THE IMPACT OF NEW IDEAS IN FORESTRY 1/

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Abstract.--The use of containerized tree seedlings, in a program of increased timber growth and improved wood utilization, can help avert a timber shortage in the United States. Additional research, as well as the transfer of research into practice, will require international cooperation, as exemplified in this symposium.

INTRODUCTION

Today, we are in the midst of a forestry revolution! It is a revolution of ideas--the new ideas of today that will become the accepted forestry practices of tomorrow. If we are to avert a timber squeeze, we must develop new ways of producing and planting superior trees, of harvesting better timber crops and of processing timber without waste. Today, not only the United States, but all the nations of the world, must make the best possible use of their commercial timberlands. And the planting of containerized tree seedlings is one of our best weapons in this continuing battle.

AVERTING A TIMBER SQUEEZE

We all know the United States is headed for a timber squeeze of major proportions if we do not change our ways. On one side, demand for lumber and other wood products is expanding. On the other side of the crunch, Americans are increasing their demands for all forest resources--not only timber, but also water, range, oil, minerals and recreation.

Yet our base of commercial timberland is actually shrinking. Between 1962 and 1970, we lost 8.4 million acres of commercial timberland --more than a million acres a year. If our predictions are correct, this valuable timberland will dwindle at the rate of 5 million acres each decade, for the next half century.

Numerous national reports over the last 2 years demonstrated beyond question that the demand for lumber, plywood, pulp and other wood products is rising far more rapidly than available timber supplies, not only in the United States, but throughout the world. This means timber prices will continue to rise.

We might meet our growing needs for housing and other timber uses partly by depending more on timber substitutes such as steel, aluminum, and plastics. But this alternative creates additional problems--high energy requirements, pollution and other environmental problems, and accelerated depletion of nonrenewable resources.

We could help overcome the timber squeeze by importing more timber from other nations. But this would tip the balance of payments against the United States. Also, as demand for timber increases throughout the world, more and more countries will by vying for limited timber imports.

INTENSIVE FORESTRY NOW!

I believe the best plan of attack is to improve wood utilization and increase long run timber growth and harvest--by accelerating tree planting, stand improvement, protection and other forestry measures. This will require substantial investments and balanced management of forest lands, as well as imaginative research and planning. In short, intensive forestry! And containerized planting offers us a major new tool in such intensive forestry.

Containerized planting promises to grow tree seedlings quickly, efficiently, cheaply, and with greater assurance of planting success.

To obtain high germination, rapid growth and proper physiological conditioning of seedlings, the nurseryman must control environmental

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factors. He can best do this by developing an inexpensive greenhouse culture. Scandinavian scientists have already been studying this technique for a decade or more. Their discoveries have reduced the growing time for several species of bare-rooted stock from 3 or 4 years, to a mere 2 years.

But, as you know, in heated plastic greenhouses, containerized seedlings can grow to a plantable size in just 4 to 10 weeks. In the near future, the Forest Service will plant both containerized and bare-rooted stock on a number of severe sites. This stock will possess genetic and physical characteristics for improved survival and growth. Although greenhouse culture is still in its infancy in the United States, it should mature to wide usage within the next 10 years.

GREATER ROLE FOR THE NURSERYMAN

As we intensify the forest management, the nurseryman plays a greater role on the reforestation team. At one time, the nurseryman's job was finished when the seedlings left his door, alive and healthy. Today, this is not enough. The nurseryman must work closely with seed collectors, shippers, planters and foresters to successfully reforest a tree stand.

The interrelationship between the grower and the user is even more essential with container-grown seedlings than with bare-rooted stock. Each step--from seed to plantation--forms one thread in a finely woven fabric. The forestry team must cooperate to interweave each thread--from seed selection and nursery practices, to planting prescriptions, site preparation, and, finally, planting.

Other new ideas in the forestry revolution relate directly to containerized planting. Researchers are scoring tremendous accomplishments in tree improvement. In spite of its short history, tree breeding is already becoming a mature science. Today, in the United States, more than 8,000 acres of seed orchards are thriving and beginning to produce genetically superior seed for our forests of the future. But this is expensive seed. It cannot be wasted. In many cases, containerized seedlings can promise the greatest number of plantable trees from each pound of seed.

NEW IDEAS OF THE FUTURE

As I gaze into forestry's future, I see containerized seedlings offering still other far-reaching applications. For several years, the Forest Service has been testing balloon and helicopter logging on steep, unroaded areas, and in places where conventional ground machinery would scar the landscape. Presently being developed is a new transportation system called Aerocrane, which may someday permit us to log rugged terrain at moderate cost. The Aerocrane draws 40 percent of its lifting capacity from helium-filled balloons and 60 percent from rotation of machine-powered wings. This "chopper-balloon" has a distinct advantage over traditional balloons which must drop or add ballast to take on or unload cargo. At the same time, the Aerocrane should be able to lift heavy cargo much more efficiently than conventional helicopters. It may indeed replace the high-cost helicopter in logging difficult and otherwise inaccessible sites.

