LA-UR-06-3549 **May 2006**

Approved for public release;
distribution is unlimited.

Title

Jemez Forest Telephone Line

A Historic Communication Network Constructed by the U.S. Forest Service as a Key Strategy in their Fight against Fire, 1906–1947

Prepared for

Ecology Group
Environmental Stewardship Division
Los Alamos National Laboratory

(Subcontract No. 24496-001-05 AH)

Prepared by **Janie O'Rourke**

Los Alamos
NATIONAL LABORATORY
Los Alamos, New Mexico 87545

Editing and composition by Hector Hinojosa, Group IM-1

Cover illustration: A telephone linesman strings the single bare wire of the Forest Service telephone line along roads and trails to connect ranger stations and fire lookout towers throughout the National Forest. This was the type of line hung across the Jemez Forest between 1906 and 1947. (Photo: U.S. Forest Service)

An Affirmative Action/Equal Opportunity Employer

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither The Regents of the University of California, the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by The Regents of the University of California, the United States Government, or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of The Regents of the University of California, the United States Government, or any agency thereof. The Los Alamos National Laboratory strongly supports a researcher's right to publish; therefore, the Laboratory as an institution does not endorse the viewpoint of a publication or guarantee its technical correctness.

LA-UR-06-3549 May 2006

Title

Jemez Forest Telephone Line

A Historic Communication Network Constructed by the U.S. Forest Service as a Key Strategy in their Fight against Fire, 1906–1947

Prepared for

Ecology Group
Environmental Stewardship Division
Los Alamos National Laboratory
(Subcontract No. 24496-001-05 AH)

Prepared by

Janie O'Rourke

Los Alamos
NATIONAL LABORATORY

Los Alamos, New Mexico 87545

Contents

Abstract 1
Section 1: Origin of the Jemez Forest Reserve and Early Telephone Line 2
Protection of the National Forests 2
Establishment of the Jemez Forest Reserve 3
The Building of the First Telephone Line in the Jemez Forest Reserve 4
Section 2: Organizing against Fire in the Jemez Forest 13
Fire Plan for the Jemez Forest 13
Early Fire Lookouts on the Jemez National Forest 14
Santa Clara District 15
Cochiti District 17
Locating Fires Using Triangulation 20
Fire Detection in Bandelier National Monument 22
Lookout Safety 24
Section 3: Evolution of the Jemez Forest Telephone Line 27
Forest Residents and the Jemez Forest Telephone Line 27
Right-of-Way Easements 27
Telephone Service in Exchange for Reporting Fires 28
Telephone Centrals for Jemez Division of the Santa Fe National Forest 29
Early Telephone Service to Private Residences on the Pajarito Plateau 32
Telephone Line Spur to Los Alamos Ranch 32
Telephone Line Spur to Pajarito Canyon 36
Telephone Line Spur to Frijoles Canyon 36
Civilian Conservation Corps 1933–1942 37
CCC on the Pajarito Plateau 37
Manhattan Project 39
Commercial Telephone Service from Santa Fe to Los Alamos 40
The End of the Line 41
Section 4: A Telephone System Designed for Forests 43
Ground Return System 43
Hemingray No. 9—The Jemez Forest's First Telephone Insulator 43
Split Knobs Forestry Insulators 46

Small Round Split Knob 48
Medium Round Split Knob 48
Large Round Split Knob 49
Large Oval Split Knob 51
Octagonal Split Knob 54
Alternate Hanger Systems for the Split Knob 54
Post-Style Porcelain Insulator 57
Section 5: Data Analysis of Telephone Insulators Found on the Jemez Forest 59
Methodology 59
Insulators Trace the Telephone Lines across the Pajarito Plateau 63
Blue Glass Marks the Old Pajarito Line 67
Porcelain Insulators Added to OPL Corridor 68
Stone House Segment of the OPL 70
Los Alamos Canyon and Twomile Canyon Segments of the OPL 71
East-West Lines in Proximity to Los Alamos Canyon 72
Changes to the Old Pajarito Line 77
Realignment between Rendija Canyon and Los Alamos Canyon 77
Hidden Canyon Line Between Army Barracks and Los Alamos Canyon 80
Realignment of the OPL south of Los Alamos Canyon and west of Anchor Ranch 83
Telephone Lines to Pajarito Canyon 85
Telephone Lines East of Pajarito Cabin 85
Works Cited 93

List of Tables

Table 2-1. 1914 Jemez National Forest Districts, Ranger Stations, and Lookouts 15
Table 5-1. Distribution of Insulator Types on the Jemez Forest, the Pajarito Plateau, and the Old Pajarito Line 70

List of Figures

Fig. 1-1. Use Book Committee, Washington, D.C. 3
Fig. 1-2. 1906 Archeological Map of Jemez Plateau. 5
Fig. 1-3. Hanging the Telephone Line, 1933. 6
Fig. 1-4. Jemez Forest Reserve Telephone Line circa 1907. 7
Fig. 1-5. Camp Meeting at Pine Springs Ranger Station, 1924. 7

Fig. 1-6. Telephone Line across Frijole[s] Canyon. 8
Fig. 1-7. Blue Bird Ranger Station Site..... 9
Fig. 1-8. Early Ranger Station in Upper Cochiti Canyon, 1907. 10
Fig. 1-9. James Leese and Mackwood Hopper Astride Burro..... 11
Fig. 2-1. Frank Andrews, Santa Fe Forest Supervisor, 1932..... 14
Fig. 2-2. Forest Guard on Fire Patrol Duty..... 15
Fig. 2-3. 1914 Jemez Forest Fire Map. 16
Fig. 2-4. Bland Ranger Station. 17
Fig. 2-5. 1914, Cerro Pelado Lookout..... 18
Fig. 2-6. Cerro Valdez Lookout in the Jemez Forest. 19
Fig. 2-7. Saint Peter's Dome, 1932. 19
Fig. 2-8. Saint Peter's Dome Cabin, 1932. 20
Fig. 2-9. Red Top Lookout. 21
Fig. 2-10. Fire Guard Phones in Fire..... 21
Fig. 2-11. Use of Triangulation on Cerro Pelado Lookout..... 22
Fig. 2-12. Lookout Tree Ladder at the Wye Upper Crossing. 23
Fig. 2-13. 1940 Construction of Bandelier Lookout by CCC on North Rim of Frijoles Canyon. 24
Fig. 2-14. Frijoles Rim Lookout. 25
Fig. 2-15. Lookout Stool. 26
Fig. 3-1. Reimbursement Voucher for Española-Coyote Phone Line. 27
Fig. 3-2. Two Crank Phones Once Used on the Forest Service Line. 28
Fig. 3-3. Walter Hernandez Manning the Cuba Central in the 1940s..... 30
Fig. 3-4. Telephone Centrals on the Jemez Forest. 31
Fig. 3-5. Ketchum Ranch in Turkey Canyon..... 32
Fig. 3-6. Lillie Homestead. 33
Fig. 3-7. No Phone Here. 33
Fig. 3-8. Spur Line to Brook's Ranch. 34
Fig. 3-9. 1916 Map Submitted as Part of the Proclamation dated Feb. 11, 1916, Creating Bandeler National Monument. 35
Fig. 3-10. CCC Boys Practice Splicing Telephone Wire, 1935. 38
Fig. 3-11. Pole Climbing Practice, 1938. 38
Fig. 3-12. 1940 Santa Fe National Forest Jemez Division Map. 40

Fig. 4-1. A Telephone Linesman. 44
Fig. 4-2. Hemingray No. 9. 44
Fig. 4-3. Popped Top and Split Bottom. 45
Fig. 4-4. Keyed Surfaces of a Split Knob. 47
Fig. 4-5. Split Forestry Knob. 47
Fig. 4-6. (a) "R.T.&S.CO," (b) Smallest split knob, (c) Little "THOMAS." 48
Fig. 4-7. Hemingray with RT&SCO. 49
Fig. 4-8. A Medium round "T" Knob. 49
Fig. 4-9. Large Round with Oval Center Hole. 50
Fig. 4-10. (a) Large Round THOMAS, (b) Large Round T-Circle, (c) Large Round M-Triangle. 50
Fig. 4-11. Thomas Flat-sided Oval. 51
Fig. 4-12. Large Oval Knox Insulator Half. 52
Fig. 4-13. Large Smooth Oval White Insulator of Illinois Electric Porcelain Company. 52
Fig. 4-14. "Triangle-M" Trademark Embossed on Upper Outside Edge and Style D-1 Embossed on Lower Edge. 52
Fig. 4-15. Large Brown Oval Insulator. 53
Fig. 4-16. Octagonal Split Knob. 54
Fig. 4-17. Three-inch Staple. 55
Fig. 4-18. Wood Pin Hanger. 55
Fig. 4-19. Metal Hook. 56
Fig. 4-20. Wire Ring, Perhaps. 56
Fig. 4-21. Post-style Insulator. 57
Fig. 5-1. Solomon Lovato Looks at 1914 Jemez Forest Fire Map. 59
Fig. 5-2. Documented Sites on the Jemez Forest. 60
Fig. 5-3. Bracket in Bark. 61
Fig. 5-4. Insulator Loop. 62
Fig. 5-5. Hemingray and RT&SCO. 63
Fig. 5-6. Insulator Sites on the Guaje Quadrangle. 64
Fig. 5-7. Insulator Sites on the Frijoles Quadrangle. 65
Fig. 5-8. Topless Hemingray on Fallen Snag. 66
Fig. 5-9. 1913 Jemez Forest Reserve. 66
Fig. 5-10. Hemingray Sites in Jemez Forest. 67

Fig. 5-11. Telephone Lines across the Pajarito Plateau. 69
Fig. 5-12. Thomas Flat-sided Oval. 71
Fig. 5-13. OPL Crossing Los Alamos and Twomile Canyons. 72
Fig. 5-14. Trail in Twomile Canyon. 73
Fig. 5-15. Earliest Line Up Los Alamos Canyon..... 73
Fig. 5-16. Updated Line in Upper Los Alamos Canyon. 74
Fig. 5-17. Telephone Line along Road to Los Alamos Reservoir. 74
Fig. 5-18. Double Brackets West of Ashley Pond. 74
Fig. 5-19. Double Brackets in Los Alamos Canyon. 75
Fig. 5-20. Wood Bracket on Reservoir Trail. 76
Fig. 5-21. Large Round Knob along Trail toward Reservoir. 76
Fig. 5-22. Metal Pin on Reservoir Road..... 77
Fig. 5-23. 1937 Santa Fe National Forest Map..... 78
Fig. 5-24. Relocated Pajarito Line. 79
Fig. 5-25. Dot Grant Homestead Road..... 79
Fig. 5-26. Double Strain Insulators..... 80
Fig. 5-27. New Crossing of Los Alamos Canyon..... 81
Fig. 5-28. Smooth Oval Knob on Line..... 81
Fig. 5-29. Post-style Insulators. 82
Fig. 5-30. Two Post-style Insulators in Hidden Canyon. 82
Fig. 5-31. Northwest Corner of Ramon Vigil Grant. 83
Fig. 5-32. Telephone Line along West Jemez Road. 84
Fig. 5-33. Ramon Vigil Grant Boundary Line..... 85
Fig. 5-34. Knox on Branch-line to Pajarito Cabin. 86
Fig. 5-35. A Line of Artifacts East of Pajarito Cabin. 86
Fig. 5-36. Telephone Line to Pajarito Cabin Drawn on 1946 Santa Fe National Forest Map. 87
Fig. 5-37. Two Segments with Oval Split Knobs. 88
Fig. 5-38. Oval Split Knob in Otowi Section. 88
Fig. 5-39. Location of Pole Line with Single wood Brackets. 89
Fig. 5-40. Pole Line with Single Brackets..... 89
Fig. 5-41. Telephone Line Built by Man from Nearby Pueblos. 90
Fig. 5-42. Broken Arms of the mountain States. 91

Fig. 5-43. Two Generations of Telephone Poles. 91
Fig. 5-44. Side Bracket on the Pole Line..... 92

Jemez Forest Telephone Line

Abstract

This report documents a telephone system that played an integral part in the Forest Service's campaign against fire in the Jemez Forest from 1906 until the 1940s. The length of the Jemez Forest telephone line expanded from just thirty-five miles at the end of 1906 to several hundred miles by 1947. Many artifacts of the Jemez Forest line, consisting mostly of insulators high in the trees, still exist across the Pajarito Plateau and the larger area of the Jemez Forest. This report presents a history of the Jemez Forest telephone line, as well as an analysis of its existing artifacts. An in-depth analysis focuses on dating the telephone insulators and the lines to which they once belonged within the area of the Pajarito Plateau.

The report is divided into five sections. The first section looks at the context of the Jemez Forest telephone line, including the political and social issues surrounding the early forest reserves and Forest Service. The second section discusses the early fire strategies developed for the National Forests as well as specific fire lookouts built in the Jemez Forest. Section three looks at how the Jemez Forest telephone system evolved to serve the local residents. This section also describes how human events, such as the Depression era's Civilian Conservation Corps and the Manhattan Project of World War II, impacted the Forest Service telephone line on the Pajarito Plateau. Section four examines the technology of the telephone system developed by the Forest Service, including the ground return system and the various types of telephone insulators used over a forty-year period. Section five explains the methodology used to analyze the artifacts and date the remnants of the Forest Service line.

In the appendix are the geographic positioning system (GPS) coordinates of waypoints of all artifacts located within the Frijoles, Guaje Mountain, Puye, and White Rock U.S. Geological Survey quadrangle maps. The GPS coordinates for the entire Jemez Forest are also included for each of the ten insulator types: Hemingray No. 9 glass, small round knob, medium round knob, large round with oval center knob, Thomas flat-sided oval knob, large oval Knox knob, large smooth oval white knob, large smooth oval brown knob, post-style insulator, and octagonal knob.

A list and copies of related Jemez Forest Service maps have been submitted separately.

Section 1: Origin of the Jemez Forest Reserve and Early Telephone Line

Protection of the National Forests

Most nineteenth-century Americans believed that the United States was a country of inexhaustible forested lands and natural resources. During this period the United States federal government initiated many programs, such as the homestead and timber-culture acts, to encourage the use and development of its vast open spaces through the transfer of public domain into private ownership. However, by the mid-nineteenth century a growing number of people became alarmed by the rapid depletion of forested lands in the public domain caused by rampant fraud in federal land giveaway programs as well as by poor timber practices (Baker et al. 55). George Perkins Marsh's seminal book *Man and Nature*, published in 1864, gave birth to the early American Conservation Movement by articulating the need for better land use policies and forest conservation (USDA, First Environmental 2).

Due in part to the persuasion and pressure from the Conservation Movement members, Congress passed the Forest Reserve Act of 1891, also known as the Creative Act, which gave the President of the United States the authority to designate and create reserves from forested public lands. Under the Creative Act, designated forested lands were to remain under federal ownership to be protected and managed in a sustainable way for the benefit of and use by future generations. It wasn't until six years afterwards, however, when Congress passed the Organic Act of 1897, that funding was actually provided for the management and regulation of forest reserves. The Organic Act of 1897 gave the Secretary of the Interior the authority to hire forest rangers and supervisors who were charged with regulating the forest reserves' occupancy and use (Williams, N. pag.).

In 1905, Congress consolidated federal forestry expertise by transferring the management of the forest reserves from the Department of the Interior to the Department of Agriculture, which housed the Bureau of Forestry. Gifford Pinchot, an outspoken leader in the Conservation Movement and founder of the Society of American Foresters, was appointed to head what became known as the U.S. Forest Service, under the Department of Agriculture (Baker et al. 56–57). As head of the Forest Service, Pinchot supported the view that the purpose of the forest reserves was to preserve a perpetual supply of timber and resources for local use (Pinchot 7). His guiding philosophy was that the National Forests should provide for the "greatest good for the greatest number in the long run" (Pinchot 11).

