REFLECTIONS ON SOUTHERN FOREST TREE NURSERIES

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It was suggested that I make a few remarks about the history of southern forest tree nurseries. I agreed to dip deep into my memories *as* this may be my swan song.

History repeats itself at some future time--if not exactly the same, yet very similar. If we do not keep accurate records of our activities, current history is lost; and the future generations must re-invent the wheel. Much of the history of old nurseries is lost.

These remarks are dedicated to those nurserymen who have left this life for whatever Heaven is available to forest tree nurserymen. Some of them have already had their Hell on Earth.

The first southern forest tree nursery of record was near Pensacola, Florida, in the 1820's where the Federal Government grew live oak seedlings to produce oak timber for ships of the Navy.

The second nursery was not established until about 1900+. This was a small nursery on the Biltmore Estate in North Carolina used in reforesting the denuded mountainsides in and surrounding the estate.

This talk has not been polished so that each I has been dotted and each T crossed. But I am not up for promotion or tenure and no one can fire me. So first let us look at the development of nurseries in the south beginning with the 1920's.

The 1920's.

The first forest industry nursery was established in my hometown, Bogalusa, Louisiana, in 1919 by the great Southern Lumber Company. By 1929, the company had established 30,000 acres of pine plantations. Other industry nurseries were established in Louisiana and Mississippi during this period, but were all closed by the late 1920's.

The Industrial Lumber Company tried to make farm land of the forest land in Southwest Louisiana. They brought in farmers and loggers from the Lake States and gave them 40 acres and a mule. After three years of failures the company decided to put the land back into pines and established a small pine seedling nursery.

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Carolina was established at Camden on five acres of land. The state appropriation was $4,000. Total production was 730,000 seedlings a

year. Larry M. Staley was the nurseryman. The Denmark Nursery in Athens, Georgia, covered about two acres and was operated by the Forestry Department of the University.

The 1930's.

One of the most imaginative and progressive conservation programs in history was the Civilian Conservation Corps, established in 1933. Other new programs of this decade were the Soil Conservation Service and the Resettlement Administration. Each of these agencies established nurseries for producing tree seedlings and/or plants for wildlife and erosion control. The Munson Nursery in Florida was a resettlement nursery. Some states established new nurseries with funds provided by the C.C.C. or other federal sources.

The Acquisition Program of the U.S. Forest Service added thousands of acres of cutover forest lands and abandoned farm lands to the existing and new national forests. The C.C.C. provided the momentum for the reforestation of these lands. The Forest Service established the Ozark Nursery in Arkansas, the Stuart Nursery in Louisiana and the W. W. Ashe Nursery in Mississippi. It was my good fortune to develop the Stuart Nursery in 1932-33 and the Ashe Nursery in 1936. The Ashe is now the only forest service nursery in the South.

The 1940's.

Reforestation and seedling production were put on hold during World War II. State organizations began to re-open nurseries in 1946. There were new problems with financing, labor, diseases, new chemicals, etc.

Auburn University, in cooperation with the Alabama Department of Forestry, established the Auburn (J.M. Stauffer) Nursery and a nursery research center. (The leaders were Jack T. May and A. R. Gilmore.)

The 1950's.

Three important developments were:

1. The forest industries began the establishment of new nurseries.
2. The Nursery Research Program at Auburn University provided soil and plant tissue analyses to nurseries and made recommendations for soil management and cultural operations.
3. The Soil Bank Reserve Program provided for the expansion of state nursery programs and expansion of nursery research.
3. Four forest industries initiated some degree of research in the area of seedling production.
4. There was a shift in emphasis from number of seedlings to quality of seedlings.

Now I will talk briefly about the organization that you are attending today - The Southern Forest Nursery Association.

