Earl H. Frothingham: Portrait of a Pioneering Researcher and the First Director of the Appalachian Forest Experiment Station

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The U.S. Department of Agriculture's Forest Service faced an important decision in 1921. In July, the agency established the Appalachian Forest Experiment Station (AFES), headquartered in Asheville, NC. The immediate objective of the AFES was to study methods for increasing productivity of the heavily cutover forest lands that were being acquired for national forests. The agency needed a highly qualified forester to administer the new experiment station, someone with a research background and knowledge of local forest conditions as well as being a capable administrator and good communicator. Ultimately, that forester and first station director of the AFES was Earl Hazeltine Frothingham.

Earl Frothingham as director of the Appalachian Forest Experiment Station.

Surprisingly, only fragments of biographical information are available on this pioneer forest researcher and first station director of the AFES (e.g., Gaston 2016, Maunder 1971). The following summary of Earl's life, work, and legacy has been assembled from many different sources, but remains unfortunately incomplete.

FROTHINGHAM, THE STUDENT

Earl (often called "Andy"), the youngest of five children, was born to James Frothingham and Chloe Hazeltine on August 31, 1880 in Manchester, IA. The Frothingham family in America, however, had roots in New England. In the early 1630s, Earl's great-great-grandfather, William Frothingham, left New England to settle in Charlestown, MA. William Frothingham's descendants were prominent in the American Revolution and in government, portrait painting, and even literature—a great uncle of Earl's father was Washington Irving, the well-known 19th century author of *Rip Van Winkle* and *The Legend of Sleepy Hollow*. Earl's parents were from New York where his father was a Presbyterian minister. Church-related assignments caused the family to move to several midwestern States including Minnesota, Iowa, and lastly Illinois, where Earl attended Chicago's Hyde Park High School. After graduating high school, Earl enrolled in the University of Michigan where he received a B.A. in 1904 (with a forestry emphasis); 2 years later, Earl earned a M.S.F. from the newly opened forestry program at the University of Michigan (Detroit Free Press 1906).

An early event influenced his career path into postgraduate study in forestry (Maunder 1971). In a letter to Gifford Pinchot (Forest Service Chief when Earl was

Endangered male Kirtland's warbler (*Dendroica kirtlandii*) in a jack pine forest in Michigan. (Photo courtesy of Joel Trick, U.S. Fish and Wildlife Service)

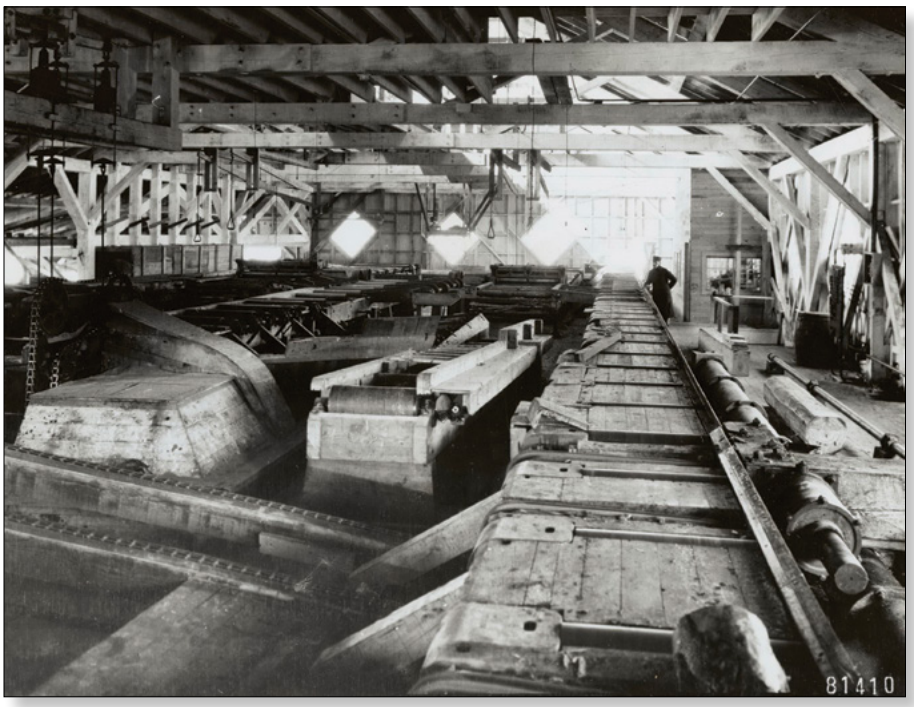
hired and later his colleague in the national office), Earl stated: "I owe my first inclination toward forestry to an early passion for the study of birds" (Gaston 2016: 12). According to various accounts (Covert 1903, Frothingham 1903, Wood 1904, Wood and Frothingham 1905), Earl, as an undergraduate student museum assistant, heard the song of a bird he did not recognize while on a spring fishing trip to one of Michigan's jack pine (*Pinus banksiana*) forests. Earl and his friend collected a specimen of this bird which expert ornithologist, Norman Wood, identified as the previously assumed extirpated Kirtland's warbler (*Setophaga kirtlandii*). When questioned about taking a rare songbird, Brigham (1943: 105) recounts Earl's response, "It was there in some numbers and in full song. The song and the bird were new to me and I thought best to secure a specimen by which to identify it." When asked why he did not take more specimens, he said "I knew they had nests and hated to take breeding birds. I never thought of its being Kirtland's Warbler."

