The Fort Valley Experiment Station and Its Preservation

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The first U.S. Forest Service (USFS) forest experiment station was established in August 1908 in Fort Valley, Arizona, for the purposes of research into silviculture (the management of trees). The station began in a two-room forest ranger cabin with one employee. Over eighty years later, it has grown to include several residences, an office, greenhouses, meeting rooms, and outbuildings. Silviculture is no longer the main emphasis of USFS research and the Fort Valley site has become outmoded and given way to new facilities located in Flagstaff. As the Fort Valley station ends its first century of existence, it stands as the location for innovative programs in forestry research, interpretation, and preservation administered by a collaborative effort.

A Forest Service forester, Raphael Zon, encouraged USFS Chief Gifford Pinchot to establish experiment stations that were solely devoted to scientific research on the national forests. Recognizing the need for research, the USFS actively sought permanent investigative sites which brought Forest Service men to Flagstaff—the home of the largest ponderosa pine stand in the United States. Zon and two fellow foresters, Willard M. Drake and Gustaf Adolph Pearson, rode horses through the Coconino National Forest in August 1908. Their trip was delayed while they sat out a brief midsummer monsoon that produced torrents of water and created streams where there had been none before—an indication of the extreme weather conditions in the area. Afterward, they traveled one more mile and climbed the knoll where the Fort Valley ranger station was located and Zon proclaimed, "Here we shall plant the tree of research" (Pearson 1936). Hence, on January 1, 1909, the official opening of the first USFS experiment station would fulfill the mandate to provide technical bases for national forest management. The site was known originally as the Coconino Experiment Station, but changed to the Fort Valley Experiment Station in 1911.

The location is in the northwest corner of Fort Valley, a large open meadow at the base of the San Francisco Peaks that sits at an elevation of about 7,000 feet. Pon-

derosa pine surrounds the valley and two year-round springs (Big and Little Leroux) supply water to the area. Fort Valley was chosen because of the virgin stand of timber (access to Fort Valley was difficult and expensive, so loggers had generally stayed away), the existing ranger's cabin, and the accessibility of water. Also, if trees could regenerate at Fort Valley, where sixty-degree diurnal temperature changes are common, then they could regenerate elsewhere much easier.

At the time of the foresters' visit, the Flagstaff region was extensively involved in lumbering and the forest surrounding the town was in danger of being clearcut and left a barren wasteland. (The idea of selective cutting and leaving seed trees was unknown, or, at least, not practiced.) Pinchot, who several years previously had gained personal knowledge of the Coconino National Forest from a mule-chasing escapade, agreed when the forest's supervisor, Frank C. W. Pooler, suggested the territory as the site for the agency's first research location (Pearson 1936; Pinchot 1947). Silviculture was the top priority of forest research, and where better to study tree regeneration than in a forest that was fast falling to the loggers?

Life at the Station

Pearson, one year out of college, remained at Fort Valley as the director and spent the winter of 1908-09 alone in the ranger cabin. One of his winter chores was to convert the cabin into a combination office and residence. Pearson gave much of the credit for his survival that first winter to his two mules, Pat and Mike. The mules brought supplies, equipment, and men to the station between 1908 and 1918. They could travel nine miles into Flagstaff in one hour and forty minutes—when encouraged with a whip. Later, when more staff was on site, the mules escorted the young men into town for Saturday-night entertainment and made sure they returned home safely (Pearson 1936).

A young silviculturalist, Emanuel Fritz, was assigned to the experiment station and arrived in August 1916. He was awestruck by the beauty of the forest with the San Francisco Peaks overshadowing all, and felt blessed that he could enjoy the solitude of Fort Valley. Fritz joined the Pearson family (he had married in 1910), the maintenance ranger and his wife, and other assistants. By this time, the station's structures consisted of the original ranger's cabin, which served as Pearson's residence; an office/laboratory; a barn (for the mules and a milk cow); and possibly two small residences. During the cold weather, duties included building an all-night fire under the storage tank to keep the station's water system from freezing. Bachelor Fritz and his co-workers never figured out a way to keep their quarters warm so they retired early in the evening. The station's isolation forced the workers to be self-suf-

ficient, since the roads to town were sometimes impassable and supplies were not always promptly replenished. A small greenhouse built for research purposes undoubtedly also served as a vegetable garden for the staff's use. The wintry days usually warmed up sufficiently to set chairs outside in the sun and read or play cribbage, or explore the forest on snowshoe. Fritz also well remembered the sub-zero days and shoveling snow after a thirty-inch snowfall in April 1917. Pearson was delighted to learn that Fritz was handy with tools, because the single-wire telephone line between the experiment station and Flagstaff was always needing repair (Fritz 1964).