1937. The first conference in the Southern Region was at the W. W. Ashe Nursery. The only persons attending were from the Forest Service and the state nurseries. Larry Staley and I are the only two participants still living. The major discussion was about the development of new equipment, i.e., mechanization. I remember a comment Mr. Wakeley made on fertilizing pine seedlings - "It may be better not to fertilize much since we did not know much about seedling nutrition." Another comment along these lines was made by a forest scientist who stated that "Longleaf seedlings could be grown in a bag of marble."

1947. The state management chiefs and nurserymen began the current series of conferences in 1947 - during a period when I was not associated with nursery operations.

1949. The third conference was held in Pensacola, Florida, with Carl Muller *as* host. Eighteen persons were in attendance. Major subjects included: seed; weed control with mineral spirits; white grub control with BHC and chlordane; equipment development; soil management; and cover crops such as soybeans, velvet beans, field peas, oats, vetch and crotalaria. Soil additives in use at this time were sawdust, cotton seed meal, peanut hulls, barnyard manure and sewage sludge. The common fertilizer recommendation was 200 to 400 pounds of 5-10-5 per acre.

1952. The sixth conference was at Auburn University. Fifty-two persons were present which included 20 nurserymen, 18 management chiefs or assistant state foresters, 6 university staff, and 6 from other agencies. Major subjects were equipment development, weed control and soil management (Auburn had recently established a soil testing service for nurseries). At this meeting, industry nurserymen were invited to attend the next conference.

1954. The eighth conference was in Lufkin, Texas. Sixty-one persons were present including 35 from states, 16 from industry, 7 from the Forest Service and 3 from universities. Major subjects were soil management, fusiforme rust and nursery insects.

Back To The Past.

Let us use our imagination and return to the 1920's and the early 1930's. You have a new job which is to produce one million seedlings a year. You have the following:

1. 5 to 20 acres of worn out farm land.
2. 2 mules or horses.
3. A middle buster, a Georgia stock and a sweep, and a seed bed roller.
4. A dozen rakes, some shovels, picks and hoes.
5. A 15 horse power tractor.
6. A disk harrow, a spike tooth harrow; and a 2-botton 10-inch turning plow.
7. You can employ 10 to 40 men at 15 to 25 cents an hour.
8. Fertilizers are 4-8-4, ammonium nitrate, superphosphate, and muriate of potash.

9. Chemicals are: formaldehyde, carbon disulfide, lead arsenate, aluminum sulfate, and materials to prepare bordeaux mixture. There are no seed extractories, no seed testing laboratories, no soil testing labs and no consultants. What do you do and how do you do it?

Here Are Some Of The Things You Do.

1. Collect seed by hand. Dry them in an open shed. Shake seed from cones by hand.
2. Test seed for viability using a hammer or a flotation test.
3. Apply 300 pounds of 4-8-4 per acre and disk in.
4. Line out alleys using poles and flags.
5. Plow alleys using a mule and middle buster.
6. Finish off seedbeds by hand - using rakes and shovels.
7. Sow seed by hand after weighing enough seed for each 100 square feet of seedbed.
8. Roll seedbeds and mulch with pine straw or burlap bagging material.
9. Install an overhead irrigation system and irrigate seedbeds.
10. Weed seedbeds by hand.
11. Spray seedlings with bordeaux mixture - using hand sprays.
12. Lift seedlings by hand using shovels or lifting forks.
13. Pack seedlings in tubs in bundles of 25 or 50; or in Forest Service bales.
14. Do a lot of praying.

From Then To Now - What Were The Major Changes?

I will list these changes and then discuss each one individually.

1. Seed testing
2. Mechanization and equipment development
3. Chemical weed control
4. Chemical control of diseases and insects
5. Improved soil management - soil testing, etc.
6. Mulching
7. Site selection
8. Seed orchards - improved seed
9. Water control
10. Improvement in management

I. Seed Testing.

Germination tests were not available until about 1930 when Phil Wakeley began running germination tests in his office in New Orleans. He used cooking or baking pans and placed them on the window sills in his office. There were no controls and no duplication. In the early 1950's, the Forest Service established a seed testing lab at the Ashe Nursery. Mail service to Brooklyn was very slow, and the lab was moved to the Georgia Forestry Center at Macon, Georgia. Today, several organizations have seed testing facilities.

