

NURSERY MECHANIZATION

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We both have a difficult job to do in the next 15 minutes. My job is to convey to you my thinking on nursery mechanization. Your job is to assimilate what you can of my talk. I hope that you do not finish your job before I finish mine.

There is not much need to elaborate on the need for more mechanization of our nursery operations. There was a time when simply by word of mouth I could hire 150 people and still have a waiting line. This has not been true for sometime. We are not only unable to hire unskilled labor, but the semi-skilled is also a thing of the past. We are turning more and more to high school students on vacation, Saturday work when certain people are available from their regular jobs, and many have resorted to using convicts.

Recently, I received a letter from Bud Terrell in New York in which he stated that they had timed their lifting operations with the high school--Easter vacation. I have also, from time to time, heard from other parts of the country indicating that this problem is likely nation-wide.

We must mechanize to stay in business, and at this time, many of our problems seem very difficult.

In thinking over the problems of nursery mechanization, I have realized that not only are we individuals with different ideas, but our problems are also individual; and although the main purpose may be the same, our approaches are different. To give you some ideas as to how different they can be, I find that the nurseryman at Goldsboro, North Carolina, the nurseryman at Morganton, North Carolina, and I in Virginia are all using different methods to pack seedlings even though we end up with the same type of package, which is clay-dipped roots wrapped in water-proof paper. Each of us swears by his method, of course, and no doubt secretly wonders why the other fellow does not do things his way.

Another example: you might think that cone tumbling would be a very simple operation and would involve simply running the cones through a revolving cylinder; but the State of Maryland uses an entirely different approach in that they use a sloping, flat platform which shakes up and down violently as the cones pass over it. This gets the job done just as well. The point is, it seems that one of our problems is to know what the other fellow is doing along certain lines of mechanization and to be able to adapt certain parts of an operation to our own use.

The most important problem which we have, and I'm sure that the same problem is true throughout the country, is to be able to lift seedlings when we need them and as fast as we need them. As you know, we must

do this under adverse soil and weather conditions. If we can just get the seedlings out of the ground, many of our problems are greatly reduced. For years, we have pondered this problem of seedling lifters.

Several years ago, the State of Georgia took upon themselves to design and build a lifter. The State of New York followed their example and built a machine. This summer, while I was on a trip to Pennsylvania, I heard by the grapevine that their machine was not working properly and dashed off a letter to New York asking them about it. It seems that they have not been able to put their machine in production. Bud Terrell wrote me as follows: ..."Perhaps our toughest problem is to get some good engineering help to fix some of the minor things still wrong with the machine. If this thing picked beans instead of trees, our problems would have been solved long ago."

This brings out a point which is well worth considering along these lines of mechanization. For years, we have adapted and innovated certain farm machinery to our uses and it now appears that we have reached a point in our development that **in** order to properly build these certain specialized machines, we are going to have to spend larger amounts of money. This is something that neither you nor I, nor our superiors, are accustomed to. We in Virginia are pondering the lifter and have somewhat different ideas concerning the best type of machine for this function. But the money angle enters into it very strongly, for we hesitate to spend large sums when we are not sure the thing will work when finished. For example, the Allis Chalmers Company builds a large potato digger which I believe with considerable adapting would do our job. However, this completed machine would cost us somewhere in the neighborhood of 69,000. To purchase the certain basic parts of this machine, which we would need to start our renovation, would likely cost somewhere near 35,000. Also, from what I can gather about the power requirements, it appears that we would need a tractor in the 90-horsepower class. There are likely very few of us that have such tractors on the nursery, and I'm certain that the State of Virginia does not. These things make the development of such a machine very difficult.

We have discussed the possibility of building a simpler machine--the idea being that an endless belt would project from the back of a trailer which is pulled over the bed with a small tractor. People would work on either side of this conveyer belt and the conveyer belt would simply carry the trees into the trailer where they would be either packed or arranged for transportation to the packing building.

I am not particularly enthusiastic about this for it still requires the use of considerable labor.

The time consuming operations of packing seedlings in the field into washtubs and boxes is another detail that needs improving. We have plans to try using a quick method of wrapping bundles of seedlings in a canvas carrier affair to transport them to the grading and packing building.