FROTHINGHAM, THE FOREST ASSISTANT

Shortly after receiving his graduate degree, Earl began work with the Forest Service on July 1, 1906, just a year after Congress had created the agency (Gaston 2016). His first duty station was in the Office of Forest Extension at the Dismal River National Forest in Halsey, NE. While employed at the Office of Forest Extension, he worked with Carlos Bates, another new hire who used innovative methods for the production of tree seedlings suitable for survival under harsh conditions in plantings established as plains windbreaks. In the fall of 1906, he and Bates were transferred to the Branch of Silviculture in the Washington Office where they worked in the Office of Silvics under the direction of Raphael Zon. Chief Pinchot had given Zon the responsibility to establish forest experiment stations (Young 2008).

Later in life, Earl believed his writing proficiency could have been a factor in being hired by the Forest Service (Maunder 1971). Writing proved to be a valuable skill at this stage in his career, as an important project of Zon's staff was to conduct studies to increase the productivity in heavily cutover eastern forest types. During summers, Earl and several assistants would collect field data, which he would summarize for publication during the winter (Maunder 1971). He wrote descriptive publications for forest communities of Douglas-fir (*Pseudotsuga menziesii*) (Frothingham 1909), aspen (*Populus* spp.) (Weigle and Frothingham 1911), second-growth mixed hardwoods (Frothingham 1912), eastern white pine (*Pinus strobus*) (Frothingham 1914), northern hardwoods (Frothingham 1915b), and eastern hemlock (*Tsuga canadensis*) (Frothingham 1915a). He also wrote management and marketing publications (Frothingham 1916, 1917d).

Earl was more than just a researcher, but some of his forestry work with the agency did not go smoothly. For instance, he was assigned a forest management project in 1912 on the 230,000-acre Menominee Indian Reservation in northeastern Wisconsin that ended up in the Federal Court of Claims many years later. In 1908, legislation introduced by Wisconsin Senator Robert M. La Follette allowed for a cooperative agreement between the U.S. Department of the Interior, charged with supporting and managing tribal lands through the Bureau of Indian Affairs (BIA) and the U.S. Department of Agriculture (through the Forest Service) to be developed to do a number of



The interior of the sawmill built in 1908 by the Forest Service for the Menominee Indians in northeastern Wisconsin. Earl Frothingham came to their reservation in 1912 to develop a management and timber cutting plan for the Tribe's forests, unaware of an earlier law that limited the way trees could be cut. Earl's more aggressive harvesting suggestions were adapted by the Forest Service into a plan that resulted in decades of litigation against the Federal Government, with the Menominee prevailing in court in 1950. (USDA Forest Service photo taken by E.A. Braniff in January, 1909)