II. Mechanization and Equipment Development.

With an abundance of low wage local labor and the C.C.C. there was no real push toward labor saving equipment. The location of many nursery sites was based on the availability of local labor. Early mechanization had two objectives:

1. **Eliminate the drudgery of some of the operations.**
2. **Reduce the time span needed or required to do a job.**

Regular agricultural equipment was used for some operations. Tractors, manure spreaders, etc. needed modification for use with 4-foot wide seedbeds. Nurserymen used their ingenuity to adapt or make needed changes. The Ashe Nursery was a leader in the mechanization program. A truck chasis was modified to make a nursery go-devil which would straddle the seedbeds. It was used *as a* light tractor to pull a seedbed shapper, a seeder, a burlap laying machine, a spray machine and a seedbed cultivator. The Ashe Nursery was the source of the first tractor mounted under cutting equipment and the first seedling grading table.

The State Forester of Tennessee developed the hazard seeder. Whitfield in Georgia was one of the first industrial companies to get involved in the manufacture of nursery equipment. The Georgia Forestry Commission and the University of Georgia developed the prototype of the $100,000 Love Lifter.

III. Chemical Weed Control.

Prior to 1946, all weeds and grasses were removed by hand. Frequently there were more than 200 persons hand weeding in some of the larger nurseries. World War II created a labor shortage and also higher wages. During the war, mineral spirits were used to control weeds in a Guayule Nursery in California. Mineral spirits were introduced into southern nurseries in 1946 when the price was 15 cents a gallon.

A major development during the 1940's was the development of synthetic organic pesticides. Methyl bromide and other organic pesticides were tested to control weeds at the J.M. Stauffer Nursery in 1950 and 1951. Dr. Mason Carter worked with new herbicides at Macon, Georgia and Auburn University. Dr. David South followed Dr. Carter. The results from the Auburn University Southern Forest Nursery Management Cooperative are now history.

IV. Chemical Control of Diseases and Insects.

The two major diseases in the 1920's and the 1930's were brown spot on longleaf pine seedlings and fusiforme rust on slash and loblolly seedlings. The standard control was with bordeaux mixture - a time consuming operation requiring 10 to 20 treatments a season. Fermate or ferbam replaced bordeaux mixture, but not the number of sprayings. The big breakthrough came with the development and registration of Bayleton. The Auburn Coop played a leading roll in getting Bayleton registered.

The black or cotton root-rot appeared at the Ashe Nursery in 1937. It was 10 years before the disease was identified. Dr. B. Henry found that the Ashe variety was caused by a nematode-pathogen complex.

Ethylene dibromide (E.D.B.) controlled the nematodes and root-rot at the Ashe Nursery, but was not effective in controlling the root-rot at other nurseries. Other synthetic organic fungicides and nematicides have been effective.

The two most frequently used soil fumigants are M. C. - 2 (98% methyl bromide) and M. C. - 33 (33% chloropicrin).

In the 1930's, white grubs were a major pest. Chlordane and related insecticides were very effective. However, most of these are no longer available.

The process of testing and **registering** pesticides *is* essential for the successful operation of forest tree seedling nurseries.

V. Improved Soil Management - Soil Testing, Etc.

There were no reliable recommendations for soil management and fertilization prior to the 1950's. Inorganic fertilizers were used sparingly. Phil Wakeley cited several examples of harmful or negative effects. Green manure or cover crops were used in all nurseries. A major use of the cover crop was the harvesting of peas or beans by nursery employees and others for home consumption. The yield of dry matter was very low and did not increase the organic level of the soil. Sugar cane residue was used as a soil additive at the Ashe Nursery in the late 1930's. Use of sawdust as a soil additive began about 1950 at the *J.* M. Stauffer Nursery.