Another operation which could be greatly improved is that of packaging. We have changed our methods almost every other year; and time is limited so I will not elaborate too much on what we are doing. John Hall, a nurseryman in Minnesota, has reworked a hay baler which he contends makes packaging easier. I wrote to him a year ago and he sent me many details of this operation. With his machine, he states that he has packaged 1,250,000 in an 8-hour day with a 12-man crew. This assembly requires an Allis Chalmers hay baler, a 50-foot conveyer table 36 inches wide, and 2 electric motors -- one 5-horsepower and one 3-horsepower. He states that this machine replaced 40 to 50 people. I am not able to determine just how valuable this machine would be to us except that we are packaging up to 1,000,000 seedlings a day with 12 people and are using considerable less equipment. I am, therefore, of the opinion that this machine would not be worthwhile for our use.

The method that we are using is called a packing circle in which four people work beside a circular wheel conveyer 8 feet in diameter. Special packing tables roll around the circle and each of the four people do certain operations as the tables pass in front of them. Each circle will handle one-half million seedlings in 8 hours easily. This accounts for eight people and the other four brings supplies, carries away packages, etc. All of our seedlings are clay-dipped and this brings up another point. Several years ago I wrote to a number of nurserymen who were clay-dipping their seedlings and asked them if the moisture-holding felt which they were using was necessary. All felt that it was. We decided to try a cheaper material. This felt costs about \$13.00 per 600 feet. We tried using the No. 810 paper table cloth material and have found it to be very satisfactory -- having shipped probably 50,000,000 seedlings with it. This reduces the cost to approximately one-third as we pay somewhere in the neighborhood of 54.25 for the same footage of paper. This tablecloth comes in 40-inch width rolls and will pack approximately 280,000 seedlings in 1,000 packages.

Another detail of mechanization which is important would be the development of an attachment to the Whitfield seeder to apply fertilizer a proper depth under each drill row. We are wasting a great amount of fertilizer in that it goes away before the plant can reach it. Several years ago I ran a series of tests of various fertilizer mixtures applied under the drill row. I tested germination in flats in the germinating room and realized that this is the real way to fertilize seedlings. Of course, many others have done the same thing and we are all aware of the advantages; but a machine still has not been devised to properly do this job.

Recently, in the Tree Planters' Notes, we saw a very elaborate machine. Part of its function was to apply fertilizer in this manner, but the machine is experimental and is not devised for the hard use that it would get over a large nursery. The main problem is to inject the fertilizer, either liquid or dry, cover it properly, and still have

a seedbed. We have played around with this some, but never seem to have time to concentrate on this when it should be done. I have talked to various farm implement people, but as yet have not been able to find any mechanism delicate enough for our use.

With regard to the Whitfield seeder, many nurserymen are still calibrating their drill by counting the number of seeds that fall over a measured distance. If the rivet which holds the flexible spout under the hopper is removed, and a pin inserted here to hold the spout, you can readily remove the spout and catch the seed that falls. In this manner, the drill can more easily be set as the setting is then adjusted on a weight basis over a considerable larger area. Proper calibration can be a serious problem when the seedlings cover some 50 to 60 acres as accumulations or loss will readily add up to a serious condition.

Most of us now have fairly good seed handling and cleaning facilities. But, I have yet to see an economical, satisfactory means of handling large numbers of pine cones. We need to develop a means of processing the cone from the time it arrives at the plant through the extraction operation which requires a minimum of hand labor. If we could devise an auger to convey pine cones as grain is handled, we could then use the same type of storage methods as used in the grain business.

We are all, no doubt, working on various ideas on a number of different machines to improve our nursery operations. It would seem that if we could all get together and agree on certain standards that some details in our mechanization requirements could be standardized. Our main problem is that we are scattered throughout the country, unable to communicate satisfactorily; therefore, it is almost impossible for a manufacturer to determine just how many machines he could sell once they were developed.

Bud Terrell's point that "if the thing picked beans the problem would have been solved long ago" is, of course, the largest difficulty; and I do not have the answer to it. I do, however, have a suggestion to place before this group. It seems to me that mechanization stands very high among our needs. It appears that along certain lines we could arrive at a standardized method. Also, it seems we need a means of liaison among us. Further, we need an engineer, forester, and nurseryman to evaluate these various ideas and to work them into a good, usable machine.

We can then go to a manufacturer and be able to assure him that there is a sizable market for such equipment. Recently, at a large private nursery, I was told by the manager, "if you ever develop a good lifter, we want one." The need for good equipment is likely greater than we realize.

It seems logical that the U. S. Forest Service should be the one to assign an engineer to this task and get the job started.