to produce 20,000 cords after 35 years. (By the end of the rotation, the approximate annual cut would have jumped to 30,000 cords and an additional 22 million board feet of sawlog-sized material).

Assuming Cooks 6 x 10 spacing is employed and only 20% of these planted acres failed (management intensity would have to exceed present levels), 871,200 plantable seedlings per year would be required. Based on New York estimates, about 22 acres would be needed for seed production alone

It would be a big job. Whether we try to supply part of one pulp mill's requirements or another goal is chosen, putting appreciable numbers of elite trees into the woods will require a massive undertaking. And appreciable numbers must be established if our improvement efforts are not to be in vain.

If we casually inspect the prospects of such a massive program, ve are somewhat reassured by our progress and future prospects in tree improvement and silviculture. We are finding better trees, and are learning quite a bit about how to grow them.

But when we encounter the questions of who will invest in such a program? Who will manage large plantations intensively? I do not see the answer, in New Hampshire, at least our past planting history has been one mainly of gross negligence of small patches No investor appears to be seriously considering a massive planting program. Not until we drag some astute forest economists into the fold can a picture be painted which may or may not create interest similar to that. In the Christmas tree business here in New York. We are not yet overrun with business-like Christmas tree growers in New Hampshire, I might add. Also, despite repeated analyses showing the appreciable profits which are likely from pruning white pine, very few of our pines are losing their lower branches.

Whether an economic or social problem, the need to motivate large-scale investseats in planting better trees should be obvious A considerable effort will be necessary in my neck of the woods before superior seedlings are exploiting our many good sites. Parallel studies are now needed, complementing present tree improvement efforts, to create ways and means of attracting the large investments necessary to put our efforts into the woods. The more we plant the greater the results from tree improvement will be