As Chief Forester, Pinchot felt confident that the "technical and complex problems arising from the necessary use of forest and range could be successfully achieved with a management program based on "…scientific methods and a technically trained force" (Pinchot 10). Pinchot, shown in Fig. 1-1, initiated a series of booklets for his forest rangers, "The Use of the National Forest Reserves," containing Forest Service regulations regarding grazing, sale of timber, and permitting. Potential rangers were required to pass civil service exams that tested technical skills as well as field experience. But while appropriate regulations and management would safeguard the forests against human

depredations, Pinchot saw that "Probably the greatest single benefit derived by the community and the nation from forest reserves is insurance against the destruction of property, timber resources, and water supply by fire….The burden of adequate protection can not well be borne by the State or by its citizens…for it requires great outlay of money to support a trained and equipped force, as well as to provide a fund to meet emergencies. Only the Government can do it, and, since the law does not provide effective protection for the public domain, only in forest reserves can the Government give the help so urgently needed" (Pinchot 63). It was Pinchot's campaign against fire in the forest reserves that inspired and guided the heroic efforts of the Forest Service over the next half-century. Key to the success of that campaign against fire was the development of the telephone system that provided a reliable and comprehensive communication network.

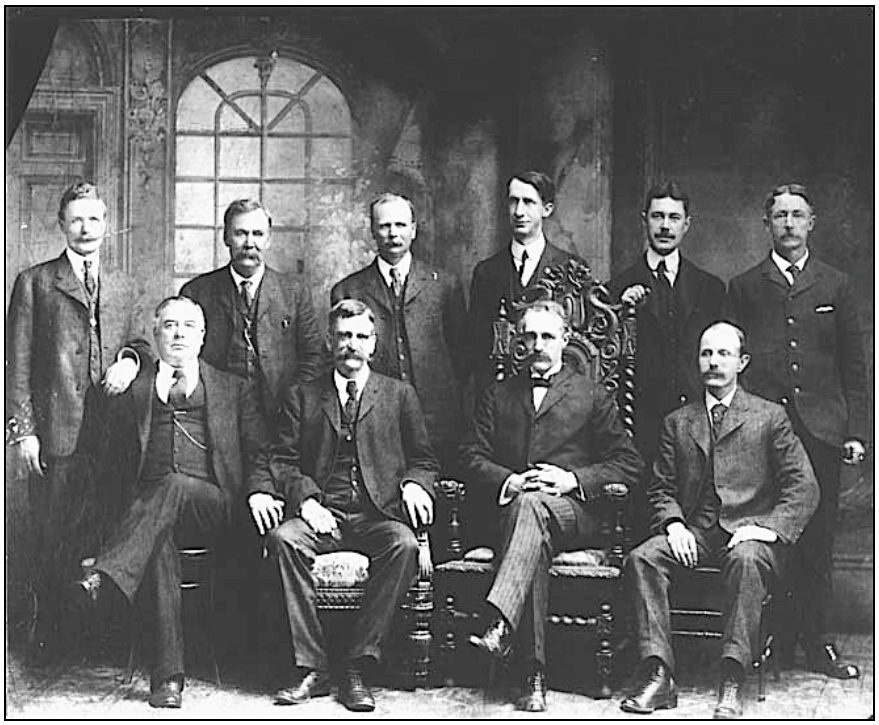


Fig. 1-1. Use Book Committee, Washington D.C., 1905. Gifford Pinchot (front row second from right) sits with men appointed to revise the "Use Book" of 1905. (Photo: Santa Fe National Forest)

Establishment of the Jemez Forest Reserve

On October 12, 1905, the same year that Gifford Pinchot was appointed to head the Forest Service, President Theodore Roosevelt proclaimed the creation of the Jemez Forest Reserve as "…an area to be reserved from entry or settlement and set apart as a Public Reservation, for the use and benefit of the people…." (U.S. Presidential). Los Alamos and much of the surrounding Pajarito Plateau were included in the southeastern quadrant of the Jemez Forest Reserve. The original boundaries of the Jemez Forest Reserve extended north to the Tierra Amarilla Grant, with an arm reaching up to the

Colorado border, and dipped south of the Cañada de Cochiti Grant. The town of Cuba lay just outside the west boundary of the Reserve, and the Santa Clara and San Ildefonso Pueblo Grants edged the east boundary. The most southeastern section of the Reserve lay along the west bank of the Rio Grande. Existing land grants and patented homesteads within or intruding into the Reserve's exterior boundaries, such as the Baca Location No. 1 and the Ramon Vigil Grant, were excluded from the Reserve (Fig. 1-2).

The boundaries, as well as the name of the Jemez Forest Reserve, evolved over time. The narrow arm reaching to the Colorado border became part of the later Carson National Forest. As a result of the Forest Homestead Act of 1906, known for many years afterwards as the "July 11th Act," parcels of agricultural lands within the Jemez Forest were patented into private ownership. In 1907 the name Jemez Forest Reserve was replaced by Jemez National Forest—the word "reserve" was removed to allay fears that use of the Forests was to be overly restricted (USDA, Book I 79). In 1915 the Jemez National Forest and the Pecos National Forest, located east of the Rio Grande, were combined to become the Santa Fe National Forest. The area previously known as the Jemez National Forest became the West Half or Jemez Division of the Santa Fe National Forest. And finally, in 1916 the most southeastern section of the old Jemez Forest Reserve became Bandelier National Monument, although it remained under the jurisdiction of the Forest Service until 1932. In this report I refer to the general area of the old Jemez National Forest as the "Jemez Forest."

The Building of the First Telephone Line in the Jemez Forest Reserve

Within one year after the creation of the Jemez Forest Reserve, work was begun on a communication system that would play an integral part in the Forest Service's monumental effort to protect the new forest reserve from fire. The communication system was a single bare telephone wire hung on trees to connect ranger stations and lookouts across the Jemez Reserve. By the end of 1906 the telephone line would extend just across the lower southeast corner of the Jemez Forest Reserve, running approximately thirty-five miles from the town of Española on the Rio Grande westward across the Pajarito Plateau and up into the Jemez Mountains, stopping just north of the small town of Pines.

Ben and George White, brothers whose family homesteaded on Los Alamos Mesa in 1896, were two of the men hired by the Forest Service to hang the telephone line. They were part of a small crew of men who scaled the ponderosas to hammer in the insulators that held the line (Fig. 1-3). Ben White describes the route of the early telephone line in an interview conducted in 1965. The location and extent of the line as described by Ben White are illustrated in Fig. 1-4.

Excerpts from his narrative, highlighted in bold, are expounded on below.

> **…the line came west from Española just south of Puye Cliff Dwellings to the Stone House Ranger Station.**

Stone House was located in Sawyer Canyon approximately six miles north of Los Alamos Canyon and eight miles east of the Baca Location boundary. Although there is not a trace left of the old ranger station, Stone House was once a substantial rock structure, unique among the early and more typical log-constructed ranger cabins. Stone House probably predated the Jemez Forest Reserve (Linda Goforth).

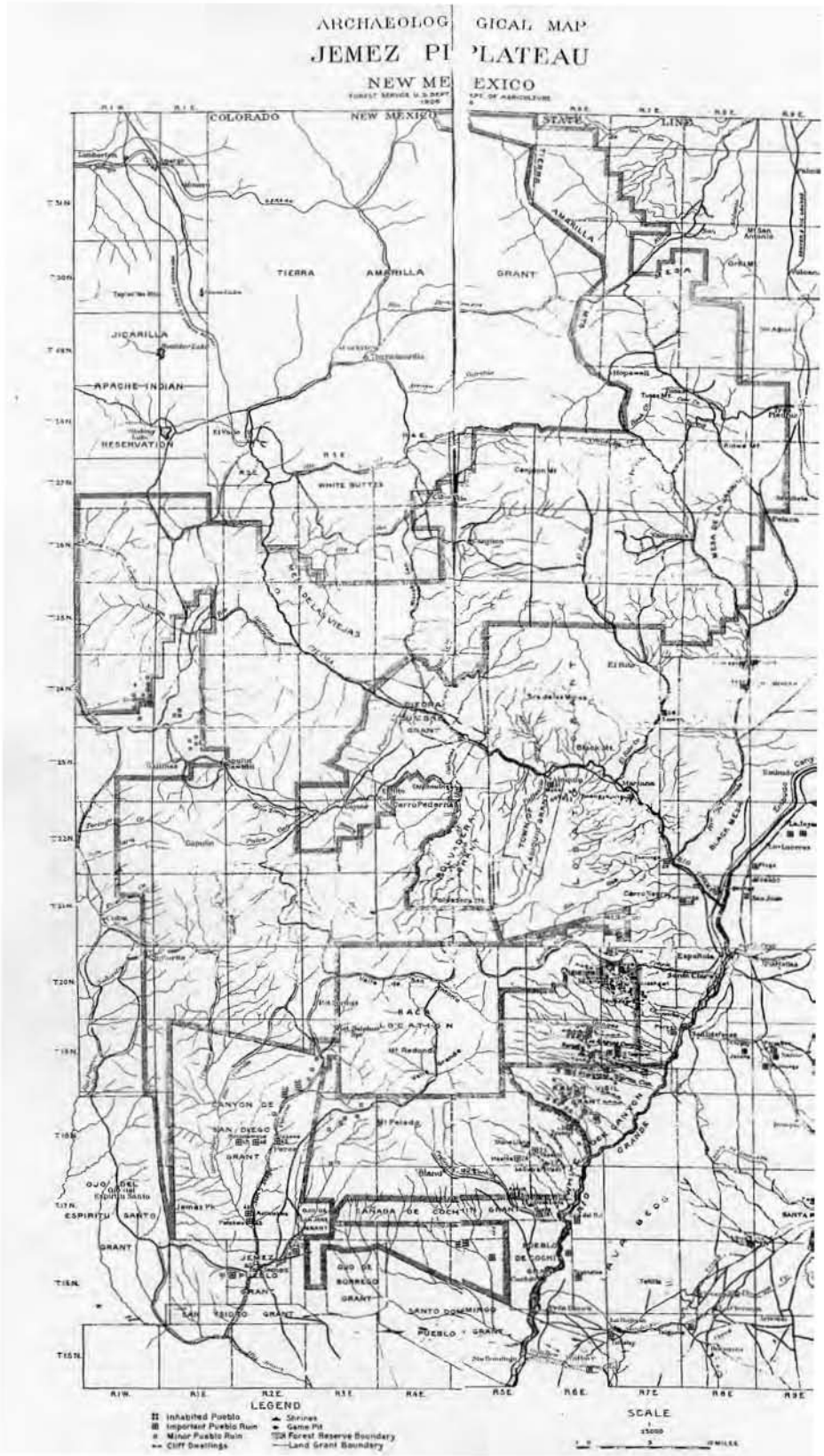


Fig. 1-2. 1906 Archeological Map of the Jemez Plateau. Broad lines indicate the boundaries of the Jemez Forest Reserve.

Fig. 1-3. Hanging the Telephone Line, 1933. Men used climbing spurs to attach telephone insulators twenty feet up in tall, straight ponderosas. (Photo: Forest History Society at Duke University)

> **From here [Stone House] south and west past Pine Springs, the location for a later ranger station.**

In 1918, a second ranger station was established in the Santa Clara District at Pine Spring, located in Garcia Canyon about one mile south of Stone House. Used concurrently for several years, the Pine Spring Ranger Station eventually supplanted Stone House as the ranger's district headquarters (Fig. 1-5). Both Stone House and Pine Spring ranger stations were located along the old Pajarito Trail. The section of telephone line following this trail, from Sawyer Canyon south to the Los Alamos area, served as the main trunk line into the entire Jemez National Forest from 1906 to the 1940s, and many homesteaders of the area referred to this segment of the Pajarito Trail as the Telephone Trail (Hoard, p. 62). Three miles south of Stone House Ranger Station, the trail and telephone line crossed to the south side of Guaje Canyon. Continuing south along the Pajarito Trail, the telephone line dropped into Rendija Canyon and followed a wagon road west to pass through the narrow crack that gave Rendija Canyon its name.

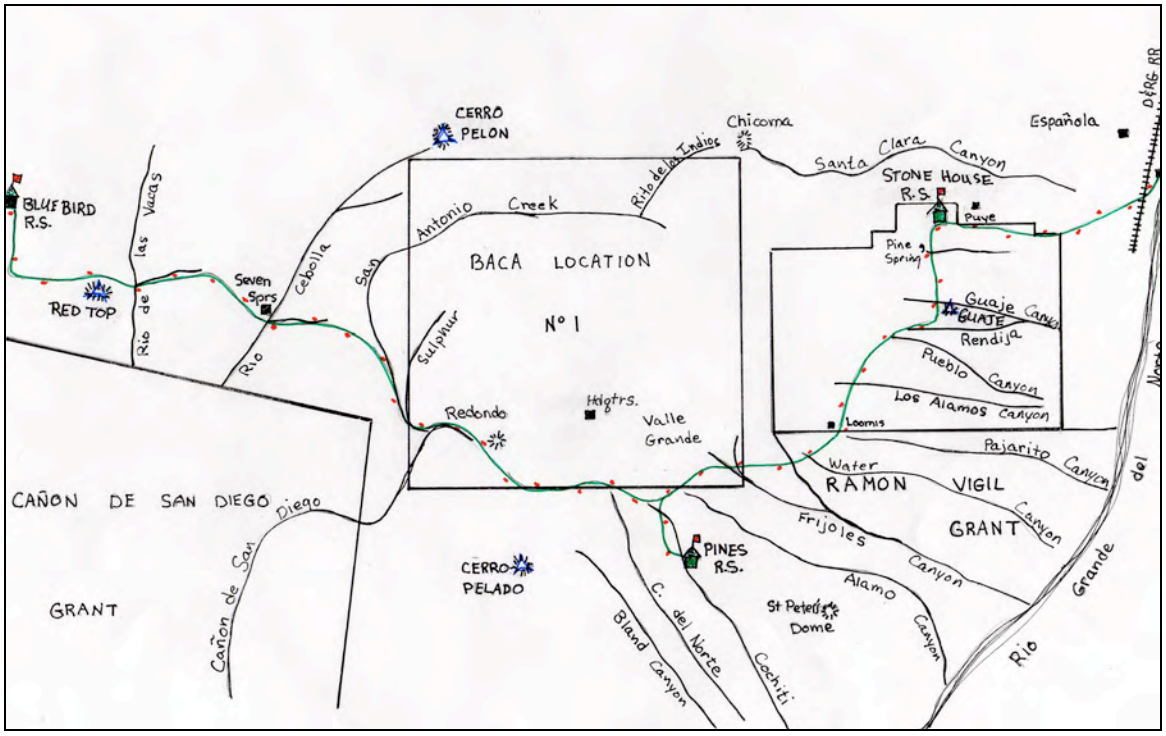


Fig. 1-4. Jemez Forest Reserve Telephone Line circa 1907. This graphic illustrates the location and extent of the early telephone line as described by Ben White. The line reached across the southern third of the Jemez Forest between Stone House and Blue Bird ranger stations, a distance of approximately seventy miles. The extent of that first section of line completed in December of 1906 was about the first half of that distance, reaching from Stone House to Pines Ranger Station.

