

Early History of Tree Seedling Nurseries in the South

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Barnett JP. 2013. Early history of tree seedling nurseries in the south. In: Haase DL, Pinto JR, Wilkinson KM, technical coordinators. National Proceedings: Forest and Conservation Nursery Associations—2012. Fort Collins (CO): USDA Forest Service, Rocky Mountain Research Station. Proceedings RMRS-P-69. 42-46. Available at: http://www.fs.fed.us/rm/pubs/rmrs_p069.html

Abstract: The forests in the South were devastated by aggressive harvesting that began following the Civil War. By the early in the 20th century, many millions of acres of land needed reforestation. Foresighted individuals began a committed effort to restore this land to a productive condition. This effort required dedication, innovation, cooperation, and leadership. The pioneering work of people including Carl A. Schneck, Henry Hardtner, J.T. Johnson, F.O. "Red" Bateman, and Philip Wakeley helped create the foundation of reforestation and nursery technology in the South, and the forests they helped restore have become the basis of the South's economy today.

Keywords: restoration of southern forests, southern pines, nursery managers, nursery production

The Problem

As early as the late 1910s, millions of acres of deforested land spread across the South. Development of the lumbering industry following the Civil War brought jobs and businesses, but after the timber was cut out, there was bleakness and a spirit of desolation. The magnitude of the cutover land was brought into focus when a survey was conducted by the Southern Pine Association in 1919. The cutover land equaled the combined areas of Alabama, Mississippi, and Louisiana. This survey reported that 92 million acres of land had most of the timber removed (Heyward 1958).

Development of steam-powered logging equipment did much to increase the damage from harvesting practices. For example, some sawmills made use of steam skidders, a logging practice which caused great damage to any timber left standing (Figure 1). Not all of this cutover land was barren stump-land since all sawmills did not practice the same degree of utilization, nor did all use steam skidders. However, little of the cutover acreage was capable of becoming productive again without help. Cutover lands were a man-made problem and required a man-made solution (Figure 2).



Figure 1. Steam-powered skidders manufactured by the Clyde Ironworks in Duluth, Minnesota, greatly increased logging capability in the early 1900s. Forty acres of timber could be skidded to the railroad track for loading on train cars with one setting of the skidder.



Figure 2. This is typical of the cutover land in the West Gulf Coastal Plain in the early 20th century. Many millions of acres of such cutover land needed reforestation.

Slowly lumbermen and the general public began to become interested in developing some sort of reforestation effort. The leader of this effort was Henry Hardtner of the Urania Lumber Company at Urania, LA. Some felt his vision of reforestation was foolish, but he persisted and convinced others that there was a future in second-growth forests (Burns 1978).

The Coming of Forestry to the South

As the 20th century began, the newly created Forest Service began receiving requests for assistance and information on reforestation from lumber companies and individuals scattered across the South. To meet these requests, the Forest Service recruited a few individuals with forestry experience related to the issues of concern. Although they had little forestry training, these individuals had exceptional ability to observe nature, draw tentative conclusions, and make practical

recommendations. The most notable of these Forest Service foresters who traveled widely throughout the South were Austin Cary, W.W. Ashe, and W.T. Mattoon (Barnett 2011).

Also at the turn of the century, it was apparent that there was a critical need for forestry training and education. Gifford Pinchot, who later became Chief of the Forest Service, established a forestry program in the late 1800s at George Vanderbilt's Biltmore Estate near Asheville, NC. After leaving the Biltmore Estate, he recommended that Carl A. Schenck, a professionally trained forester from Germany, be hired as his replacement and to establish a forestry school. Schenck established the Biltmore Forest School in 1898 and its curriculum focused on providing one year of practical forestry management training. It is considered as the first forestry school in the United States, but Cornell, Minnesota, Michigan, and Yale created forestry schools shortly after the Biltmore experiment began. In the South, the University of Georgia (1906) and Louisiana State University (1926) led in establishing 4-year forestry programs.

Schenck's Biltmore Forest School closed after 15 years, but as unconventional as it was, it trained about 400 students, some of which made notable contributions to forestry in the United States. Schenck and his students established a few plantations, but their focus was more on stand management.