Looking even further into the future, if we can log a site from the air, why can't we replant it from the air? An intriguing possibility! If we do perfect such a technique, we will probably use container-grown trees. Researchers are continuing to test means of planting containerized trees from the air. If the Aerocrane or a similar craft proves effective, we could perhaps develop a lightweight version to plant trees--by hand or by machine--from just a few feet above the ground. We are also testing methods of combining the low cost of aerial seeding with the superior stocking control of planting in rows.

IMPROVING WOOD UTILIZATION

One thing is clear! We cannot halt the escalation of wood consumption. Therefore, we must improve utilization of our available timber supplies. Once we allowed ourselves the wasteful luxury of piling and burning hardwood species during site preparation. Now, we are using more and more of these hardwoods to supplement, or even replace, softwood fiber in many products. We must advance our technology until we can process all usable material. Since this process will gradually deplete nutrients in our forests, researchers will have to determine when and where to use supplemental fertilization.

To combat the energy shortage, forests may someday become a major renewable source of fuels. True, for many years wood residues have helped generate the wood products industry, but I am thinking in larger terms. I am told that gasoline mixed with 10 percent methyl alcohol will give better gas mileage, prolong engine life and disgorge fewer pollutants than today's pure gasoline. And, no engine modifications are needed. Methyl alcohol can be created from almost any organic matter. Imagine how clean our forests could be if tops, stumps, and rotten wood unsuitable for other products could be converted to liquid fuel and hauled away in a tanker. Foresters could then replant the site more easily and cheaply, perhaps by machine instead of hand.

You may call these ideas my forestry dream book of the future. But, one trend is clear even today. The role of the forester is changing. He covers more ground than in the past. His domain extends beyond the mountain and forest, to the desert and plain as well. Not only does he harvest wood, he also manages all other goods and services that the land can provide. He is a silviculturist, a logger, an ecologist--a soil scientist, a geneticist, a landscape architect--an engineer, a social scientist, an executive.

ACCOMMODATING NEW IDEAS

A public that once ignored the forester now watches his efforts very closely, concerned that he does his job well. To meet the public's newly-aroused expectations, the forester must broaden his mind. He must recognize and accommodate new ideas. One of the most vital of these new ideas is containerized planting. Research in containerized tree seedlings is booming. We cannot let this research lie idle, but must apply it as quickly as it is developed.

The potential of containerized planting is limitless. But, right now, this innovative concept does have practical limitations. The greatest is cost. Today, and in the foreseeable future, the cost of containerized tree seedlings far exceeds that of traditional bare-rooted plantings.

As researchers develop new and better methods of containerized planting, the cost will decrease many fold, and foresters will adopt it on more sites.

There is still much research to be done. International cooperation is more important than ever. No country has the resources to do everything on its own. We must share our ideas, our research findings, our new technology--as we are doing here this week. We must go even further--and continually strive to implement our research findings.

INTERNATIONAL COOPERATION IS ESSENTIAL

This symposium exemplifies excellent international cooperation. Although workshops on container technology were held in both Alberta and Louisiana in 1971, this is the first meeting that brings together scientists and practitioners from the bulk of the North American continent.

Indeed, Canada and the United States have been allies in many forestry ventures. Together we sponsored the Forest Fertilization Symposium in 1972. Together we prepared an English language version of Terminology of Forest Science, Technology, Practice and Products. Together we participate in the International Union of Forest Research Organizations and the Food and Agriculture Organization.

Today, the wide sponsorship of this Symposium, its diverse program and the large attendance, proclaim the tremendous interest in containerized seedlings. This Symposium has brought together researchers who want to exchange ideas; production people who seek the latest and best information; decision makers who must decide where the new technology fits; and friends of forestry who need to keep abreast of new developments.

But what will be the ultimate impact of containerized planting? Even the experts gathered here today disagree as to the percentage of forest land that may ultimately be planted with containerized tree seedlings. Will it ever reach 80 or 90 percent? Will it stop at 5 or 10 percent? Will it stabilize at 30 or 40 percent? This I cannot predict. You, the participants in this Symposium, will ultimately determine the impact of this new idea in the continuing forestry revolution. For this Symposium, and hopefully, more like it in the future, will transform research into practice, to grow our forests of the future.