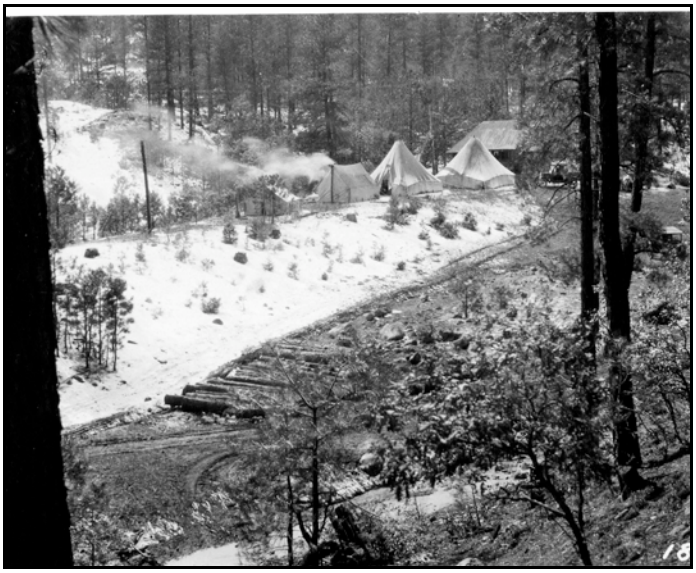


Fig. 1-5. Camp Meeting at Pine Spring Ranger Station, 1924. Pine Spring Ranger Station, in use from 1918 into the 1940s, was the site of one of the annual meetings held for the rangers of the Jemez Forest. The ranger cabin can just be seen in the background. (Photo: U.S. Forest Service)

Then south past Los Alamos along the western edge of the townsite to what was then the Loomis Ranch, approximately two miles south of Los Alamos.

From Rendija Canyon the telephone line circled west and south to cross Pueblo Canyon and then cross Los Alamos Canyon at a point near where today's West Road climbs out on the south side. The line continued south along the base of the Jemez Mountains to pass the old Loomis Ranch, later Anchor Ranch, just north of the Ramon Vigil Grant boundary. From there the line crossed into the northwest corner of the Ramon Vigil Grant and followed a wagon road southward, skirting along today's West Jemez Road.

From here the line turned west to the top of Sawyer Mesa....

Just south of Water Canyon the line took a sharp turn westward to begin its steep climb up into the Jemez Mountains. It followed a precursor of today's State Road 4 onto Sawyer Mesa, passing near today's American Springs. The telephone line then left the wagon road to climb up onto and across the southeast flank of Cerro Grande. From here the line crossed the head of Frijoles Canyon along what was then known as the "Road to Buckman's Sawmill" within the southeastern corner of the Baca Location No. 1 (Fig. 1-6). From the head of Frijoles Canyon the line generally headed west along the Baca Location's south boundary. Just west of South Mountain the line turned north into the Baca Location's southwest corner.

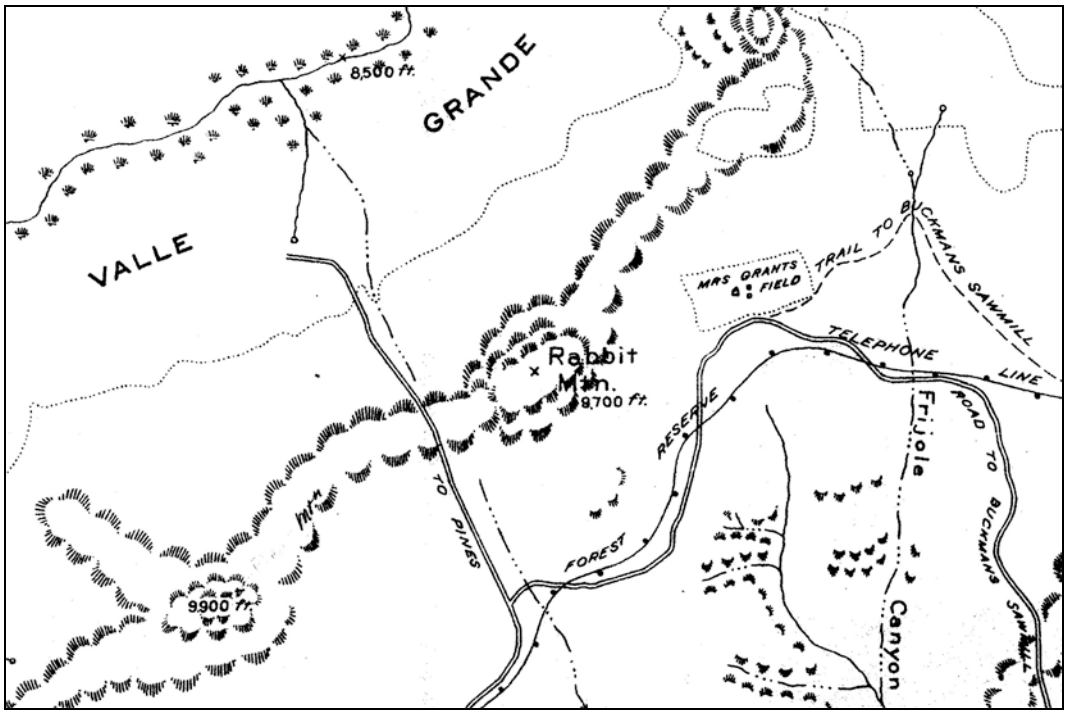


Fig. 1-6. Telephone Line across Frijole[s] Canyon. This partial view of the 1908 map of the Baca Location shows the Forest Reserve Telephone Line following along Buckman's Sawmill Road as it crosses Frijoles Canyon on its way to Pines. (1908 Baca Location Map)

…then up Redondo Canyon past La Cueva, turned north up the San Antonio Creek and west again above Seven Springs.

The telephone passed through the Baca Location's bowl-shaped El Cajete to follow Redondo Creek and then passed out of the west boundary of the Baca Location. The line continued westward across the deep canyon drainage of San Antonio Creek. At Cebolla Canyon the line passed a ranger cabin at Seven Springs then continued westward to cross the broad drainage of the Rio de las Vacas. Continuing west, the 1907 line ended at a ranger cabin southwest of Blue Bird Mesa less than two miles from the western boundary of the Jemez Forest and ten miles east from the town of Cuba (Fig. 1-7).

Fig. 1-7. Blue Bird Ranger Station Site. This structure, its use unknown, is part of the Blue Bird Ranger Station site. The site was also part of an old ranch with corrals and outbuildings.

A portion of the original line branched at the head of Cochiti Canyon south down Cochiti Canyon to Pines Ranger Station, later named Tent Rock.…

South of Rabbit Mountain a spur line branched from the main line south to drop into an upper tributary of Cochiti Canyon. The line followed the narrow-bottomed Pines Canyon southward ending at Pines Ranger Station just above the small town of Pines (Fig. 1-8).

Ben's brother, George White, in an unpublished document, described the difficult conditions endured in December of 1906 after completing the telephone line to Pines Ranger Station (White, Ben):

> I had to move out of Pines because the snow got so bad – it was 5' deep. It was December 1906. The heavy snow broke the lines down that we had built and I had to go over and repair the breaks. When the supervisor came out to inspect the telephone line he told us go on with the line to Sulphur Springs as they had the

money there. So we told him to go back to Española to get a Bill of Groceries and wire and stuff we needed and send it out to us.

We sent Ben to meet the wagons. He got down in the Valle Grande and bogged his horse. So …we had to walk through 5' of snow and lead the horses. It took all day to go 8 miles. We got to Rio de los Indios and no wagons – no food and no beds. So we went on over to the head of Santa Clara Canyon about 6 miles and on the divide. The snow was deep…Next morning we started down the canyon. It was 18 miles to the [Stone House] RS….We got to the ranger station at 4:30pm. Kate Leese and three children were there and they had only one small can of tomatoes and a piece of corn bread. I called Frankenburger at the Española Mercantile store. I told him to find James Leese and call me. Leese had been there 2 days and his family was up there in the snow without food. He was finally found and I told him to get a load of groceries and get up there –that we were all starved….It was 14 miles from Española. He got there at midnight.

Fig. 1-8. Early Ranger Station in Upper Cochiti Canyon, 1907. The American flag flies high over the predecessor to the later Pines Ranger Station in upper Cochiti Canyon. A pack horse is readied for a day's work. (Photo: U.S. Forest Service)

Both James P. Leese (Fig. 1-9) and George White continued to work on and off for the Forest Service for the next several years. Leese was the ranger at Stone House in the Santa Clara District 1911-1912 (USDA, Book III, 205). Around that same time George lived in Guaje Canyon, hired by the Forest Service to keep the Forest Service telephone line in repair. George's son Andrew recalls that his dad "rode a horse and led a pack

horse loaded with wire and insulators to repair broken lines when the winter snows broke them down" (Goforth).

Fig. 1-9. James Leese and Mackwood Hopper Astride Burro. Leese (left) later worked for HH Brook of Los Alamos Ranch. (Photo: Los Alamos Historical Society)

Section 2: Organizing against Fire in the Jemez Forest

Fire Plan for the Jemez Forest

In 1908 the administrative authority within the Forest Service was moved from the Washington office and put into the hands of administrative officers in the field. This decentralization of the agency allowed the Forest Service to be more responsive to local needs and to focus on program development within the individual forests (USDA Book I 64). Chief Forester Gifford Pinchot appointed Arthur C. Ringland to head the Forest Service's District 3, a multi-state region previously known as the Southern District, which included the National Forests in the Territory of New Mexico. Like Pinchot, Ringland saw that while the Forest Reserve regulations would protect the forests from waste and depredation, the remaining threat to the forest came from destruction by fire (USDA, Lookouts 5). Soon after taking office, District Forester Ringland wrote to the supervisors of each of the Forests in his District to inform them that they would be required to develop "…a complete fire plan for their Forests" (USDA Book I 209–210).

In his letter Ringland described in great detail the three key strategies he saw as essential to the development of a fire protection program for the Forests: detection, communication, and transportation. His prescription for fire detection was to build permanent fire lookouts on strategic peaks "…to reduce greatly the cost of patrol as well as increase in a corresponding degree the efficiency of fire protection." His prescription for a reliable, comprehensive communication system was to "provide for the construction of telephone lines from lookout stations to Ranger's or Supervisor's headquarters, in order to give prompt notices of fires. Such lines will obviously form a part of the telephone system of the Forest." In addition he advised the building of other lines from "…Ranger's headquarters to distant settlements in the Forest, where…inhabitants can be persuaded to act…as fire guards...." His prescription for mobilizing the manpower needed to fight the fires was to identify the potential workforce and to construct trails "…for the rapid transfer of fire-fighting forces…" (USDA Book 1 209–212).

The supervisor responsible for developing that first fire plan on the Jemez Forest was Ross McMillan. Over the next couple of years McMillan and Thomas R. Stewart alternated as supervisor of the Jemez Forest and between the two of them they worked to better allocate resources and manpower (USDA Book III 125). It was under their supervision that the Jemez Forest began to be organized into districts. Each district had an assigned ranger responsible for managing that district as well as for building his own cabin to serve as the ranger station. The telephone line construction, begun in 1906, continued as it was extended to reach out to each of the district ranger stations established across the Jemez Forest.

The 1914 Jemez Forest Reserve Fire Map shows that for the Santa Clara District, located east of the Baca Location, it was the old Stone House that became the district ranger station. For the Cochiti District, located south of both the Santa Clara District and the Baca Location, the Pines Ranger Station became the district station. The area of Los Alamos was contained within the boundaries of the Santa Clara District but had many connections to the adjacent Cochiti District, including telephone lines, trails, and social

and commercial interactions. The boundary between the Santa Clara and Cochiti Districts was the north rim of Frijoles Canyon.

In 1909 Frank Andrews became the supervisor of the Jemez National Forest (Fig. 2-1), working under Arthur Ringland (USDA Book III 125). Andrews later became Supervisor of the Santa Fe National Forest, which was created from the combination of the Jemez and Pecos Forests in 1915, where he served as supervisor from 1920 to 1944 (USDA Book III 129). It was during Andrews' early tenure on the Jemez National Forest that Pinchot's vision and Ringland's fire plan were fully achieved. The 1914 Jemez Forest Fire Map shows that trails had been built connecting settlements and ranger stations. Permanent lookouts had been identified and assessed. And the telephone line had been extended across the entire Jemez Forest, reaching nearly 145 miles in length. The line connected not only the five district ranger stations and nearby settlements but had at last been brought up to the very top of each district's designated lookout peak.

Fig. 2-1. Frank Andrews, Santa Fe Forest Supervisor, 1932. Andrews was an early ranger and supervisor of the Jemez and later Santa Fe National Forest. (Photo: U.S. Forest Service)

Early Fire Lookouts on the Jemez National Forest

In the early days on the Jemez Forest before there were permanent lookouts, the rangers kept watch for fires on their daily patrol routes along the high ridges and peaks (Fig. 2-2). When a fire was spotted, these "smoke-chasers" would gallop with shovel, mattock, and ax to extinguish the blaze (Pinchot 68). The communication between lookouts on mountain peaks was done by heliograph—a device that used sunlight and mirrors to send Morse code (USDA Lookouts 19). The development of permanent lookout stations and their subsequent connection to the telephone system made fire control on the Jemez National Forest much more effective by enabling fire information to be conveyed immediately from the lookouts to the district ranger who could then quickly mobilize and direct a team of Forest Service men and local residents to the fire site.

Fig. 2-2. Forest Guard on Fire Patrol Duty. Early lookouts used sharp eyes and binoculars. (Photo: U.S. Forest Service)

Santa Clara District

As shown on the 1914 Jemez National Forest Fire Map (Fig. 2-3), each of the Jemez Forest's five ranger districts had within their boundaries a designated lookout peak that was connected to the telephone system (Table 2-1). The lookout peak for Santa Clara District was Guaje Mountain. A very short spur line branched from the trunk line at the south rim of Guaje Canyon and ran up to the top of the peak. The 1914 Fire Map rated Guaje Mountain as a secondary lookout with a "visibility efficiency" of eight miles north and south, and four miles east and west. Guaje Lookout probably never had a permanent structure built on top—the fire guard would have lived down in Guaje Canyon during the summer fire season and ridden his horse up to the peak each day "to provide observation coverage for areas that cannot be seen by the primary lookout" (USDA Lookouts 150).

Table 2-1. 1914 Jemez National Forest Districts, Ranger Stations, and Lookouts

Gallina District	Coyote District	Rio de las Vacas District	Cochiti District	Santa Clara District
Chupadero Ranger Station	Coyote Ranger Station	Blue Bird Ranger Station	Pines Ranger Station	Stone House Ranger Station
Dead Man's Peak Lookout	Cerro Pelon Lookout	Redtop Lookout	Cerro Pelado Lookout	Guaje Mountain Lookout

Even without a permanent structure on top, Guaje Lookout would have had a telephone box on a post as well as a map board. The map board was a National Forest map cut and glued to a wooden board oriented to the surrounding landscape. The center of the map corresponded to the location of the lookout and around the circumference of the map were marked the degrees of a circle (USDA Lookouts 150). The "fire finder" map and the telephone enabled the lookout to quickly locate and get the bearings on fire sightings and then report the information directly to the Santa Clara District Headquarters at Stone House.