Funding was slight from the very beginning, probably because research had low priority from the administration and also lacked exposure to the general public, which, in turn, meant less congressional lobbying for funds. But the staff, sometimes under difficult circumstances, continued to gather data necessary for making forest management decisions. Fritz was convinced that "if we can work out regeneration here, under such adverse conditions, it can be done anywhere else more easily" (Fritz 1964). He did not specify if he was referring to living accommodations or forest problems.

For the field (or summer) season, several permanent technicians and sometimes ten to twelve temporary workers were assigned to Fort Valley. A cook/janitor has hired at $60 per month plus board, since Pearson felt that scientists were hired to do research, not cook. The cook/janitor was paid by both the Forest Service and the workers (prorated to about $1/day/man). The grounds were neatly kept: Pearson emphasized the housekeeping part of the job along with the scientific work since he believed that experiment stations had to be presentable to the public and "should in years to come represent the highest scientific talent in the Forest Service" (Pearson 1914).

The Fort Valley Experiment Station triumphs as the site of the first bathroom in USFS Region 3, built in 1918. It was actually a bath house, built inches away from the ranger cabin since there were cost limitations on buildings. Pearson later advised experiment stations to construct their buildings during the first year of operation so that scientific research could be the primary function, although Fort Valley structures were not constructed right away. By 1927, after nineteen years of research activity, Fort Valley contained the structures mentioned above, plus two more residences (Pearson 1936).

At that time, the Fort Valley staff included several technicians and sometimes a clerk. Depression-era governmental work project funding and the expansion of station research duties to include range experiments allowed for more construction to occur between 1930 and 1935 than had been done during the prior 22 years. In 1935, the original water

system was replaced by a two-and-a-half-mile underground pipeline that connected Little Leroux Spring to the station at a cost of $10,000. Electricity replaced gas lights in 1936 (USFS 1935-52; Pearson 1936). Since its inception, the facility had grown from one structure and one staff member to a campus with several residences, a barn, dormitory, office building, schoolhouse/recreation hall, laboratory, root cellar, and as many as twelve technicians.

Until 1953, the Fort Valley Experiment Station was part of the Southwestern Forest and Range Experiment Station whose territory included Arizona, New Mexico, the western half of Texas, and the Oklahoma Panhandle, with headquarters in Tucson, Arizona. After 1953, research funding cuts caused the Southwestern Station to merge with the Rocky Mountain Forest and Range Experiment Station headquartered in Fort Collins, Colorado, with new boundaries of Arizona, New Mexico, Colorado, Kansas, Nebraska, South Dakota, and eastern Wyoming.

The station always worked cooperatively with the Coconino National Forest and its regional supervisors in Albuquerque, New Mexico. Research was conducted upon lands around the Southwest forests, and the station served as the site for ranger schools to train incoming regional rangers. The first school (1909) included rangers from across the country, but later schools were primarily for employees of the USFS's Southwest Region. The earliest schools were held under tent coverings; later, funds were allocated to build several structures on the station grounds that were used for the school. During these schools, students were taught about silviculture, camp maintenance, law, grazing, field work, horse care, and office work. Scientists assigned to Fort Valley often served as instructors to the school attendees.

Foresters involved with the initial years of the USFS spent time at Fort Valley since the station was the first of its kind and the main field station and laboratory for forest management investigations in Region 3. Pearson trained and worked with many men considered "founding fathers" of forest research: Raphael Zon, Samuel T. Dana, Theodore S. Woolsey, Jr., Enoch W. Nelson, Clarence F. Korstian, Bert Lexen, E. M. Hornibrook, Edward C. Martin, and Charles K. Cooperrider are among those who worked at Fort Valley (Gaines n.d.). An impressive number of publications by these and other scientists evolved from research performed at Fort Valley.

During the 1950s, the Arizona State Teachers College (now Northern Arizona University) in Flagstaff began a forestry school and USFS personnel based at Fort Valley participated by lecturing and offering laboratory opportunities to students. USFS built a Forestry Sciences Laboratory on campus next to the School of Forestry and commencement of these two new programs coincided

with the fiftieth anniversary of the Fort Valley Experiment Station. Celebrations emphasized the newer facilities that would henceforth perform much of the work the experiment station previously did. After this, scientists' presence at Fort Valley diminished except for research work done in the forest.

Research at the Station

Long-term objectives of Fort Valley ponderosa pine research include natural and artificial regeneration, stand improvement methods, and mensurational (measuring) studies. Research was primarily conducted in the Coconino National Forest within walking or riding distance of the station. Pearson and his staff established sample plots throughout cutover and virgin forest lands varying in size from 12 to 400 acres. Most of the trees in each plot were assigned and tagged with a number, so scientists could measure and observe the tree's growth over time. Usually a tree was measured every five years, sometimes more often, and checked for disease infestation, damage from rodents, or other factors that affected growth.