Auburn University established the first nursery soil testing laboratory for the chemical analysis of soil and plant samples, in 1953, under the direction of A. R. (Bob) Gilmore. This service was used by all soil bank nurseries and most other nurseries for several years, along with recommendations for fertilization and other aspects of soil management.

The first recommendation for the use of lime in a nursery was 100 pounds per acre and we were not sure if damping-off would take off because of this bold action.

Records of the results and recommendations for many nurseries are on file at the Auburn Coop.

VI. Mulching.

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VII. Site Selection.

In the early days, the best nursery sites were considered to be the loams or sandy loams, underlain at about 18 inches with a heavier but permeable subsoil. With increases in mechanization and total production, the sands and loamy sands were found to be the more desirable soils. Mechanical lifters are more efficient on sandy sites than on the loamy or clayey soils. Sandy *soils* are also more workable during adverse weather conditions than the heavier soils.

Initially sandy soils were considered to be sterile and more droughty than the loamy soils. Use of soil additives to increase organic matter, exchange capacity and water holding capacity increased the productivity of the sands. Soil tests provide a very reliable measure of the productive capacity of a nursery soil.

VIII. Seed Orchards - Improved Seed.

The Forest Tree Improvement Program in the southern region originated in the early 1950's. By 1975, some seeds were available from first generation seed orchards. Today, improved seed is used almost exclusively in southern forest nurseries.

IX. Water Control.

Until the mid 1970's, the amount of irrigation depended on the personal judgement of individual nurserymen and was determined almost entirely by feel with the fingers. Modern tensiometers can read soil moisture or an equivalent value within a few minutes and with a high degree of accuracy. Tensiometers coupled with electrical controls can provide specific quantities of water at prescribed times.

X. Improvement in Management.

This can be attributed to:

1. More experienced nursery managers.
2. Nurserymen with better education and training.
3. More information available in publications such as "Planting the Southern Pines" of the 1950's and "The Southern Pine Nursery Handbook" of the 1980's.
4. Short courses on specific problems such as pest control and equipment development.
5. The Auburn University Southern Forest Nursery Management Cooperative - its research, publications and contact meetings.
6. Regional conferences such as this one.

Conclusion

In the discussion today, I have hit some highlights *as* to where we have been and where we presently are in the management of southern forest nurseries. As I suggested in the beginning you need to be acquainted with the past and to preserve records of the present for those who follow you. You are involved in a very exciting and enjoyable occupation.

In closing, I wish to quote from an old litany--"May the road rise to meet you, may the wind always be at your back, may the sunshine warm your face, the rain fall soft on your field, and until we meet again may God hold you in the hollow of his hand." Thank you.

Addendum to Reflections on Southern Forest Tree Nurseries.

Industry nurseries in the 1920's.

Four nurseries were in Louisiana and one in Mississippi.

State nurseries in the 1920's and 1930's.

First state nursery was probably in Louisiana about 1923. Luther Delaney was the nurseryman. His son and grandson are attending this conference.

The Herty Nursery near Albany, Georgia was established in the mid-1920's; and named for Dr. Herty, a chemist at the University of Georgia who developed the process for making newsprint from southern pines. The Denmark Nursery in Athens was established soon afterward.

Florida's first nursery was at Olustee, Florida.

Mississippi's first nursery at Mt. Olive was started by Richard-later a Regional Vice President of Weyerhaeuser and also the State Forester.

Industry nurseries about 1950 and later.

Probably the first industry nursery of this period was by Southern Advance Paper Co. at Hodge, La. It was started by Wes Sentell, a former nurseryman at the Ashe Nursery and a Guayule nursery in California.

St. Regis started two nurseries in Florida. The first was the Lawton Nursery at Cantonment and the second at Lee.

Other early industry nurseries were the Rayonier nurseries at Yulee, Florida and at Glennville, Georgia; the Continental Can Nursery at Statesboro, Ga., The Brunswick nursery at Jesup, Ga. and the Union Camp Nursery at Bellville, Ga.