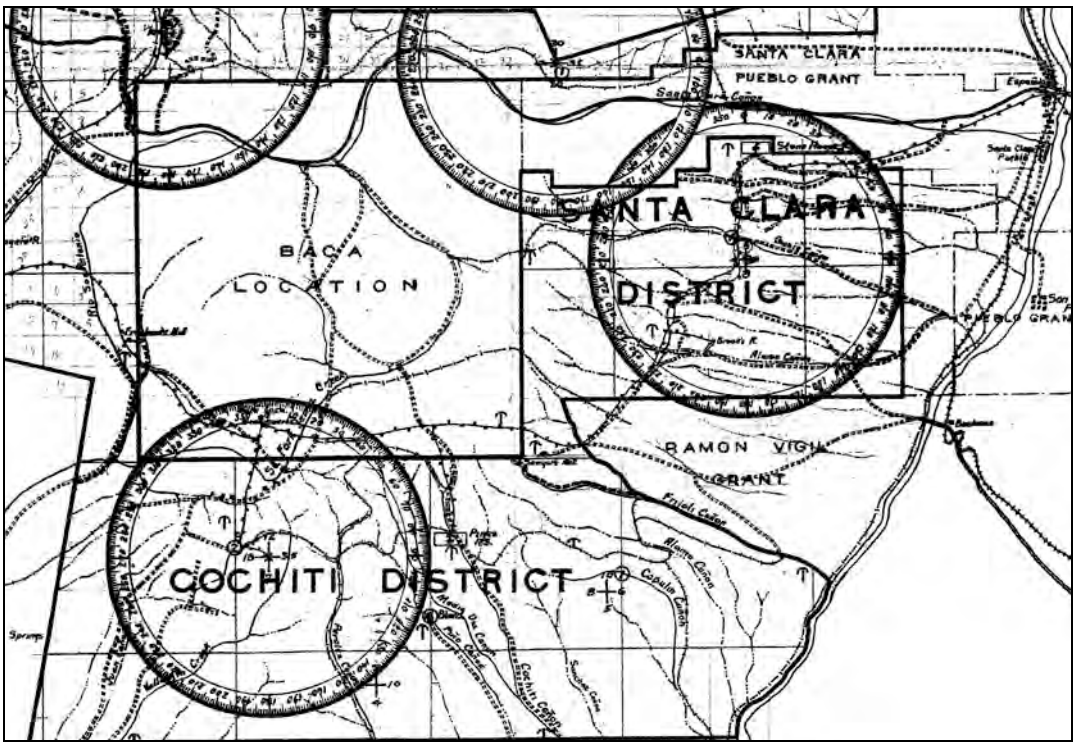


Fig 2-3. 1914 Jemez Forest Fire Map. District ranger stations are named and indicated by a house with flag. Fire toolbox locations are shown with anchor symbol. Lookout peaks for each district are in the center of a compass. Guaje Lookout is in the center of the Santa Clara District compass and Cerro Pelado Lookout is in the center of the Cochiti District compass. A line with dots along indicates the location of the telephone line.

In 1914, a fire near the small mining town of Bland prompted the Forest Service to extend the telephone line from the Pines Ranger Station two and one-half miles southwest to the town. The *Santa Fe New Mexican* on May 12, 1914, reported that a spark at a sawmill had ignited a blaze that could be seen from Santa Fe. Ranger A.J. Connell, newly assigned to the Cochiti District, "…had charge of the fire fighting force….Three more lookout points on the Jemez have just been connected up with the phone system and a telephone line is being built from the Pines station to Bland…Assistant Ranger Sloanaker left yesterday for Bland to supervise this phone job."

By 1915 the Forest Service map was showing a new ranger station built one-half mile up canyon from the mining town of Bland (Fig. 2-4). The old Pines Ranger Station was decommissioned in 1923 and sold to Dick and Georgie Boyd, who developed it into the Tent Rock dude ranch (Boyd). The Bland Ranger Station then became the main station serving the Cochiti District. A.J. Connell, who was the early ranger at Bland, left the Forest Service to become the director of the Los Alamos Ranch School in 1917 (Wirth 18).

Fig. 2-4. Bland Ranger Station. This is what the abandoned Bland Ranger Station looks like today. The section to the right of the large fir is the original 13' by 17' log cabin built in about 1915.

Cochiti District

The fire lookout for Cochiti District was Cerro Pelado, one of the earliest and longest used lookout peaks on the Jemez Forest (it's still in use today). The spur line to Cerro Pelado, approximately five miles in length, branched south off of the main Forest Service line at a point just south of El Cajete on the Baca Location. The 1914 Fire Map rated Cerro Pelado with a "visibility efficiency" of twelve miles to the north seven miles to the south, thirty-five miles to the east, and eighteen miles to the west. Cerro Pelado was a primary lookout—that is, someone lived on the peak throughout the fire season—from May through July. Pedro Sandoval, the first lookout guard to live on Cerro Pelado, built a log cabin on the peak in 1912 (Fig. 2-5) (Sandoval). The exposed location of the cabin, as with other early cabins built on lookout peaks, made electrical storms extremely dangerous. Sandoval told of how a lightning strike would send a blast through the cabin chimney causing sparks to "fly around the stove" (Gonzales).

Fig. 2-5. 1914 Cerro Pelado Lookout. Pedro Sandoval's boy Carlos waits on horseback for his father at the cabin on top of Cerro Pelado. As a young man, Carlos was a lookout at Bear Head in the Cochiti District. (Photo: U.S. Forest Service)

The early structures built on the lookout peaks were living quarters for the lookout guard and were typical log cabin construction with few windows. To allow for an unimpeded 360-degree view, the fire finder map was located outside of and away from the cabin. And when the telephone line was first brought up to the lookout peaks, the phone box was also attached to a post outside of and separate from the cabin because it was such a lightning attractor (Fig. 2-6). The lookout cabins were eventually equipped with lightning arrestors on the roofs and copper grounding wire buried at the corners to improve safety (Curry).

While Cerro Pelado continued to be the primary lookout for Cochiti District, a second lookout was manned in the district on St Peter's Dome as shown on the 1925 Santa Fe National Forest, West Half Map. Saint Peter's Dome was located on Forest Service land just outside the western boundary of Bandelier National Monument, an area carved out of the eastern end of the Cochiti District in 1916. Bandelier remained under Forest Service jurisdiction until it was turned over to the Park Service in 1932. In 1929 the Forest Service extended its telephone line from Bandelier's ranger station in Frijoles Canyon southwestward, passing by Stone Lions, to reach the lookout on top of Saint Peter's Dome.

In 1930 H.D. Schmeltzer was the lookout guard on St. Peter's Dome. At that time there was no shelter on the Dome and Schmeltzer lived in a tent down in the saddle during the fire season. Schmeltzer described the Dome as "…just a rocky peak in the clouds without tower or cabin, with only a map pasted on a board (Fig. 2-7) and a "…telephone posted among the rocks…." Schmeltzer recounted his experience on the peak just a few days after he arrived:

> [I] saw swirling clouds of smoke which seemed to come from right under the Dome's north pinnacle….I turned my protractor on the smoke and took its bearings. It was hardly necessary. The fire was just across from the Dome, on a dry mesa. I called the ranger. 'Where in hell have you

been!' He shouted. 'Guaje lookout reported that fire ten minutes ago and it's right under your nose. Can't you even smell smoke? Get to that fire as fast as your old nag will carry you.'

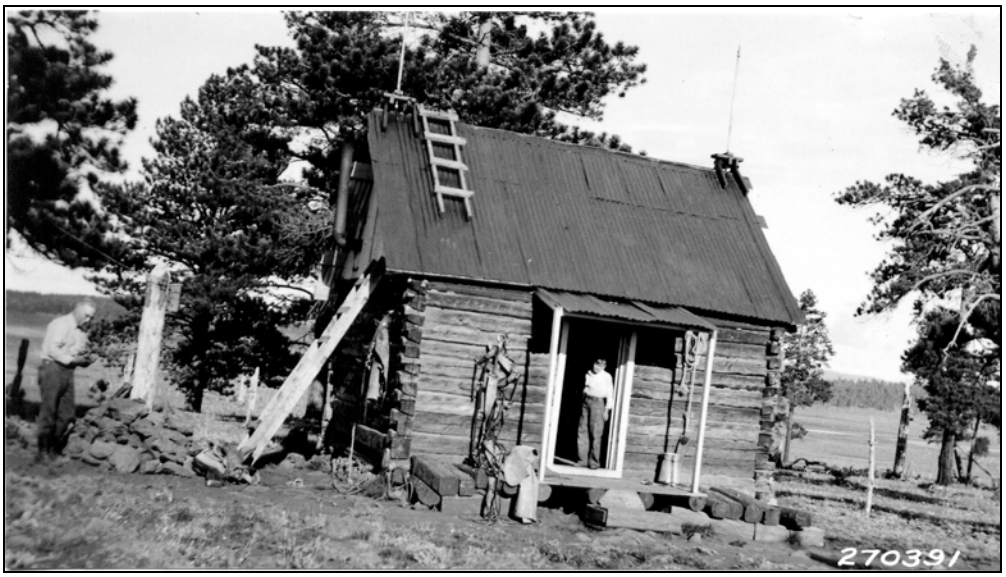


Fig. 2-6. Cerro Valdez Lookout in the Jemez Forest. Located near the town of Coyote, the log cabin roof has two lightning arrestors and the telephone is "posted" outside in a pile of stones. (Photo: U.S. Forest Service)

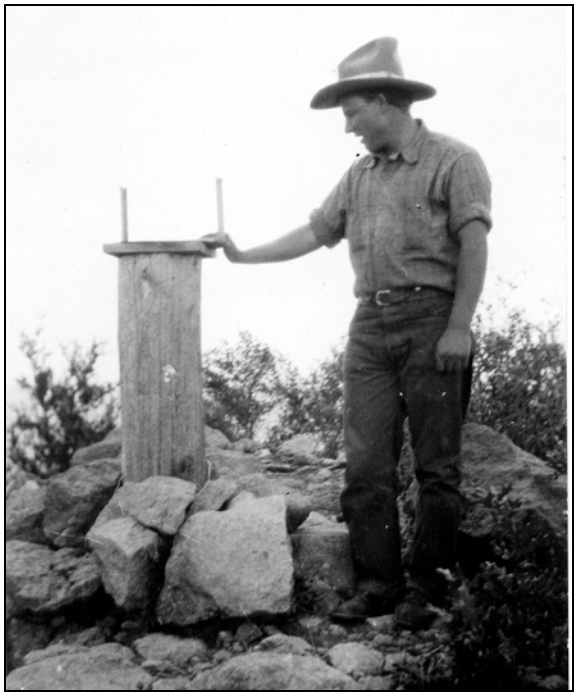


Fig. 2-7. Saint Peter's Dome, 1932. Fire guard standing by map board with protractor. (Photo: U.S. Forest Service)

The usefulness of the Saint Peter's Dome Lookout, despite the inexperienced fire guard, appears to have justified the construction of a permanent lookout cabin on top (Fig. 2-8):

> Before orders came to pack-out, I blasted off the tip of the peak with high explosives in preparation for a cabin's foundation. (Schmeltzer 16–17, 38–40)

Fig. 2-8. Saint Peter's Dome Cabin, 1932. The lookout cabin that was built soon after the peak of the Dome was blasted off in 1930. This was probably one of the last of the log cabin lookouts built. (Photo: U.S. Forest Service)

Beginning in the mid 1930s the Forest Service began replacing the old log cabins on lookout peaks with structures especially designed to improve visibility and reporting from the lookouts. There were several standard types of lookout structures, most made from precut lumber; some were elevated on wooden or steel towers, some had a cupola observatory, but all had the common feature of having windows all around to allow for a 360-degree view (Fig. 2-9). These new lookouts were equipped with an Osborne fire-finder map mounted on a post in the center of the lookout structure. A telephone adjacent to the fire-finder map enabled bearings to be quickly communicated to the district ranger so that triangulation could be used to pinpoint the fire (Fig. 2-10) (Gonzales).

Locating Fires Using Triangulation

Triangulation was the method used to determine the location of a fire that was viewed from two different lookouts. Each lookout guard took a bearing on the fire. The information was reported to the district ranger, who plotted the two direction lines on a map. The intersection point of the two lines indicated the position of the fire, usually within an accuracy of a quarter mile (Fig. 2-11). In the following excerpt from a January 1949 *New Mexico Magazine* article, James A. Armitage described his use of triangulation while working as a lookout guard on Cerro Pelado in the 1940s:

Fig. 2-9. Red Top Lookout. Aladdin L-4 style lookout of pre-cut timber built in 1933 in the Cuba District. The Osborne fire finder can be seen through the windows. (Photo: private collection of Betty-Jane Curry)

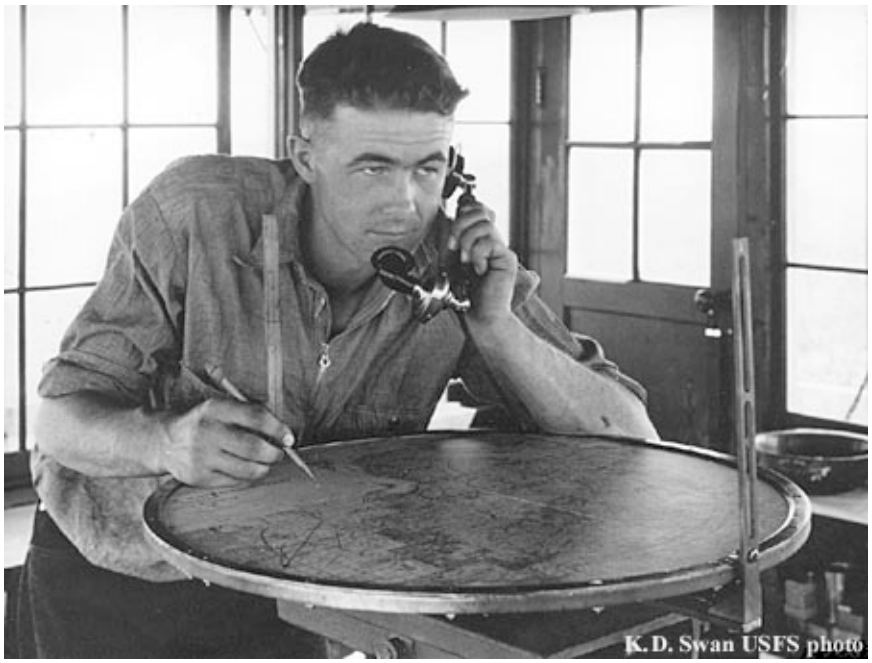


Fig. 2-10. Fire Guard Phones in Fire. The guard uses an Osborne fire finder to get the bearings of possible fire. He then telephones the information to the district ranger, who uses information from two or more fire towers to determine the fire location and to organize a fire fighting crew. (Photo: U.S. Forest Service)

The third long ring had barely finished when a voice answered at the other end. “Ranger Station, [Leon] Hill Speaking.”

“This is Cerro Pelado, I said. “I have a smoke at 268.”

“That smoke at 268 - about where along your line of sight do you locate it?”

The question means the ranger has consulted his fire map, extending a white string from the Cerro Pelado, the center of the circle, through the 268th-degree of the circumference. With one bearing on the fire thus established, he now requests another, an estimate this time of how far along the radius, plotted by the string, the fire is located from the lookout. Subsequently a second lookout tower will confirm or modify my estimate. The process is known in surveying as triangulation.

“I’ll get Red Top to give us a north-south reading. You can hang up, Jim, I’ll call back in a few minutes.” (14)

Fig. 2-11. Use of Triangulation on Cerro Pelado Lookout. Frank Gonzales (left) shows Bill Davis how triangulation is used to pinpoint fires. Strings attached to lookout points within compass circles on the map are aligned along reported bearings of a fire from two different lookouts. The strings intersect at the fire location.

Fire Detection in Bandelier National Monument

The closest lookout to Bandelier National Monument was Saint Peter’s Dome. The Dome Lookout was located just outside the west boundary of Bandelier and belonged to the Forest Service. In 1932 when the jurisdiction of Bandelier changed from the Forest Service to the Park Service, Bandelier began to look at ways to improve their own fire detection capabilities. In February 1936 the forester at Bandelier, James Fulton,

recommended construction of "…two lookout tree ladders on this Monument….Such ladders would constitute a fast, safe method for fire crews to locate fires." The ladder trees were built at Corral Hill and the wye of Upper Crossing Trail (Fig. 2-12), two places that afforded good views south to Alamo Canyon and where the central locations make them "handy to routes of travel" (National Jan. 1936). The ladders, constructed of angle iron and fastened to the trees with lag screws, were painted dark green and wired for lightning protection. A telephone box was placed on Corral Point in February 1938 (U.S. NPS Custodian).