projects on the Menominee Reservation. This law included Forest Service funding and the building of a sawmill to be owned and operated by the Tribe and fed by mature timber as designated by the Forest Service to be harvested from the Reservation. While this formal agreement was ended shortly after the mill was constructed due to disputes between the two Federal agencies, the Forest Service continued to provide forest management support. Earl, apparently unaware of the stipulations in the 1908 law and subsequent agreement, installed a 1.5-mile-long transect through the designated tract of almost 4 square miles to develop rules for harvesting, which loggers would follow under tribal supervision. After analyzing the results of his inventory on a limited (2,300 acres) area, Earl concluded the necessary level of harvesting to provide logs for the mill required clearcutting, rather than the lower volumes that would be yielded by selecting individual trees for harvest. Hence, Earl's harvesting rules specified that hardwoods of all sizes and pines larger in diameter than 15 inches would be cut, which the Forest Service then translated into a plan for the entire Menominee Reservation. The loggers contracted by BIA applied Earl's suggested rules with little oversight and much of the tract was cleared. The Menominee were unhappy with the results of the harvest and in 1935 filed a lawsuit [Menominee Tribe of Indians v. United States (Fed. Cl. 1950)] in the federal court of claims seeking damages from the Federal Government because the Forest Service had not followed provisions of the 1908 Act. Federal lawyers defended the actions of the Forest Service, but in 1950 the Court agreed with the Tribe and in 1951 awarded the Tribe a total of $8.5 million in damages (Davis 2000, Hoyt 1951, Monroe Evening Times 1951, Trosper 2007).

Earl Frothingham in his study of thinning an eastern white pine plantation at the Biltmore Estate, which had been planted by Carl Schenck in 1899.

FROTHINGHAM, THE FOREST EXAMINER

The Menominee case apparently did not hinder Earl's career—he did that job based on his limited understanding of the circumstances—and his work and productivity continued to help him advance in his career. For example, Earl was a pioneering voice for a suitable measure of forest site quality—an essential component of silviculture for assessing stand productivity. An active debate centered on a choice among methods based on composition of vegetative communities, culmination of stand volume, and tree height. Undoubtedly influenced by his former professor, Filibert Roth, at the University of Michigan for a site index system based on height (Roth 1916), Earl took up this cause and in a series of articles he reinforced the logic behind using site index (Frothingham 1918, 1921a, 1921c).

Further evidence of Earl's growing status with the agency is shown by his promotion to forest examiner around 1914 and assignment to an ambitious field project associated with the 1911 Weeks Act. The Weeks Act authorized the Forest Service to purchase private forest lands in the Eastern United States to protect headwater sources of navigable streams and to maintain those lands as national forests. Across much of this region, headwater forests had been heavily cutover, and managers needed better information to restore these areas to productivity, including replanting them, if necessary. Perhaps because of his experience with similar forest types, Earl was assigned to survey cutover areas purchased for national forests in the Southern Appalachians with the objective "… to find some definite basis for immediate silvicultural management" (Frothingham 1917c).

Beginning in early July of 1915 with one field assistant, Earl visited 50 cutover timber stands in national forest purchase areas of North Carolina, Virginia, and West Virginia. He stated in his work plan that each inventoried stand was considered "… as a diagnosis of the different unrelated sets of conditions found and was without any previously formed hypothesis" (Frothingham 1917b: 4). After talking with residents to determine when harvesting occurred, Earl established one or more quarter-acre sample plots and collected stand data on the sites prior to harvest. The data included what was cut (and what remained), how the sites were regenerating, what the future prospects of the developing stand were, and what method of cutting would give better results (and why). Initially, the cutover study was intended to run 2 years, but was suspended in mid-July of 1916 to allow for an investigation of the effects of intense rainfall from two hurricanes on sites treated with different harvesting practices (Asheville Citizen 1916, 1922). Subsequent evaluation of the first-year results of the cutover study indicated additional field work was not necessary to satisfy the objectives of the investigation. Earl organized the results of the cutover study in a report that was submitted to William L. Hall, Assistant Forester in charge of land acquisition for national forests, and summarized in a publication (Frothingham 1917a, 1917c). Earl's thorough study of forests in the Appalachians made him particularly knowledgeable and his perspective on the future needs of society from public lands would prove important in his next assignment.