In January 1909, Pearson initiated a project to determine the effect of climate on ponderosa pine seed regeneration. He began keeping weather records by establishing six meteorological observation stations in a chain across the open park of Fort Valley, of which three were checked daily and the others weekly. The stations monitored temperature, precipitation, relative humidity, and wind movement within the park area. This assignment was to determine weather's role in reseeding, and it accompanied other experiments such as the creation of plots for a seed-tree method of regeneration (1910).

Effectiveness of the seed-tree project was complicated by the disturbance from wildlife and livestock grazing, and Pearson studied Fort Valley-area forest and forage types that had been grazed by sheep. His 1910 recommendation was that logged lands should be protected from sheep and cattle grazing until the seedlings were well established. Further examination over the next several years corroborated his earlier findings. Later, when the Fort Valley station became headquarters for a range experiment station in addition to forest work, extensive research on grazing effects continued.

Between 1916 and 1920, research at Fort Valley included a study of forest types to find out physical conditions prevailing in specific forests. Instruments placed at various locations and altitudes recorded the conditions of air, soil, precipitation, and wind. Fritz was involved in this project as he and his partner placed weather stations at altitudes of 8,500 and 10,500 feet. The higher station was installed in mid-November when the ground was already frozen solid; the workers chipped out the earth to bury support poles. They then gathered data weekly from

the stations, no matter what the weather. It was an all-day event: they left the station at 5 AM with snowshoes strapped on and lunches packed (Fritz 1964).

Before 1931, the lands used for research by the experiment station were not designated study forests, except through agreements between Coconino National Forest and Fort Valley that withdrew certain forest lands from entry. In 1931, a Forester's Order officially established the Fort Valley Experimental Forest on Coconino National Forest lands. This further protected study plots from logging, hunting, fuelwood cutting, homesteading, and other uses. The original order listed 2,420 acres near the station as experimental forest lands. All research analyses of the forest were to be conducted at the experiment station. In 1935, amendments added 1,600 acres, including Little Leroux Springs and some Kaibab National Forest lands. Another amendment in 1941 added more forest lands, making a total of 4,950 acres on the experimental forest (USFS 1931; Pearson 1942).

The station's research lands were not limited to the Fort Valley Experimental Forest, and for years the scientists studied forest territories around the Southwest. This practice included range studies when the station's scope expanded to include forage research; hence, its name change to the Southwestern Forest and Range Experiment Station. During the 1930s, research was conducted at Fort Valley and elsewhere on seed spot experiments, ponderosa pine, piñon tree nut production, nursery observation, range monitoring, fence post durability, and logging and timber-sale monitoring. Beginning in 1936, thirty Civilian Conservation Corps (CCC) laborers worked at Fort Valley for five months on reservoirs, erosion control, forest planting and seeding, forest stand improvement, range revegetation, eradication of poisonous plants and weeds, and experimental plots. Ten miles of utilization roads were also built during the Corps' tenure of several years (USFS 1935-52).

In the 1940s, the Fort Valley Experiment Station staff who were not called into World War II military service involved the public in the station's ongoing work by giving radio interviews on forest topics that promoted the value of research on national resources during wartime. Pearson encouraged more use of forest trees to support national defense. The station remained open during World War II since research dollars were plentiful for silviculture, forest insect study, and disease work. In 1942, after a five-year analysis, a study of current Forest Service timber harvesting methods was thought to be misdirected, and station scientists recommended that a new approach called improvement selection be initiated. This technique sought to cut the less-desirable trees first to allow the higher-quality trees more room to grow. Early logging practices had always cut the straight trees first and left the crooked

ones (USFS 1935-52).

In September 1944, a seminar honoring Pearson was held at the Fort Valley Experiment Station, as Pearson's research career had earned him a national reputation as the expert in ponderosa pine management. Twenty-five representatives of timber management and research from five western regions met at Fort Valley for three days of discussions and fieldwork on ponderosa pine research and paid tribute to Pearson and his thirty years of work before his retirement in December 1944. Pearson and his staff had measured and nurtured over 40,000 trees in the Fort Valley Experiment Station and surrounding forest. Pearson's pioneering work in tree regeneration enabled later foresters to consider all the influential factors and decide on the best approach to a given situation. For his retirement project, Pearson wrote an encyclopedia on ponderosa pine management that eventually became the handbook used by all foresters.

Fort Valley research continued with inquiries into management after forest fires. In 1948, a human-caused fire burned 1,800 acres on the southern boundary of Fort Valley, and 1,500 acres were burned in 1950 near A-1 Mountain, also near the southern boundary of Fort Valley. With the proximity of the experiment station to the fires, forest-fire research provided an opportunity for an experimental effort in replanting. The methods used following the 1948 fire proved successful, and allowed the burned area to recover more efficiently (USFS 1953-80). These techniques have since been employed by other foresters across the nation.