Fig. 2-12. Lookout Tree Ladder at the Wye Upper Crossing. In 1936–7 the Civilian Conservation Corps (CCC) built two ladder trees to help locate fires. One ladder tree was at Upper Crossing (above) and a similar ladder tree was at Corral Hill. Neither ladder tree remains. The CCC also extended the telephone lines to each of the Lookout trees. This photo was taken soon after the 1977 La Mesa Fire. (Photo: Chris Judson, National Park Service)

By 1938 Bandelier had decided that they needed more than just tree ladders—Bandelier wanted to have a lookout point of their own. “By having our own lookout we can have detection service for a longer period than we have previously had from the forest service’s Dome Lookout.” And “…in order to properly man this lookout point, a selected group of [CCC] enrollees” were schooled in how to read maps and to use an “alidade for locating fires and a telephone for reporting” (U.S. NPS Custodian, Feb. 1938).

In February 1938 Bandelier set up Roadside Point Lookout, a temporary lookout with a tent as a shelter, on the north rim of Frijoles Canyon near the entrance road. The June 1938 Monument Report noted that there had been five small fires to date, four on the Ramon Vigil Grant and one in Bandelier. The report then went on to boast that, “All five fires were first reported by our enrollee lookout who mans Roadside Point Lookout. He beat the Dome Lookout in every case. Perhaps we should change the grade of our lookout point from secondary to primary” (U.S. NPS Custodian).

In August 1940 Bandelier began construction of its own lookout structure on the north rim of Frijoles Canyon with “a completely glassed observation room complete with fire finder and map table” (Figs. 2-13, 2-14). At the same time Bandelier’s lookout was being built, the Forest Service was replacing the 1930 cabin on top of St. Peter’s Dome. An unusually heavy November snowstorm caught Forest Service workers engaged in the construction of the new fire lookout on Saint Peter’s Dome. A Bandelier crew used a tractor to reach the six men trapped without shelter or food (U.S. NPS Custodian, Nov. 1940).

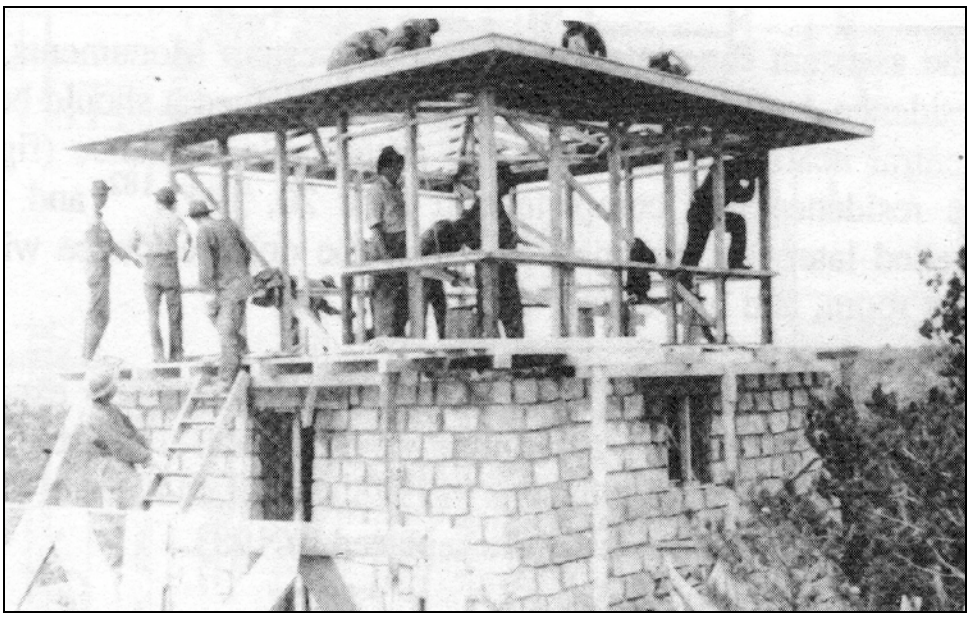


Fig. 2-13. 1940 Construction of Bandelier Lookout by CCC on North Rim of Frijoles Canyon. (Photo: Bandelier National Monument)

Lookout Safety

Being on a mountaintop during an electrical storm is always dangerous, but using the telephone on the mountain during lightning is even more dangerous. By the 1930s the

Forest Service posted safety instructions near telephones in fire lookouts. The instructions warned that when the storm was a mile or more away and it was necessary to use the telephone, the fire guard was to stand on an insulated stool—that is, a stool with glass insulators on its feet (Fig. 2-15). If the storm were a mile or closer distance, the fire guard was to throw the "disconnect-grounding switch" (USDA Lookouts 243). For the added security during a lightning storm, lookouts were to stand on the insulated stool even when not talking on the phone. Betty-Jane Curry, whose husband Jack Curry was a lookout at Red Top in 1939, remembers that once she and her husband both stood on the stool during a lightning storm (Curry).

Fig. 2-14. Frijoles Rim Lookout. View from Bandelier's lookout on the north rim of Frijoles Canyon southwestward to Boundary Peak at the west boundary of the Monument. To the left of the pointed Boundary Peak is St. Peter's Dome. The photo is deceptive. Three major canyons between the two lookouts made travel, telephone line construction, and maintenance extremely difficult.

Fig. 2-16. Lookout Stool. A fire guard in a lookout tower would stand on an insulated stool for protection during electrical storms. The stool has four glass telephone insulators screwed onto the feet of the stool. Frank Gonzales demonstrates standing on the stool at Cerro Pelado Lookout.

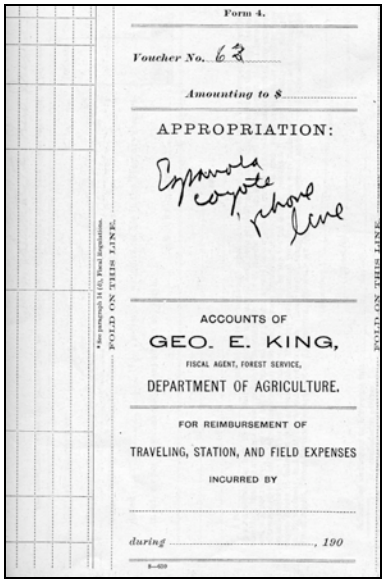
Section 3: Evolution of the Jemez Forest Telephone Line

Forest Residents and the Jemez Forest Telephone Line

Right-of-Way Easements

The Jemez Forest telephone line continued to evolve as it reached out to new ranger stations, lookouts, and forest settlements. Wherever the old lines or new lines crossed private land, the Forest Service was required to obtain an easement for the right of way and to pay an annual fee (Ringland May 1911). On June 11, 1906, the Forest Homestead Act was passed, allowing lands within the boundaries of the forest reserves to be homesteaded if that land were shown to be more valuable for agricultural use than for timber production. Referred to for many years afterwards as the "Act of June 11th," this law opened land within the Jemez Forest Reserve—including on the Pajarito Plateau—to additional homestead patents. In 1908 Charles B. Rumsey submitted a voucher (Fig. 3-1) to the Department of Agriculture for reimbursement for his expenses while working on the Jemez National Forest's "Española Coyote 'phone line'" (Rumsey). Part of his job, while camped in Water Canyon, was obtaining telephone line easements across private property. Among his expenditures he listed $1.00 paid to each of the following:

> Paid for the Right Away…accross the Ramon Vigil Grant
>
> Paid for the Right Away…accross the Old White Ranch, now owned by H. H. Brook
>
> Paid for the Right Away…accross the Ranch owned by James Loomis


Form 4.

Voucher No. 63

Amounting to $.....

APPROPRIATION:

Espanola coyote 'phone line

ACCOUNTS OF

GEO. E. KING,

FISCAL AGENT, FOREST SERVICE,

DEPARTMENT OF AGRICULTURE.

FOR REIMBURSEMENT OF

TRAVELING, STATION, AND FIELD EXPENSES

INCURRED BY

.....

during ....., 190

FOLD ON THIS LINE.

Fig. 3-1. Reimbursement Voucher for Española-Coyote Phone Line. This 1908 voucher is for reimbursements related to work on the Jemez Forest's Española-Coyote telephone line, including payment for telephone line right of way through private property. (Rumsey)

In May 1911, District 3 forester Arthur Ringland sent out a memo informing all of his supervisors that a new telephone easement form would soon be out and urged diligence in obtaining easements "to safe-guard right-of-way for the telephone lines across June 11th lands." The Jemez Forest Supervisor, Frank Andrews, wrote back to Ringland with a modification for the new form. "In many instances our lines cross patented ranches by being attached to trees instead of poles…I believe that the real facts should be embodied in the right of way deed" (Andrews). Ringland agreed and recommended a further addition of defining a right of way width as three feet (Ringland, Dec. 1911).

Telephone Service in Exchange for Reporting Fires

Although the telephone line was originally built to serve the Forest Reserve and its rangers, additional uses and demands soon evolved. Because forest settlements, both within and adjacent to the Forest Service boundaries, were a source of manpower to help fight fires, the Forest Service extended the telephone line to commercial operations such as sawmills and mining communities. Isolated forest homestead and ranching families also wanted to connect to the telephone line. This single wire also became an important lifeline in the lives of the isolated forest residents and settlements. All of the forest residents that I spoke with fondly remembered the old crank phones that were once part of the Forest Service line. A few had saved the box phones, like Betty-Jane Curry who had two of them in her pantry (Fig. 3-2), but all said that they wished they had. By 1914 the Forest Service was offering a cooperative agreement in which the Forest Service telephone line would be extended to Forest residences in exchange for their aid in detecting, reporting, and even fighting fires.

Fig. 3-2. Two Crank Phones Once Used on the Forest Service Line. These two old phones are in Betty-Jane Curry's home in Telephone Canyon. Her husband's family ran the central exchange at the Ketcham Ranch north of Red Top Lookout. Both her husband and her father-in-law, Jack and Jim Curry, were lookouts on Red Top.

As part of the cooperative agreement, each resident was required to answer a fire call three times a day. The fire call was one long ring and everyone on the line would pick up and each would say their name and that the line was working. If the phone didn't work then the resident might ride the line to find the break. The quality of the repair varied depending on the capabilities of the one doing the repairs. When an insulator was broken or had been pulled off the tree then somehow it would have to be replaced and reattached—the Forest Service standard attachment height was 15 to 20 feet up the tree. Lewis Caldwell, whose family had a sawmill in the area in the 1920s, remembered many times having to set the insulator back up in the tree. He had climbing spurs that attached to his boots, but to have the right angle to make the spurs work it was necessary to lean out away from the tree. Mr. Caldwell didn't like leaning away from the tree so he would reattach the insulator and line by standing on his horse (L. Caldwell).

Telephone Centrals for Jemez Division of the Santa Fe National Forest

The average Forest Service telephone line could handle a total of 10 to 20 phones connected on a line unit that did not exceed 50 miles in length (USDA Handbook 4). As the telephone system expanded and the number of users increased, telephone central exchanges, or switching stations, were required to break up the "load" (USDA Handbook 3). One of the first telephone centrals for the Jemez Forest was located in Española, the railroad town outside of and 14 miles east of the Jemez Forest boundary. The original operator for the Forest Service at the Española Central was Mrs. Haynie. (B. White). Most of the early switching stations were located within private homes or commercial establishments. From the Forest Service maps, the Española Central appears to have been situated between the west bank of the Rio Grande and the track of the Denver & Rio Grande Rail Road—perhaps at either the train depot or Frankenburger's Española Mercantile.

In 1918, a central was established in Cuba at the Young's Hotel and Harriet Young Hernandez was the early telephone operator there. Part of Harriet's job as central fire dispatcher for the Forest Service was to call the fire lookouts on the Jemez National Forest to make sure the telephone line was in working order. Each lookout would answer with "Lookout all clear." When there was a fire, the lookout would call it in to "Cuba 1" who would then report it to the Forest Service headquarters in Santa Fe. The information Harriet gathered from the lookouts was used to locate the fire and organize a fire-fighting crew (J. Hernandez). The Cuba Central was located in the Young's Hotel up until the 1940s. Harriet's husband Walter sometimes helped at the switchboard (Fig. 3-3).

By the 1930s there were enough people on the Forest Service telephone line that a directory was put out for the Jemez Division of the Santa Fe National Forest (Jemez). Printed on the front cover of the directory is a warning from the Santa Fe Forest Supervisor, Frank E. Andrews: "This telephone system was constructed primarily for use by the Forest Service, therefore official Forest Service calls must have precedence over all other calls. Since there are a large number of permittees using this line, please make conversations as brief as possible…conversations should not extend over three minutes."

Fig. 3-3. Walter Hernandez Manning the Cuba Central in the 1940s. Walter's wife, Harriet Young, was the central for many years at her family's Young's Hotel in Cuba. (Photo: private collection of John Hernandez)

For the Jemez Division the directory lists five centrals (Fig. 3-4): Española, Bland, Ketcham Ranch (Fig. 3-5), Cuba, and Jemez Springs. The centrals at Española, Cuba, and Jemez Springs also connected to the commercial Mountain States Line. The division units of the line were Española to Bland Central Line, Bland to Ketcham Ranch Central Line, Ketcham Ranch to Cuba Central Line, and Cuba Central North. The Los Alamos and Pajarito Plateau area was on the Española to Bland Central Line. The Forest Service telephone system used coded ringing, where each residence was assigned a special pattern of long and short rings. Listed below are the names of those on the Española–Bland Central Line along with the associated ring patterns:

Bland Central	2L 1S
Española Central (Connection Mt. States Line)	1L
Boyd, Dick	3S
Chama District Ranger (In winter)	2L 2S
Davenport, John	3S 1L
Guaje Lookout	2S 2L 1S
Hofheins, D.F.	1S 3L
Los Alamos Ranch	1L 1S 1L

McCurdy Sawmill	2S 1L 1S
Pine Springs Cabin	2L 2S
Puye Lookout	2L 2S 1L
Rio Grande District Ranger	2L 2S
Rito Frijoles Resort	3L 2S
Rito Frijoles Ranger Station	2L 2S
Smithwick, F.J. (Anchor Ranch)	1S 1L
Saint Peter's Dome	2S 1L 2S
U.S.I.S. Ranger	2S 3L
Young, J.W. (R.N. Earl)	1L 4S

The Bland–Ketcham Ranch Central Line had thirteen users on the line including

Bland Central	2L 1S
Ketcham Ranch Central	4S 1L
Jemez Springs Central	2L
Baca Location Headquarters	3L 3S
Cerro Pelado Lookout	4S
Jemez Springs Ranger Station	3L
Red Top Lookout	1S 1L

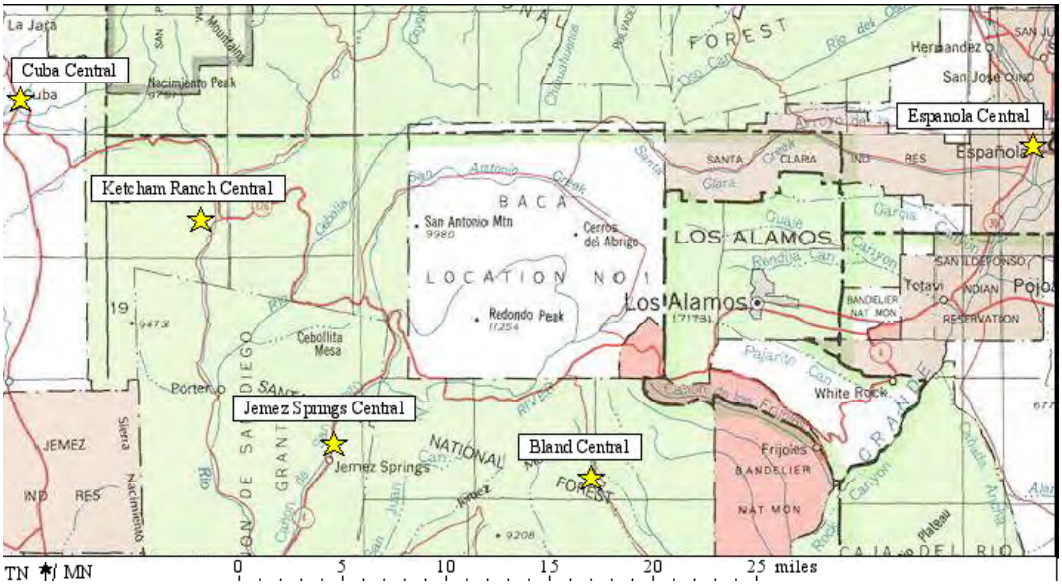


Fig. 3-4. Telephone Centrals on the Jemez Forest. There were five telephone centrals for the Jemez Forest Service line during the late 1920s. Los Alamos and the Pajarito Plateau were on the Española to Bland Central.

