PRESENT STATUS OF SEEDLING HARVESTERS

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During my attempt to gather information for this presentation, one thing became evident--harvesters are "coming out the walls." I have had much interesting correspondence with many people on this subject and there is great interest, much activity, and most important, a very optimistic attitude.

My purpose here is simply to outline, as best I can, just what is going on -with respect to seedling harvesters. To begin, there seems to be two approaches to the.harvester construction problem: (1) the beet digger and (2) the potato digger.

The beet digger, or the parallel belt conveying method, seems to be the most prevalent; but the potato digger, or cross chain conveyor method, is far from being out of the picture. In some cases, a combination of the two principles are being used.

However, from here on the differences between machines show much planning and forethought. The main idea being to adapt the harvester to local needs and conditions. Also, there *is* much imagination and individual thinking going into the construction of these machines.

I would like to briefly outline, as best I can, the various machines that have been described to me.

I had the pleasure of seeing a series of slides showing the New Zealand machine. The construction is about the same as the standard 40-inch potato digger, except that the back end (or discharge) is some 5 feet to 6 feet above the ground. The machine is operated at conventional tractor speeds to get good root cleaning. No attempt *is* made to control the seedlings--they pass over the machine in a solid blanket. However, a large box is mounted at the discharge end. This box opens to the rear. A man follows and guides the seedling flow. With practice he can direct them so that all tops are turned toward the open end. We then have a solid stack of seedlings some 4 feet wide and 5 feet high. When the box is filled, the entire machine is moved to the packing building where a hoist removes the full box and replaces it with an empty one.

North Carolina has for several years been working with a potato digger which moves slowly over the bed and is used to elevate both seedlings and soil (the entire bed) to a trailer working height. The elevator places the seedlings on a flat, chain link conveyor on the trailer. Much of the soil promptly falls through the open chain link conveyor. Some 10 people riding on the trailer remove

the seedlings as they pass by and pack them into either boxes or canvas wrappers. The culls and remaining dirt pass back onto the bed at the rear.

Last year a nurseryman in Canada wrote to me and described their machine. Recently, Mr. H. *J.* deVries of Kemptville, Ontario, wrote to me again. He described their machine as being somewhat the same as the New Zealand design. Their machine handles about a million and a half seedlings per day.

All others seem to be headed in the beet digger or parallel belt direction.

I have descriptive literature and pictures of a machine built in Germany. Jim Lott discovered this machine when he began his search for such literature several years ago. It is a single-row machine and uses a plow, under cutter, and disc. A set of pulleys shake the seedlings as they are elevated. It also incorporates a very elaborate bundling system that appears to tie the seedlings in bundles with twine--it is difficult to see just how this is done.

Our good friends, the Canadians, have not been idle. I have photos of machines in use there. They are single-row machines. One is designed for hardwoods and is operational. At last report, the pine harvester was near completion but not yet properly tested. A. C. Patterson in Suskatchewan has described their machine to me. I have simply mentioned these other nations to indicate that we are not the only ones interested in this project; in fact, it appears that they realized the need and began construction long before most of us got started.

I expect most of you have either seen the Florida machine or seen the movies of it. This is a fine machine using wide, heavy belts and is single-row. Oscar Sampson reports that it handles a half million seedlings per day. They plan a two-row type by this fall featuring a number of improvements, such as shorter wheel base and improved traverse.

George Remeta reports that Union Camp Corporation *is* building a machine fashioned after the Florida one. Features: (1) single-row, (2) 3 BV type belt with vulcanized wear strip, (3) conveyors for empty and full boxes, and (4) plans clay root treatment to be done at the machine, but this will be done later.

Jim Lott, U. S. Forest Service, reports that his new 8-row machine is being built. Richard Hallman is working with Jim and the machine will incorporate many new ideas. This machine, although being parallel belt again, uses a different approach than any others.

Mr. Hallman informs me that this new machine will have: (1) shorter belts, (2) two wheel wagon-type hitch, (3) all power from P.T.O., (4) designed for 656 hydrostatic, (5) simplified hydraulic system, (6) lighter construction, and (7) dirt removal by vibration and rotation rods. Jim will test this machine on the West Coast this fall.

Many of you have seen the machine built by Virginia. There will be motion pictures on this machine today, hence I will not dwell on it here.

Jim Wynens, Georgia Forestry Commission, reports that they are building two machines for use this winter. They are similar to the Virginia machine. Some features are: (1) lifter to be mounted on a trailer, (2) hydraulic cylinders to supply vertical and horizontal control, (3) belts will be three groove, 1-$_f$ inches wide, (4) hydraulic motor will supply power, and (5) hydraulic vibrator will remove dirt.

Eugene Turner, Louisiana Forestry Commission, writes that they are building a lifter. From his letter, I gather it will be somewhat comparable to the Arkansas machine and a similar up-dated design being built in Virginia.

E. W. Arnold, Weyerhaeuser Company, reports two machines in operation and two being constructed. One of these will come to North Carolina. The main features are: (1) vibrating knife undercuts and sidecuts, (2) foam covered belts, (3) hydraulic vibrators, and (4) side travers conveyor to remove seedlings. I have seen pictures of this machine and spent a very pleasant and informative day with Mr. Arnold. The machine handles one million seedlings per day and, from what he *says,* is apparently trouble free. The machine will function in almost any soil without breakdown. Likely, of all the machines now operating and fully tested, this is the most sophisticated and contains the most elaborate designing. It also handles more seedlings than any other that I know of.

Sid Hanks wrote to me recently and, in part, made this statement-- "It is my hope that these second generation machines will solve the basic problems and future refinements can be made as accessory equipment or replacement components without the need to begin from the ground again."

It is certainly reasonable that the same machine cannot be expected to handle all species and all conditions.

The friendly, willing exchange of ideas and accomplishments have gone a long way toward the solution of this harvester problem. I would like to especially emphasize that many people have sent me

considerable descriptive information on their construction. I greatly appreciate the work involved in doing this; however, I hope that all of you will realize that it is not possible within 12 minutes to holdforth to any degree on details.

Perhaps after another season of experience, we will indeed have a third generation machine that will have basic principles and components which will lend themselves to local adaptation.