FROTHINGHAM, THE STATION DIRECTOR

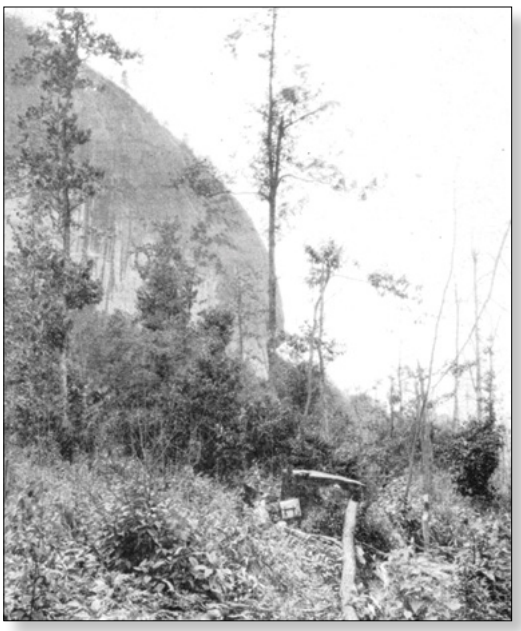
After years of internal efforts to formally expand the Agency's science program, by 1920 the Forest Service had secured the funding to develop two regional forest experiment stations in the Southeastern United States (Clapp 1921, Frothingham 1921b). Each would need the guiding hand of a capable administrator and knowledgeable researcher who shared the same vision for these stations. With a track record in research and the accomplishment of large projects—including work in the Southern Appalachians—Earl was named as station director of the newly established AFES in July 1921 (Asheville Citizen 1921a).

In addition to himself, the initial AFES staff consisted of three researchers (Clarence Korstian, Ferdinand Haasis, C.F. McCarthy) and one clerical assistant. The Station's very limited initial operating budget covered rent for office space—three small rooms on the second floor of the Asheville Citizen-Times newspaper building—and staff salary. With the budget and personnel constraints, Earl stated that the first field studies would begin immediately and would involve minimum requirements in time and expenses with attention given to site quality determination and forecasts of product yields (Asheville Citizen 1921c). Much of his early activities as station director involved communications about the complexities associated with the evolving discipline of agricultural research associated with trees, or silviculture, which he described as "… an art and a science …" of growing crops of trees (Frothingham 1923b). For instance, in a conference of largely agricultural researchers, Earl described in detail and ranked seven categories of forestry investigations (for example, insects, fire, site quality) (Frothingham 1923b). His top ranked priority was forest type studies, which he defined and justified:

> *The unit in forest management is the stand, rather than the species. The classification of forest societies (types) and physical environments (sites) therefore forms the basis for all other investigative work. In the Southern Appalachians the large number of species and the variety of habitats make this a particularly difficult matter.*

"The Station's very limited initial operating budget covered rent for office space—three small rooms on the second floor of the Asheville Citizen-Times newspaper building—and staff salary.

Earl was also well aware of the need for coordination and collaboration of the AFES research program with the broader forestry community (Frothingham 1921b). Earl almost certainly played a major role in the formation of the Appalachian Forest Research Council (AFRC) in 1925 (Anon. 1925). The purpose of the Council "… is not to conduct research work itself, but to stimulate and to coordinate the efforts of all agencies in the Appalachian region engaged in forest research, and to advise them in the selection of the problems to be undertaken" (Anon. 1925: 83). Meetings of the AFRC and participation of AFES researchers were the topic of many newspaper articles (Asheville Citizen 1925, 1931). An interesting contrast to the collaborative relationship of Earl's program of forestry research with the AFRC can be found with the Appalachian Logging Congress (ALC), which claimed membership of the leading southern lumbermen organizations. Several months after arriving in Asheville, Earl presented the AFES's research program at their annual meeting in Knoxville, TN and made a case for adopting harvesting and fire control practices that would maintain future stand productivity on cutover lands (Frothingham and McCarthy 1922, Knoxville Sentinel 1921). The



Forest conditions near Lookingglass Rock after the virgin stand had been harvested in 1913 and burned in May 1916. This photograph was taken later that summer at the location of sample plot no. 7 installed by Frothingham before the fire, on July 28, 1915, during his study of cutover areas (Frothingham 1917c). In 1923 Frothingham installed four contiguous permanent plots at plot no. 7 for a long-term study that continues to be inventoried.

ALC, however, was leery of so-called "scientific forestry methods" (Asheville Citizen 1921b), which seemed to be associated with controversial provisions of the recently introduced legislation that would reward States that enacted laws requiring fire control and sustainable forestry practices (Kellogg 1921).