Henry Hardtner, President of the Urania Lumber Company in Urania, LA, began to realize that cutover lands were a serious problem. Although he had no formal forestry training, he read widely about forestry and crusaded for the forestry cause. His belief that a second crop of trees could be grown profitably after the virgin timber was cut was ridiculed (Figure 3). In 1909, the Forest Service sent W.W. Ashe, and later, W.R. Mattoon, to assist Hardtner. It is interesting to



Figure 3. Carl Schenck (left) established the Biltmore Forest School in 1898 and Henry Hardtner (right) President of Urania Lumber Company pioneered the concept of reforestation of cutover land in the South.

note that Hardtner's ideas on reforestation were ahead of the professional knowledge. However, Ashe and Mattoon did give credibility to Hardtner's actions.

In 1921, the Forest Service established the Southern Forest Experiment Station headquartered in New Orleans and the Appalachian Forest Experiment Station in Asheville, NC. The Southern Station was responsible for research in the southern pine types. This included all of the Coastal Plain areas in Georgia and South Carolina; all of Alabama, Mississippi, and Louisiana; Texas and Oklahoma as far of the pine type went; and Arkansas south of the Arkansas River. The Appalachian Station had emphasis on mountainous hardwood types. Even in 1924, there were fewer than twenty professional foresters in the entire South (Wakeley and Barnett 2011).

Early Nursery Practices

In 1908, the Great Southern Lumber Company began operation at Bogalusa, LA, and it became the world's largest sawmill with four 8-foot band saws producing 1 million board feet of lumber every 24 hours. W.H. Sullivan, General Manager of the company, visited with Hardtner at Urania and, as a result, was convinced to begin a reforestation program. In 1919, J.T. Johnson was assigned as forester in charge of reforestation. Johnson had no formal forestry training, but "contributed an immeasurable quality of skill, labor and ingenuity to the building of the South's great pine forests" (Wakeley and Barnett 2011). Johnson established a one-half-acre pine seedling nursery in 1921-22 across from city hall in Bogalusa—believed to be the first pine seedling nursery in the South (Wakeley and Barnett 2011). The company established other nurseries soon after.

Johnson was fortunate to have F.O. "Red" Bateman as his assistant. Bateman was the company's head ranger (Figure 4). With only a ninth-grade education, Bateman became the prime mover in developing nursery and planting principles and techniques. By 1924, when Philip Wakeley was recruited by the Southern Forest Experiment Station and assigned to Bogalusa to begin a cooperative program on reforestation, Bateman had worked out



Figure 4. F.O. (Red) Bateman of the Great Southern Lumber Company developed many Southern nursery practices still in use today. (Photo source: C.W. Goodyear 1929).

the general principles still employed today—slit planting of bare-rooted seedlings grown at moderate seedbed densities in the nursery without shade (Wakeley 1976). He invented a dibble planting tool that is still in use today, and he developed the 6- by 8-foot planting spacing that became the almost universal standard used throughout the South for decades. Before the Great Depression caused the Great Southern Lumber Company to go into receivership, Bateman had planted 12,700 acres. At that time, no other successful pine plantation in the south exceeded 100 acres, with exception of the Biltmore Estate in North Carolina—and their planting stock were white pine seedlings grown in Europe (Wakeley and Barnett 2011; Schenck 2011).

An example of Red Bateman's ingenuity was the development of nursery seeding tool for longleaf pine seeds. Wakeley commented one morning on his frustration in the inability to drill sow longleaf pine seeds due to their persistent seed coat wing. Before noon, Bateman came by Wakeley's work site and asked Wakeley to stop by the nursery. When he arrived, Bateman demonstrated a seeder for nursery sowing of longleaf seeds that he devised that morning—it was a wooden trough 5 feet long to fit across nursery beds. It was hinged at the bottom to drop seeds on the bed. A pair of tall, curved handles at each end permitted opening it without stooping or kneeling, which made the device easy to use (Figure 5). The seeder resulted in marked improvement in the uniformity and quality of longleaf pine nursery stock.



Figure 5. This seed drill for longleaf pine seeds was developed by F.O. (Red) Bateman of the Great Southern Lumber Company.