Fig. 3-5. Ketcham Ranch in Turkey Canyon. John Ketcham's daughter-in-law, Gretta, ran the central at this cabin beginning around 1918. John's son-in-law and grandson were lookouts at Red Top in the 1920-30s.

Within each unit of the line, the ringing from each call was heard at every residence and anyone could pick up the phone and listen to anyone else's conversation. However, the efficiency of the line went down as the number of uninvited listeners went up. But listening in on a neighbor's phone call was a common source of both information and entertainment. John Hernandez, whose mother, Harriet Young Hernandez, was the operator at Cuba for many years, tells the story of Mrs. Lillie, who had a homestead in School Section Canyon in 1911, shown in Fig. 3-6. "Mrs. Lillie was on Jemez Forest Service line and would listen in to all the telephone calls. Sometimes if the connection was too weak, you would have to say, 'Please, Mrs. Lillie, hang up so we can hear.' And, according to the story, once she inadvertently responded in a huff, 'I'm not listening!'" When the Forest Service removed its telephone line in the late 1940s, many of the forest residents who had relied on the Forest Service line were left without any phone service (Fig. 3-7).

Early Telephone Service to Private Residences on the Pajarito Plateau

Telephone Line Spur to Los Alamos Ranch

Harold Hemingway Brook was one of the early permitees on the Jemez Forest telephone line, and the first permitee on the Pajarito Plateau, to have a spur line constructed to his homestead. The 1914 Jemez Forest Fire Map, shown in Fig. 3-8, shows a spur line branching off the main Forest Service line and extending approximately one mile east to Brook's ranch located on Los Alamos Mesa, near today's Ashley Pond. Brook had filed for entry on Los Alamos Mesa in August 1908, under the 1906 Forest Homestead Act, which allowed homesteads within the Jemez National Forest. However, in 1909 Brook received notice from the Forest Service that his application could not be considered. His claim was within an area that had been temporarily withdrawn from entry back in 1900

pending a decision on a proposed archeological park. Edgar L. Hewett, an archeologist who had excavated the major ruins of the Pajarito Plateau, first proposed the "Pajarito National Park" in 1899 in an effort to protect the archeological sites scattered across the plateau from Puye Ruins to south of Frijoles Canyon.

Fig. 3-6. Lillie Homestead. The Lillie Homestead in School Section Canyon had one of the early phones on the Jemez Forest Service line. Ironically, today there is no phone service to the forest residents living near School Section Canyon. The current owners must rely on a satellite phone, as seen above and to right of house.

Fig. 3-7. No Phone Here. Notice was placed in front window of what was the old Lillie Homestead because lost hunters were breaking into the cabin looking for a phone.

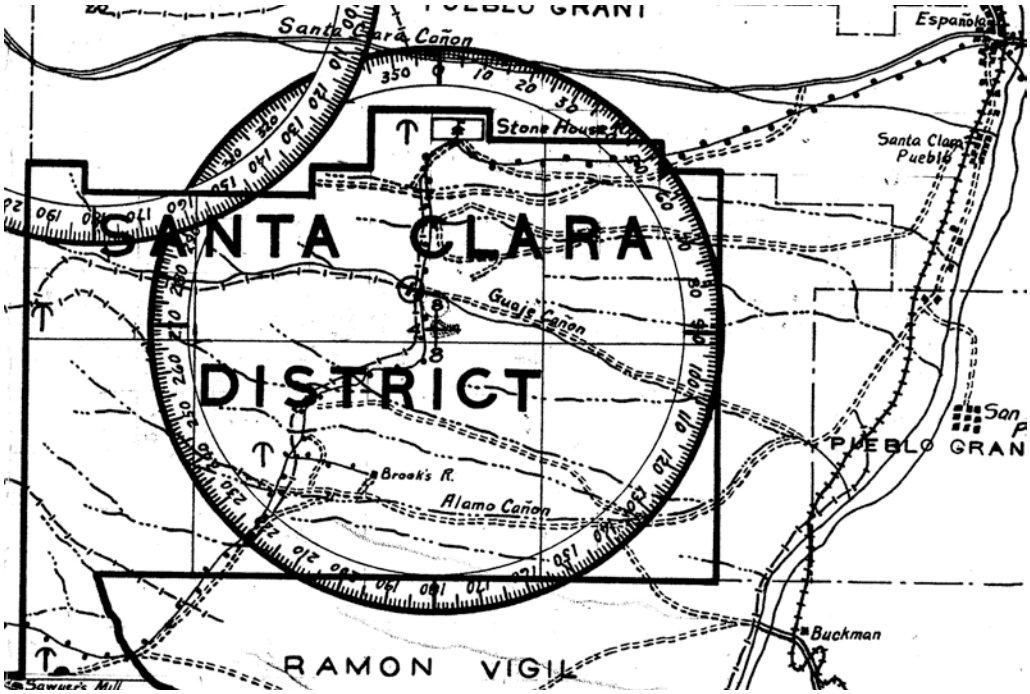


Fig. 3-8. Spur Line to Brook's Ranch. This 1914 Jemez Forest Reserve Map shows the telephone line coming from Española to the Santa Clara District of the Jemez Forest Reserve. The heavy line is the Reserve boundary and the line with dots is the phone line. At Stone House Ranger Station the line turned south, crossing the Pajarito Plateau on its way to the Jemez Mountains. A spur line is shown branching east to Brook's Ranch north of [Los] Alamo[s] Cañon. His was the first private residence on the plateau to be linked to the Forest Service telephone line.

So, on November 11, 1909, Brook wrote an impassioned letter to Hewett explaining how "Under the act of June 11, 1906, a large number of applications have been filed for examination and restoration to entry with the Forest Service who for nine years have seemingly been ignorant of this temporary withdrawal of lands from entry." Brook, who in good faith had applied and served 14 months of the time necessary for a patent, had "…schemed, toiled and spent hard earned money to make this land valuable and reclaim it from the wilderness, only to find that through error of two big departments of the government, [he would] stand a chance to lose it all…" Somewhat more conciliatory in tone, Brook ended with "I do not object to the establishment of the park, but favor it. But I do object to its being so unnecessarily large and taking away from so many homesteaders" (Brook).

Such opposition from private interests on the Plateau grew more vocal until finally Hewett's dream for a large national park encompassing the major ruins of the Pajarito Plateau ended on February 11, 1916, with a compromise for a much smaller park—Bandelier National Monument. Bandelier included the area of Frijoles Canyon and southward to the Cañada de Cochiti Grant—essentially the east quarter of Jemez National Forest's Cochiti District. The Monument also included the two small, detached sites of Otowi and [T]sankawi Ruins (Fig. 3-9).

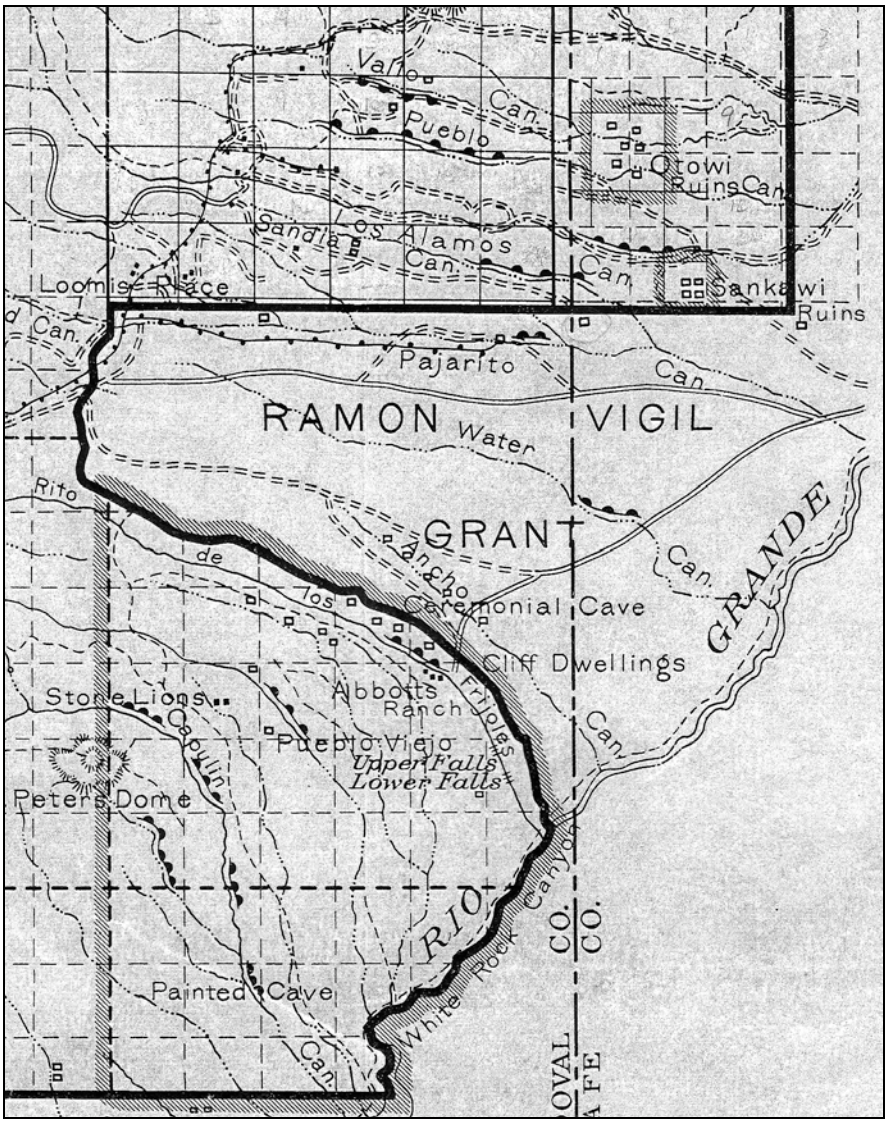


Fig. 3-9. 1916 Map Submitted as Part of the Proclamation dated Feb. 11, 1916, Creating Bandelier National Monument. The park included the shaded area south of the Ramon Vigil Grant as well as two small ruins of Otowi and [T]sankawi north of the Grant. A telephone line was extended from the west boundary of the Grant along a wagon road to Frijoles Canyon soon after the creation of Bandelier. The spur lines to Brook's Los Alamos Ranch and to Pond's Ramon Vigil Grant headquarters in Pajarito Canyon are both indicated by a line with dots.

In 1916 Brook sold his mesa-top ranch to Ashley Pond. Pond, who left the Detroit partnership that owned the Ramon Vigil Grant, opened the Los Alamos Ranch School at Brook's ranch in 1917. Pond then hired A.J. Connell, who was working as a ranger with the Forest Service, to become director of the Ranch School (Wirth and Aldrich 28). The Ranch School appears to have continued participating in the cooperative exchange agreement for telephone service and, possibly due to Connell's past experience and ties with the Forest Service. From 1924 to 1933 the Los Alamos Ranch School actually appears on maps as a permanent lookout station. The Forest Service phone line went to

the massive Big House where there would certainly have been a good view from the third floor.

Telephone Line Spur to Pajarito Canyon

In 1914 the Forest Service also constructed a second telephone spur to a private residence on the Pajarito Plateau—this time six miles east into Pajarito Canyon. An article in the April 14, 1914, *Santa Fe New Mexican*, reports that Ashley Pond and the Supervisor of the Jemez National Forest met "…to make arrangements to bring the telephone line to the Ramon Vigil Grant in exchange for fire protection cooperation." The spur to Pond's ranch came off the main Forest Service line at a point just inside the northwest corner of the Grant. The line followed a wagon road east along the Llano Largo dropping into the broad bottom of Pajarito Canyon at Pond's Ranch. Ashley Pond later wrote a letter to business partner, Roy Chapin, in which he happily reports, "The telephone line is complete…. I can now phone to Española in the morning and have my stuff delivered…" to the Buckman depot by 2:30 in the afternoon (Church).

After Ashley Pond left the Ramon Vigil Grant, it was sold to Frank Bond in 1918. The spur line to Bond's "Ramon Vigil Grant Headquarters" in Pajarito Canyon continued to be used until about 1925. Both Dick Boyd, who drove a stage between Santa Fe and his parents' ranch at Frijoles Canyon, and his brother-in-law, John Davenport, lived down in Pajarito Canyon at the Ramon Vigil Grant Headquarters during part of that time (Boyd).

Telephone Line Spur to Frijoles Canyon

In 1906 Albert J. Abbott, a ranger for the Jemez Forest Reserve stationed at Bland in the Cochiti District, was told about Frijoles Canyon by John and Cyrus Dixon of Cochiti Pueblo. Upon viewing the Frijoles Canyon for the first time, Abbott realized that it would be an ideal location for a Jemez Forest Administrative site and he reported this to his supervisor in Santa Fe. Albert Abbott also described the canyon to his father, Judge A. J. Abbott. And in 1907 Judge Abbott contracted with the Forest Service to be custodian of the ruins at Frijoles (Jastram).

By 1911 Frijoles Canyon had a ranger stationed there seasonally. However, the telephone line was not extended there until 1916, at which time Frijoles Canyon became part of the newly created Bandelier National Monument. The Forest Service, which continued to have jurisdiction over Bandelier until 1932, constructed a branch line from their main telephone at the Ramon Vigil Grant's west boundary eastward along the road built across the Ramon Vigil Grant several years earlier to access the Abbotts' Lodge in Frijoles Canyon.

Then in 1925 George and Evelyn Frey obtained a 99-year lease from the Forest Service to run the lodge and concessions at Bandelier. The Freys soon had two separate phone lines that came to the Frijoles Canyon Lodge. One was a private line that came from Santa Fe on the east. The second telephone line was the Forest Service line coming from the Jemez Mountains. The Forest Service line dropped down to the Rito de los Frijoles Ranger Station from the north rim of Frijoles Canyon, and then continued one mile east, down canyon, to the Frijoles Canyon Lodge.

Evelyn Frey tells the story of how these two separate telephone lines, both connected to phones inside the Lodge—came to the aid of two young lovers. The woman was in Santa Fe and the man was ill in the Jemez backcountry.