In 1930, Earl and the AFES later made history within the first decade by hiring Margaret Stoughton, the first professional female forester in the Forest Service (Des Moines Register 1930, McNab and O'Shields 2023). In addition to being station director, Earl was also an active scientist. Noteworthy are four permanent plots that he and McCarthy established at Looking Glass Rock in 1923, where a virgin "cove hardwood" stand was harvested in 1913 and accidently burned in May 1916 (Frothingham 1923a). In an early example of replication of treatments, vegetation competing with saplings of desirable trees was removed from two plots; the other two plots were left as untreated controls. These four plots are believed to be the oldest permanent research plots in the Southern Appalachians and continue to be inventoried (Abell 1935, Della-Bianca 1971). To facilitate and expand upon field-based research in the area, in 1925, an area on the Pisgah National Forest near Asheville, NC was designated for the construction of field offices and laboratories; 2 years later, Earl and Merwin Mattoon, National Forest Supervisor, formally established the Bent Creek Experimental Forest as a place dedicated to research and demonstration (Asheville Citizen 1926, Forest Service 1927).

Earl and his staff responded to several noteworthy forest resource challenges while he was station director, such as the commercial loss of the American chestnut (*Castanea dentata*) to an introduced fungus (*Cryphonectria parasitica*) (Frothingham 1924, 1925). Later, Earl helped to conduct one of the first surveys of forest resources in the Southern United States (Frothingham and Nelson 1944). These large-scale surveys of forest conditions started in part with the 1923 Capper Report, which was led by the Washington Office but included administrative assignments for Earl and his staff (Abell 1933). The purpose of the report, called for by Senator Capper of Kansas, was to examine national timber depletion and forest ownership following World War I with a proposal for increasing the U.S. Government's role in the practice of forestry on private lands to increase productivity. A decade later, the Copeland Report (USDA Forest Service 1933) addressed current and future problems of forest resources and management. The report required considerable input from all experiment stations and included a program of research proposed by Earl (Frothingham 1933a, 1933b, 1933c; Steen 1998). The Copeland Report recommended increasing public ownership of Eastern United States forests and better management of forest resources on private lands, with assistance by both State and Federal Governments. The work on these congressional reports was likely the stimulus for a dozen similarly formatted Forest Service bulletins in a national series on regional timber growing and logging practices; Earl wrote a bulletin for the Southern Appalachians (Frothingham 1931).

While station director of the AFES, Earl and his wife Helen (whom he had married in 1909 while a forest assistant) were an active part of the Ashville community. Earl was a member of Rotary, Civitan, and Pen and Plate Clubs and Helen's name appeared frequently in Asheville newspapers in association with various groups, including the YWCA. The Frothinghams' first home, a craftsman style bungalow in the historical Norwood Park subdivision, was built around 1923 and is included

on the National Register of Historic Places (U.S. Department of Interior National Park Service 2008). By 1929 the Frothinghams had moved to a larger house in the upscale Biltmore Forest area of south Asheville (Asheville Citizen 1929).

FROTHINGHAM, THE SENIOR SILVICULTURIST

Earl requested to be changed from station director to senior silviculturist in the AFES in 1935 (Asheville Citizen 1935). As senior silviculturist, Earl published several papers that had been delayed by his duties as station director (Frothingham 1941, 1943). In 1940, he was a member of a committee of the Society of American Foresters tasked with compiling a history of American forestry to that point (Frothingham and others 1940).

FROTHINGHAM'S RETIREMENT AND LEGACY

Earl's wife, Helen, passed away in 1941 (Asheville Citizen 1941), which may have helped Earl decide to retire from the Forest Service on August 31, 1943 (Asheville Citizen 1943). During his long career, Earl had been a member of the Society of American Foresters (since 1908), serving as the Society's secretary and treasurer for several years and a member of its executive council. He was elected a fellow of the Society of American Foresters in 1942.

In 1943, Earl moved with his older sister, Frances, to Riverside, CA, where several of his siblings lived. Two decades later, an unusual dawn redwood (*Metasequoia glyptostroboides*) in the yard of his home in Riverside caught the attention of a local reporter who featured Earl and the tree in a newspaper article (McCall 1964). Otherwise, he led a quiet life in retirement.

Earl died on October 28, 1969, and was buried next to his sister Frances in Riverside Cemetery, Long Beach, CA. His brief obituary provides his name and time of employment but nothing factual about his work as a very young Forest Service employee: "Earl H. Frothingham, beloved brother of Miss Frances Frothingham, uncle of several nieces and nephews; he was employed by U.S. Forestry Service for 37 years" (Los Angeles Times 1969). Collectively, his publication record includes dozens of scientific articles, technical bulletins, reports, and other contributions. However, it is hard to overstate the contributions of Earl Hazeltine Frothingham, long-time station director and colleague of Gifford Pinchot and many other "first foresters" to the Forest Service, the AFES, and American forestry.

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