Refining Nursery Technology

The results of Wakeley's cooperative research with the Great Southern Lumber Company on nursery production spread to other organizations interested in reforestation. A number of forestry companies developed small nurseries to evaluate the potential for beginning reforestation efforts. In 1929, Wakeley developed the idea of writing a bulletin on the results of their seed, nursery, and planting research. He decided to visit existing nurseries outside of the one at Great Southern to gain prospective from their nursery managers. The survey included six nurseries: Louisiana State University School of Forestry at Baton Rouge, Louisiana Division of Forestry at Woodworth, LA, Industrial Lumber Company at Elizabeth, LA, Long Bell Lumber Company at DeRidder, LA, and the Texas Forest Service nurseries at Kirbyville and Conroe, TX. Wakeley found the nursery managers were "observant, ingenious, and uninhibited men" (Wakeley and Barnett 2011).

The Louisiana Department of Conservation, Division of Forestry nursery was on the Alexander State Forest near Woodworth. Charles Delaney and his brother Luther were managers of the nursery and interacted frequently with Wakeley to develop the South's

first state tree seedling nursery (Barnett and Burns 2011, 2012). The Texas Forest Service nurseries followed soon afterward.

Philip Wakeley's collaboration with Johnson and Bateman at the Great Southern Lumber Company ended in the early 1930s with the advent of the Great Depression. During Wakeley's association with the Great Southern, he began developing information on seed collecting, processing, and treatments; on seedling stock specifications; and on a variety of nursery cultural treatments. With the demise of the Great Southern Lumber Company, Wakeley moved his reforestation research program to the Forest Service's newly created Stuart Nursery in Central Louisiana.

The Stuart Nursery was established by the Kisatchie National Forest (KNF) in conjunction with the creation of the Civilian Conservation Corps (CCC) in 1933. Although the KNF employees managed the nursery, a nearby CCC camp provided man-power for its operation. Nursery seedling production was about 25 million annually with most of these seedlings shipped to CCC projects that had reforestation emphases. Wakeley's reforestation research program was transferred to the Stuart Nursery. The Southern Station established an office and laboratory at the nursery and took advantage of the CCC crews to apply nursery cultural treatments and establish outplanting studies. Over the duration of the CCC involvement and support, nearly 750,000 tree seedlings were planted in research studies on the Palustris Experiment Forest (Barnett and others 2011).

The resources available at the Stuart Nursery facilitated the development of Wakeley's southern pine seedling grade specifications that are still used across the South (Wakeley 1954).

By the end of the 1930s, Wakeley and his colleagues were able to publish guidelines for southern pine seed (Wakeley 1938a), seedling production (Huberman 1938; Wakeley 1938b), and planting technology (Wakeley 1935). Early versions of these publications were used by the organizations using CCC crews to grow seedlings for reforestation projects. Most of these CCC supported projects ended with the closure of the CCC program at beginning of World War II. The availability of the CCC program provided an opportunity to field test seed, seedling, and planting research results and pioneer reforestation guidelines for southern pines.

Developing Nurseries across the South

Following World War II, a concerted effort to develop and apply reforestation technology began. In 1954, Wakeley published his "*Planting the Southern Pines*" document which incorporated the results of the research programs with the Great Southern Lumber Company and the Stuart Nursery (Wakeley 1954). This one publication provided the basis for nursery development and plantation establishment. Its thoroughness resulted in it becoming the 'bible' for restoration technology for the southern pines (Figure 6).

Soon nurseries were developed by all southern state forestry organizations and by most major forestry companies. Few nurseries established prior to WWII remained in operation. The Stuart Nursery and W.W. Ashe Nursery in southern Mississippi did continue in operation for many years, but now are closed. The Soil Bank Program in the early 1960s did much to increase the demand for planting stock and nursery development continued to expand. In the late 1970s and early 1980s, reforestation programs of forest industry continued to expand to the point that major companies developed or expanded their nursery production. So, during the late 20th century, large portions of nursery production shifted from



Figure 6. Philip C. Wakeley pioneered development of reforestation technology for southern pines that facilitated the reforestation of the South's devastated forest land.

Forest Service and state operated nurseries to large commercially operated forest industry nursery operations.

Although there have been many refinements and improvements in nursery technology over the last 75 years, the basic guidelines that Wakeley and his colleagues developed in the early 20th century remain as the foundation for these efforts.

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