> But our telephone into Santa Fe and the one into the Jemez [were] right close together and I could talk to either one of them [at the same time]. I carried on a very flourishing romance…So I talked to her, and I gave him kisses and love, very beautiful….(Frey)

Civilian Conservation Corps 1933–1942

The telephone system continued to slowly expand to meet the goals of the fire protection program in the Jemez Forest. Additional lookouts were established to improve the visual coverage on the Jemez Forest and telephone lines were constructed to connect the lookouts to the overall communication system. However, building and maintaining an ever expanding system of telephone lines to ranger stations and lookouts required more manpower and money than was ever allocated for the Jemez Forest (USDA Book I 53). Proposed projects were often postponed and workforce needs were met by hiring men seasonally and, during fire season, paying per diem guards to man the lookouts and to help fight fires.

It took a national disaster, the Great Depression of the 1930s, to finally give the Forest Service the needed money and manpower to achieve all the proposed plans so vital to the Forest Service's fire protection goals. President Franklin Delano Roosevelt's CCC, funded in March 1933, provided job training and put men and boys to work within the parks and forests (Figs. 3-10, 3-11). Called the "green army," the men planted trees, constructed trails, and built park structures. They also fought forest fires, constructed lookout towers, and laid 89,000 miles of telephone line across the country (U.S. NPS CCC 11). It was the CCC that made it possible for the Forest Service to complete the deferred infrastructure projects and even to expand the vast system of ranger cabins, fire towers, and the stringing of telephone lines to connect them.

CCC on the Pajarito Plateau

Several CCC camps were established in the Jemez Forest between 1933 and 1942. In January 1934 the first CCC men arrived to occupy the camp buildings constructed by the army in Bandelier's Frijoles Canyon. The early and ongoing projects assigned to the men of the CCC included the much-needed repairs and thorough overhaul of telephone lines. Insulators were replaced on existing lines, and new lines were extended to emergency telephone boxes, ranger cabins, and lookouts (U.S. NPS Custodian, July 1937). Although Bandelier National Monument had been transferred from the Forest Service to the Park Service in 1932 (U.S. NPS Custodian, July 1933), Bandelier continued to share the Forest Service telephone line and cooperate with fire detection and fire fighting.

Fig. 3-10. CCC Boys Practice Splicing Telephone Wire, 1935. The new tool crimps lead casing around the two wire ends. The earlier method was the Western Union splice where the two wires were twisted together and the ends tightly wrapped. (Photo: Forest Historical Society, Duke U)

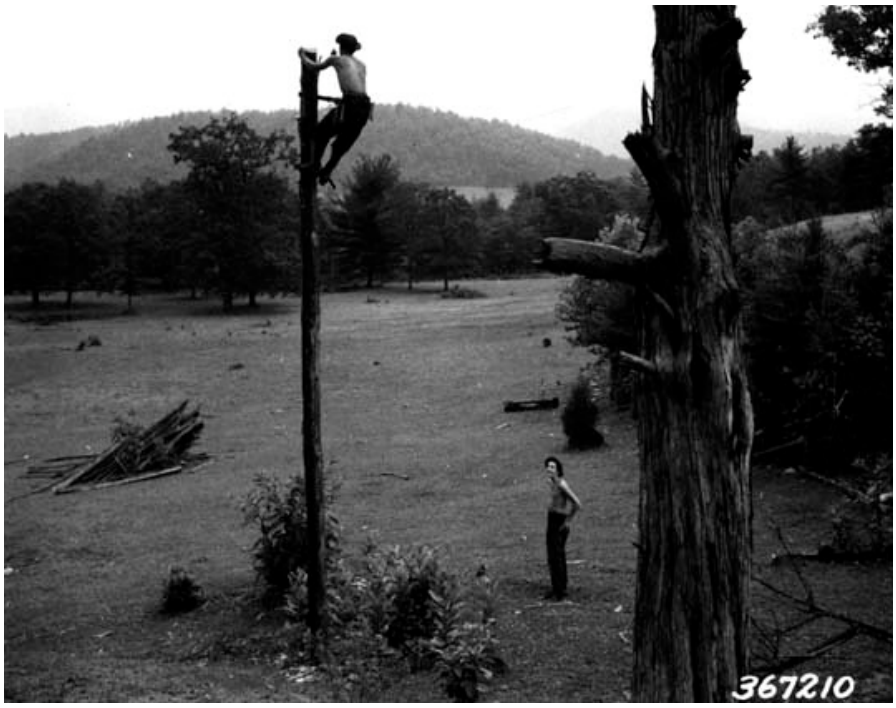


Fig. 3-11. Pole Climbing Practice, 1938. Two CCC boys take turns practicing with climbing spurs used when hanging telephone line. (Photo: U.S. Forest Service)

During the 1930s the federal government also bought up large tracts of land devastated by drought and overgrazing to try to improve their soil and grasslands (Pickens). In about October 1934 the federal government bought the Ramon Vigil Grant from Frank and George Bond (National Custodian). The Soil and Conservation Service (SCS) had their headquarters down in Pajarito Canyon at the old Ramon Vigil Grant cabin (Curry). And then in the fall of 1939 the Santa Fe Forest Service took over the Ramon Vigil Grant and stationed a ranger down at the Pajarito Cabin. They hired Jack Curry to see that the cattle were rotated between the four grazing areas established by the SCS. Both Jack Curry and his wife Betty-Jane moved to Pajarito Canyon, traveling by horseback from their home in Turkey Canyon, north of the Red Top Lookout. The trip took two days and is vividly remembered by Betty-Jane:

> The first night we got as far as Horseshoe Spring at La Cueva. Early the next day we rode to El Cajete. We passed the Baca Location headquarters – it was empty this time of year. We crossed the Valle Grande and followed the Cañon de Valle trail reaching the ridge at about dark. We continued down the Cañon de Valle trail with me falling asleep and my horse following the white flour sack tied to the back of Jack's saddle. Reaching and crossing West Jemez road we then followed the Don Gomez road to the Pajarito Cabin. We stayed in the cabin with the broken windows and were visited by the previous inhabitant – an owl. (Curry)

The Currys returned to the Pajarito Plateau the next summer and were stationed in Water Canyon, where they lived in an 8' by 20' box structure across from the CCC camp on Saw Dust Mesa. Jack's job, again, was to ride herd on the cattle on the Ramon Vigil Grant.

A telephone line was constructed from the main line along West Jemez Road, eastward following the same general east/west alignment of the original spur put in to Pond's Ranch in 1914. The 1940 map in Fig. 3-12 also shows an additional north/south telephone line, also connecting to Pajarito Cabin, that was built from State Road 4, near Bandelier, northward to the Pajarito Canyon.

Manhattan Project

The United States entered World War II in late 1941 and Los Alamos Ranch School was chosen as the site for the secret Manhattan Project and its development of the atomic bomb. The first need for the project was a secure communication system. At the time there was only one telephone line to the Los Alamos Ranch School—the Forest Service ground return system. On February 16, 1943, a memo came from Acting Forest Supervisor G. L. Wang to Joe Rodriguez, the Española District ranger, regarding the construction of a new telephone line. The proposed project was entitled, the Española-Cañada Telephone Line. It was to be a by-pass telephone line from Española directly to the Pajarito Cabin. The Army asked the Forest Service to survey and flag the route. The memo from Wang urged: "Since the Army would like us to get at this work as soon as possible, it is suggested that you give this matter your immediate attention" (Wang). A few weeks later, on March 29, 1943, the District Supervisor of the Santa Fe National Forest received a notice that the War Department was taking over control of a portion of the Santa Fe Forest, and the Ramon Vigil Grant (Harman). The letter, from J.M. Harman,

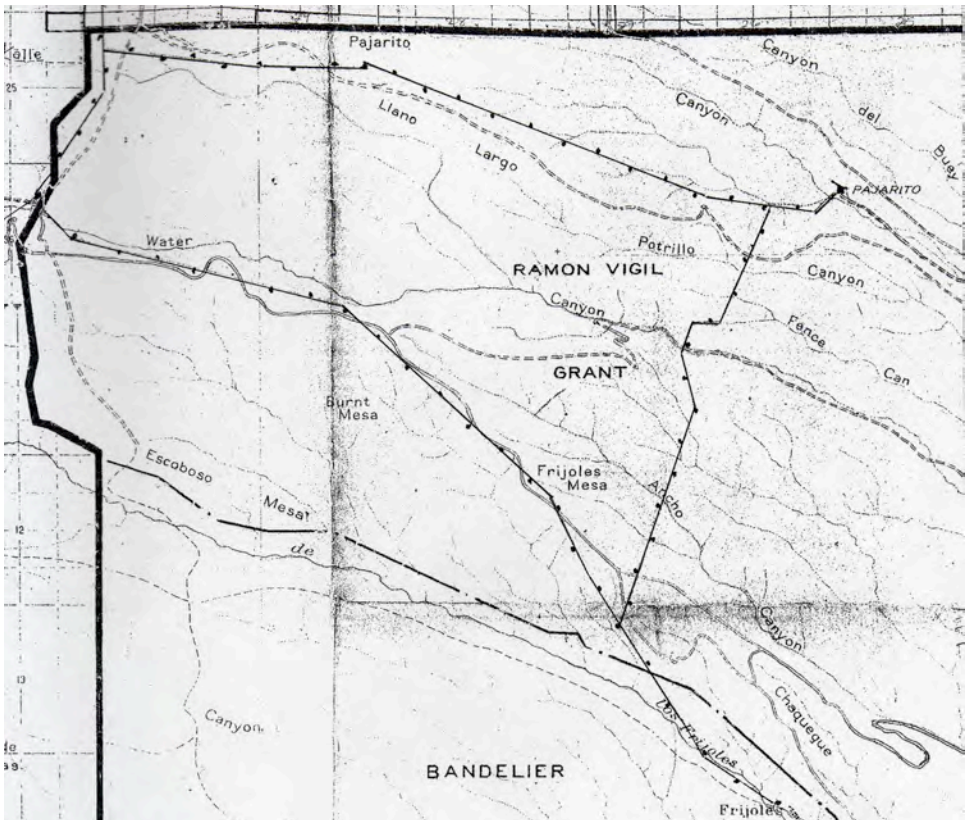


Fig. 3-12. 1940 Santa Fe National Forest Jemez Division Map. Two telephone lines go to the Pajarito ranger cabin in 1940. One line generally follows the 1914 route and the second one heads north from Water Canyon north of Bandelier Headquarters.

Colonel in the Corps of Engineers, also requested that the Forest Service continue to assist in fire detection, prevention, and suppression:

> Where necessary for fire fighters to cross the restricted area, arrangements will be made for escorting the necessary men through the restricted area…A permanent pass will be given one of your rangers to cross the western part of the central restricted area in a north and south direction. You are requested to give his name to Mr. Smyth, so that an M. I. investigation can be made. The ranger selected should be one who can be relied upon not to divulge to unauthorized persons what he may see in the restricted area.

Commercial Telephone Service from Santa Fe to Los Alamos

A single-wire Forest Service telephone line was obviously not sufficient to meet the secret military and scientific needs associated with the Manhattan Project. There was a scramble to quickly do more. Early in 1943 two men walked into the Santa Fe office of the Mountain States Telephone and Telegraph Company. They informed the clerk, Philip B. Borrows, that they needed "phone service to an abandoned boys' school located in the Jemez Mountains." The clerk "explained that since the nearest telephone line to that location was nearly 20 miles away, getting service would be difficult especially with the war on." Just to be polite, Borrows asked when they'd like the service. One of the men said, 'Tomorrow.'"

After the men left, Borrow quickly called his boss in Albuquerque who had, himself, just gotten off the phone with the Corps of Engineers. He was told that:

> …whatever the telephone company needed the Corps would provide immediately. Army trucks had already been loaded with 20 miles of field wire…The next morning the phone company took over the rural ranch line that terminated closest to the boys' ranch and the army engineers began laying field wire. Two days later, the wire was laid and a single telephone providing dial tone was in a construction shack on site. The "site" was 120 square miles under army guard.
>
> "Clearly, one phone attached to 20-miles of wire lying on the ground wasn't going to do the job. A real telephone line had to be built. Most of the phone company's experienced linemen were in the service, so Big Charley Tabacchi, a line foreman, was asked to solve the labor shortage. Big Charlie (6 feet, 5 inches) could speak fluently to the leaders of the Tesuque and San Ildefonso pueblos in their own language. He asked the Indians for their help.
>
> "Sixty Indians showed up at the job site the next day. They began to clear the right of way and dig holes in the rocky ground for the telephone poles. They worked from dawn to dusk...Regular telephone linemen strung the wire, made the splices and attached the wires to the insulators on the cross arms. The line was in and working in six days - a record that stands today." (Hackenburg)

The End of the Line

After the Japanese attack on Pearl Harbor on December 7, 1941, all CCC projects unrelated to the war effort were terminated, officially ending on June 30, 1942. Without the support of men and money from the CCC program, the Forest Service could no longer man and maintain their vastly expanded fire protection system and the telephone infrastructure began to deteriorate. The litany of problems that existed throughout the Jemez Forest and the dissatisfaction with the Forest Service ground return telephone system are exemplified by the following monthly entries in the Bandelier National Monument's Custodian Reports from 1946 (USDA Custodian). For the Los Alamos area, in addition to the physical problems of a dilapidated telephone line, there appeared to be frictions related to the multiple agencies involved (Santa Fe Forest Service, Bandelier National Monument, and the Army):

> July: The telephone line managed to be out of order when it was most needed. Last month at the time of a serious accident the line was broken in the military reservation. In June when we had five fires burning, the army had the line out on the Otowi Section. Again on July 19th when we had another fire emergency, the army had the line down. By dint of hard work we can keep the phone working about one day out of three.
>
> September: The telephone system caused trouble due to both lightning storms as well as Army interference.

And finally Bandelier's Custodian Reports from 1947 herald the end of the Forest Service's ground return system and the next generation technology (U.S. NPS Custodian):

May: Radio equipment to be used for communication during fire season–to supplement the undependable telephone system–has arrived.

July: The Forest Service and the Park Service are now negotiating with the Mountain States Telephone Company to construct a telephone line for joint use by Bandelier and the Forest Service. The Atomic Energy Commission at Los Alamos has notified the Forest Service that the present line through Los Alamos must be removed this year and the Española Telephone Company plans to install a dial-system that would render our circuit ineffectual.

August: A conference of Forest Service officials, Mountain States Telephone Co executives, and the Assistant Regional Director of the National Park Service … to discuss possible direct telephone line from Bandelier to Santa Fe. Prospects of construction of the line to Bandelier by Mountain States look favorable. And a new line to Santa Fe via Otowi Section seems assured. This will replace the present unsatisfactory Forest Service line to Española.

November: We have a verbal confirmation from the Atomic Energy Commission that arrangements are completed with the telephone-company that will enable connection with Mountain States Telephone Company in the vicinity of Otowi Section. This solves our communication problem.

Section 4: A Telephone System Designed for Forests

Ground Return System

Telephone technology was novel enough in the early 1900s that it was considered newsworthy to report a residence or business newly connected to the telephone line. An article in the *Santa Fe New Mexican* dated October 30, 1903, noted that, "The Santa Fe Electric Telephone Company placed 11 new hello machines during the month of October, making a total of 156 phones now in use in business houses and residences in the Capital City." Commercial telephone service did not reach most private residences in the smaller New Mexico towns until after World War II.

It was during this very beginning of phone technology that the Forest Service developed its own telephone system for use through its forests. The Forest Service used what was called a grounded-circuit line, essentially, a system with a telephone line extended between two phones - and with a wire buried into the ground at each phone (USDA Handbook 6). The ponderosa was the tie tree of choice because of its abundance, height, straightness, tendency to lose its lower limbs, and its longevity. Where practical, the line was strung along existing trails. Associated trails were often built to accommodate maintenance of the line as well as to serve as trails for patrols and access for fire fighters. Where the telephone line crossed open areas, poles had to be set, but because setting poles required much more time, energy, and money, a slight detour around clear areas was the preferred alternative (USDA Handbook 13).