Research emphasis changed in the 1950s and 1960s from regeneration to forest management utilizing procedures garnered from initial studies. With the opening of the Northern Arizona University research facility, workers no longer lived at Fort Valley, and, except for an on-site caretaker, the station was generally vacated after working hours. The scientists continued with earlier projects by publishing a post-forest-fire study which became standard policy for foresters to follow in marking scorched trees. New experiments with wheatgrass and aspen fuel cutting (in conjunction with the Coconino National Forest) began. Fort Valley cuttings from a mistletoe study area were used at a Flagstaff pulp mill that opened in 1953 (USFS 1953-80). In 1966, eighteen forestry students were offered a silviculture summer camp course taught by Professor Martin B. Applequist. Each day, the students were in the experimental forest measuring, observing, and learning techniques that would benefit them in their careers, following the steps of several generation of earlier Fort Valley foresters.

Study projects in the 1970s included tests of herbicides on perennial grasses, analysis of Little Leroux Springs water-flow variations, and research on Arizona fescue and mountain muhly

plant growth. Research focus changed in the 1980s to stress physiology, and a greenhouse was constructed specifically to study seedling growth in a monitored atmosphere and an entomology lab opened to examine the effect of stress on trees from insect attacks.

During the mid-1970s, the USFS entered into a memorandum of understanding with the U.S. Geological Survey (USGS) for rental of some of the Fort Valley buildings. Several USGS employees set up office and research space at Fort Valley. This cooperative arrangement has benefited both USFS and USGS and continues today with the USGS occupying two Fort Valley buildings. USGS presence has helped discourage structure deterioration since the buildings have been kept heated and maintained.

Preservation Efforts

In 1972, the director of the Museum of Northern Arizona, Edward B. Dansen, asked the USFS to consider designating the Fort Valley Experimental Station as a National Historical Landmark when he read an announcement in the *Arizona Daily Sun* newspaper that several Fort Valley buildings were to be declared surplus and sold. This was the first preservation interest shown in the site. Dansen urged the site and buildings be retained for their historical value. The USFS responded by saying available funds went to research first and what was left over went to building maintenance, which meant the buildings were not being properly preserved. The U.S. National Park Service indicated that a National Historic Landmark classification was possible when theme subjects included conservation. The result of all this was that some of the buildings were sold and moved and others remained at the station, but no historical designation was assigned (Schubert 1972).

Preservation efforts were begun by the author about 1988 as part of Master's thesis research on Fort Valley history. The station was in danger of being completely vacated with the construction of a multi-million-dollar forestry sciences complex at Northern Arizona University in 1991. The station was in limbo, an albatross to the USFS's research division, which received funding for research but not for building maintenance at an outdated historic site. To promote preservation, the author began writing articles, giving presentations, cataloguing historic documents, and working with USFS personnel to initiate use of the station in ways not limited solely to research. This is a slow, but forward-steeping, process. Plans for 1994 involve several interpretive tours and the inclusion of the station in the 1994 Flagstaff Festival of Science.

A top priority for 1994 is to complete the nomination of the station to the National Register of Historic Places. Approximately twelve structures and buildings qualify for listing. All of the buildings require interior maintenance

that includes adequate heating, insulation, painting, and other general upkeep. The exteriors of the buildings have been well-kept and contribute to the station's attractive, rustic appearance. Once rehabilitation is complete, the structures can be used as residences, offices, or meeting rooms.

Archival documents, photographs, and field records that date to the station's opening in 1909 are extant and can assist historians' and researchers' work on the station and forest lands. A recent USFS visitor to Fort Valley expressed surprise to see photographs of a site he was currently working on and was anxious to review the accompanying historical data. The collection is now being catalogued with the guidance of the USFS Historian with the intention that the materials will be accessible to forestry researchers and students.

This essay summarizes the history of Fort Valley and recent preservation endeavors. Collaborative administrative efforts to determine the future use of the 86-year-old site are now underway. The potential exists for a dynamic facility at the station. Its rural setting amidst the pines, spruce, and fir present an appealing ambiance with aids in imagining an instructive and enjoyable interpretive center. Riding or walking through the area today easily invokes visions of scientists measuring trees, planting seedlings, monitoring wildlife and livestock damage to trees, recording temperatures and precipitation, or a myriad of other activities. But most of all, a visitor senses the quiet. Even though the station is within an eighth of a mile of a major highway, its secluded setting atop a small knoll shields it from modern-day intrusions. The Fort Valley Experiment Station is a unique place because of its rank as the nation's original forest experiment station. Its pioneering and consistent research findings help dictate forest management decisions made today. It warrants preservation.

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