A three- or four-man crew hanging tree lines could average five miles a day (USDA Handbook 19-20). The axe-man went ahead, felling trees in the line's path and marking the tie-trees. The line wire, which was carried on a reel by two men or placed on the crosstree of a horse's packsaddle, was uncoiled along the path. The linesman, shown in Fig. 4-1, used climbing spikes or spurs tied to his boots and legs to climb the tie tree and attach the insulator and the line fifteen to twenty feet above the ground (USDA Handbook 16).

Hemingray No. 9—The Jemez Forest's First Telephone Insulator

The telephone wire was held to each tie tree by an insulator made of a non-conducting material. The type of telephone insulator used on the Jemez Forest Reserve in 1906 was the Hemingray No. 9—a common type in use at that time by commercial phone companies on their poles along roads and leading to residences (Fig. 4-2). The Hemingray No. 9 was a domed blue glass insulator, three and three-quarter inches in height by two and a quarter inches wide. The insulator had a single skirt with its base encircled by drip points, a design that was patented May 2, 1893, by inventor Ralph G. Hemingray. The drip points were to help shed water away from the insulator. The front skirt was embossed with "HEMINGRAY / No. 9" and the rear skirt with "PATENT/MAY 2 1893." The inside of the insulator, the pinhole, was threaded so that it could be screwed onto a foot-long oak bracket that was nailed to the tree. The line wire was held to the insulator by a short piece of tie wire wrapped around the wire groove below the insulator's crown.

Fig. 4-1. A Telephone Linesman. A telephone linesman strings the single bare wire of the Forest Service telephone line along roads and trails to connect ranger stations and fire lookout towers throughout the National Forest. This was the type of line hung across the Jemez Forest between 1906 and 1947. (Photo: US Forest Service)

Fig. 4-2. Hemingray No. 9. This small blue glass insulator was the type first used on the Jemez Forest Reserve in 1906. Note the drip points around the bottom and the threads that allowed the insulator to be screwed onto the bracket.

The Forest Service, however, experienced problems with both the glass insulator and its wooden bracket. Despite the drip points, moisture tended to creep up inside the glass. In winter the moisture would freeze and cause the domed top to crack and pop off (Gish). Also, the wood bracket was not as well suited to a living tree as to a pole because as the tree grew it twisted and stressed the bracket, causing the nails to loosen and the lower part of the bracket to split (Fig. 4-3).

Fig. 4-3. Popped Top and Split Bottom. These two photos demonstrate the problems with the glass insulator and wood bracket. The insulator top has apparently popped off due to freezing and the end of the bracket has split and broken away as the girth of the tree expanded. This ponderosa is located on West Jemez Road. (Geographic positioning system [GPS] waypoint WJ1)

Split Knobs Forestry Insulators

Sometime around 1916, the Forest Service switched from using the Hemingray No. 9 to the porcelain split knob insulator—a significantly different style of insulator that was designed specifically to deal with the challenges of stringing telephone line from tree to tree through forests. In the *Albuquerque Morning Journal* October 7, 1916, an article described a Forest Service exhibit at the International Soil Products Exposition in El Paso, Texas, in which a split knob insulator was displayed. "A system of fire protection upon the national forests will be shown by the miniature…" There will be "…a typical lookout tower from which the forest guard watches for signs of fire. The telephone system [has] the wires strung on swinging insulators from the trees…" (USDA Book II 13–14).

The new forestry porcelain knob was not fixed to the tree with a bracket like the glass Hemingray, but instead its hanger system allowed the knob to swing freely away from the tree. The split knob was actually two parts that were keyed to fit together forming a doughnut shape (Fig. 4-4). The two pieces could be clamped around the line wire and then held together by a very long hanger or tie wire that was wrapped twice around the two halves and twisted at the top. The long end of the knob's hanger wire was bent over a three-inch fence-type staple, and the staple was then hammered into a tie tree. The long tie wire allowed the insulator to hang between one and three feet away, as needed, from the tree (Fig. 4-5). Each successive tie tree was chosen to be sufficiently out of alignment so that the pull by the telephone wire was always away from the tree to prevent either wire or insulator from touching the tree, thus avoiding a "tree ground" (USDA Handbook 16–17).

The changeover from the bracketed Hemingray No. 9 to the free-hanging split knob was fairly comprehensive across the Jemez Forest because the tension required for hanging the line wire was very different between the two types of insulators (USDA Handbook 18). Unlike on pole lines, slack was absolutely necessary in a tree line to allow the wire to absorb considerable strain from falling trees—a common problem on the forest lines—without breaking. However, if weight from tree-fall was excessive, the hanger system of the forestry knobs was designed so that the tie wire would pull out of the staple, allowing the insulator to be released from the tree before allowing the line to break. When there was a break in the line, a forest guard was sent out to ride the line and, if there was enough slack, to repair the break by twisting the two broken ends back together in what was called a Western Union splice. Not everyone understood the technology of the telephone—sometimes even those whose job it was to repair the line. A story is told of a new forest guard on District 3, a cowboy by background, who was sent out to repair a broken line. However, when he reported back to the ranger station, the phone still did not work. After brief questioning it was revealed that because there wasn't quite enough slack to pull and twist the broken ends of wire together, the cowboy fixed the line by linking the two ends with a piece of his rope (USDA Book III 17–18).

Fig. 4-4. Keyed Surfaces of a Split Knob. The two halves of a split knob fit together to form a doughnut-shaped insulator.

Fig. 4-5. Split Forestry Knob. Porcelain insulator hangs at end of wire in Frijoles Canyon near Headquarters. The telephone wire would have passed through the center hole of the insulator. (GPS waypoint HQ4)

Standards were adopted very early for porcelain insulators and the standard shapes and sizes of forestry knobs were each given a U.S. identification number, such as D-1, D-2, D-3, etc. The manufacturers of the forestry knobs closely followed the more important features of the standards such as overall size, hole diameter, and groove size, but other details may have varied somewhat (Tod 16). The manufacturer would emboss his trademark, and sometimes the style number, on the outside surface of the insulator. The types of split knobs used on the Jemez Forest appeared to evolve over time, generally from small and round toward larger and more oval in shape, although the use of several of the later styles seemed to overlap. The estimated date of use of the different insulators on the Jemez Forest is speculation on my part, based on the comparison of available information regarding when a line was constructed, when a line was abandoned, and the predominance and variety of insulator types I found along particular segments of line.

Small Round Split Knob

The Jemez Forest's earliest porcelain knobs came from R. Thomas & Sons Company, a company that started out in 1873 making ceramic doorknobs and then switched to making electrical porcelain in 1884 (Tod 96). The smallest of the Thomas porcelain insulators used in the Jemez Forest was a standard U.S. No. 37 split forestry knob, as shown in Fig. 4-6 (Tod 23). It was white and round in over-all shape, with a round half-inch center hole. Its height was one and one-half inches, and its diameter is one and three-quarter inches. The trademark was either the initials "RT&SCO" embossed on the upper outside edge of the insulator or the name "THOMAS" embossed on the lower outside edge.

(a) (b) (c)

Fig. 4-6. (a) "R.T.&S.CO," (b) Smallest Split Knob, (c) Little "THOMAS"

This small round knob was found most often along the same alignments that had the Hemingray glass and was probably in use on the Jemez Forest by 1916. Specific indications for the period of use on the Jemez Forest included the fact that on the spurline to Cerro Pelado, which was built around 1914 and then abandoned around 1922, the Hemingray No. 9 and the RT&SCO were the only types of insulators found. The small split knob was actually wired to the wood brackets of the Hemingray, as seen in Fig. 4-7. The date after which the small round split knob was no longer used may be indicated by the fact that along a line that first appeared in School Section Canyon on the 1922 Santa Fe National Forest map, I found only one small Thomas, perhaps an isolated repair, while the remaining thirty-one insulators were all the larger and presumably the successor to the small round knob.

Medium Round Split Knob

R. Thomas & Sons Co. came out with a similar but slightly larger round split forestry knob. It was two inches in diameter with a single letter "T" embossed on the upper outside edge (Fig. 4-8). This medium round insulator was in use by 1922 when the telephone line was constructed west of the Baca Location in School Section Canyon. It was still in use seven years later, based on the fact that I found a string of T-insulators along the telephone line that was extended in 1929 from Bandelier Headquarters in Frijoles Canyon westward to St. Peter's Dome. I found that the later repair work and the extensions on the Bandelier Monument line used the next larger ceramic types, such as the large round and large white oval knobs.

Fig. 4-7. Hemingray with RT&SCO. This appears to be a transition between the Hemingray No. 9 and the small round split knob found on the spur line to Cerro Pelado Lookout—a line originally constructed in 1914. (GPS waypoint AP6)

Fig. 4-8. A Medium Round "T" Knob.

Large Round Split Knob

The largest round split knob found on the Jemez Forest was the standard U.S. No. D-2 (31 Tod). The insulator was only a quarter-inch larger in diameter than the medium round—but the more substantial change was that the center hole was oval-shaped instead of round (Fig. 4-9). The advantage of an oval shaped hole was that it tended to keep the pull of the line wire to the small end, and away from the joint of the two insulator halves. There were two different manufacture sources of this particular style of insulator: R.

Thomas & Sons Company and Illinois Electric Porcelain Company. The insulator from R. Thomas & Sons Company was embossed with the name “THOMAS” on the upper outside edge of the insulator or, most commonly, with the letter “T” in a recessed circle on the lower outside edge (Fig. 4-10a, b). The insulator manufactured by the Illinois Electric Porcelain Company was embossed on the upper outside edge with the letter “M” inside an embossed triangle (Fig. 4-10c)—a trademark used by the company beginning in 1915 (Tod 86).

This No. D-2 style of insulator was the most frequently documented type on the Jemez Forest. It saw widespread use beginning in the early 1930s, and continuing into the 1940s. I documented a continuous string of T-circle insulators on the line built around 1936 from Vallecitos de los Indios, a village south of the Baca Location, westward across Cat Mesa to the new Jemez Springs Ranger Station. This line first appears on the 1936 Santa Fe National Forest map.

Fig. 4-9. Large Round with Oval Center Hole. The oval shape of the center hole was a modification in design to prevent the telephone wire from getting caught and pulling at the joint of the two halves.

(a)

(b)

(c)

Fig. 4-10. (a) Large Round THOMAS, (b) Large Round T-Circle, (c) Large Round M-Triangle

Large Oval Split Knob

The largest of all the forestry split knobs used on the Jemez Forest was an oval-shaped insulator that measured three inches by two and three-quarter inches in diameter. There were three manufacturers of this standard D-1 style, and each of the three was slightly different in detail. First was the R. Thomas and Company, whose oval split knob had the trademark ”THOMAS” embossed on the upper outside edge. This insulator had distinctly flattened sides as seen in Fig.4-11, and I called it the Thomas flat-sided oval (FSO). This insulator was not widely distributed across the Jemez Forest. I found it mostly concentrated on the Pajarito Plateau, especially north of Rendija Canyon where it appears to have been a major repair of the line. The FSO did not appear on any of the lines that were constructed after 1936 and was probably in use from the 1920s to the 1930s.

Fig. 4-11. Thomas Flat-sided Oval. This large white insulator was recognizable because of its flat sides. (GPS waypoint PT68)

The second manufacturer of the large oval split knob was Knox of Knoxville, Tennessee, founded in 1923. Its trademark, “KNOX,” was embossed in a recessed rectangle on the upper outside edge of each insulator (Fig. 4-12). The catalogue style number “6651” was embossed in a recessed rectangle on the lower outside edge (Tod 87). The oval Knox insulator was not commonly found in the Jemez Forest or on the Pajarito Plateau. I did document Knox insulators on a string of tie trees that branched eastward into the Ramon Vigil Grant from West Jemez Road. This branch line appeared on the 1940 Santa Fe National Forest map.

The third large oval insulator was manufactured by the Illinois Electric Porcelain Company. It was a smooth-sided insulator, embossed with the trademark “M” inside an embossed triangle on the upper outside edge (Figs. 4-13, 4-14). The standard style of the insulator, “D-1,” was embossed on the lower outside edge. This large smooth oval split knob was found on a spurline built around 1936, from Cerro Pelado Lookout to a secondary lookout on Los Griegos. This type was also used on the line built across Pueblo and Los Alamos canyons in around 1937.

Fig. 4-12. Large Oval Knox Insulator Half. The KNOX trademark is embossed in a recessed rectangle on the upper outside edge, the style number 6651 on the lower outside edge. (GPS waypoint PO7)

Fig. 4-14. "Triangle-M" Trademark Embossed on Upper Outside Edge and Style D-1 Embossed on Lower Edge.

Fig. 4-13. Large Smooth Oval White Insulator of Illinois Electric Porcelain Company. This insulator has more rounded sides than the THOMAS oval-shaped insulator. (GPS waypoint D24)

Because vandalism was an issue in more populated areas of the Forest, the later insulators often had a very dark brown glaze to make them less conspicuous. The large brown oval insulator documented in the Jemez was identical in size and shape to the Illinois Electric Porcelain Company's smooth white oval. These two ovals were often found on the same lines—sometimes even as part of a single insulator with a white half and a brown half wired together. The markings on the large brown oval were frequently embossed with "NAT" in a recessed rectangle on the upper outside edge and "D-1" embossed in a

recessed rectangle on the bottom outside edge (Fig. 4-15). A slightly smaller brown oval had the letters “USA” embossed on the upper outside edge. The smaller brown oval was not found commonly in the Jemez Forest and there were none documented on the Pajarito Plateau.

The large brown oval was found predominantly on the more recent lines, such as the 1937 line in Pueblo Canyon and the 1936 line from Vallecitos de los Indios to the Jemez Springs Ranger Station.

Fig. 4-15. Large Brown Oval Insulator. This large brown oval insulator was often embossed with NAT and D-1 in recessed rectangles on the outside edges. The brown color made the insulators less conspicuous to vandals.

Octagonal Split Knob

The octagonal split knob was the standard style No. 22 insulator. The ones I found on the Jemez Forest had the style number “No 22” embossed on the bottom outside edge of the insulator and the trademark on the upper outside edge. Because of poor visibility, identification of the trademark is uncertain but appeared to be a “c” embossed inside an embossed circle. The octagonal-shaped insulator was the second least common insulator that I found on the Jemez Forest—there were a total of twenty documented in the entire Forest and nineteen of these were located on the Pajarito Plateau in Frijoles Canyon (Fig. 4-16). Although the octagonal shape was an early style of ceramic, No. 22 was a standard style that continued to be offered in catalogues into the 1940s (Tod 31).

Fig. 4-16. Octagonal Split Knob. This is one of the nineteen octagonal insulators found in Frijoles Canyon near the Upper Crossing Trail. It is attached to the south side of a large cottonwood at north edge of Frijoles Canyon Trail. (GPS waypoint FC6)

Alternate Hanger Systems for the Split Knob

There were a variety of methods for attaching the split knob insulators to the tie trees but the standard type of hangar support on the Jemez Forest New Mexico was a galvanized iron three-inch staple hammered into the tree. Because windfall was the chief source of damage, the line was “hung up to come down easily” (USDA Handbook 8) and the staple provided a type of hanger that would give way under a relatively light weight. This ensured that the line would fall before the force was great enough to break the wire. A fallen line, unlike a broken line, could still be used temporarily although the sound was weak (Fig. 4-17).

Other types of hanger support for split tree insulators included wood pins (Fig. 4-18) and tree hooks (Fig. 4-19), both were designed to restrict the movement of the forestry knobs to lessen the probability of “tree grounds.” These methods were used when the tie trees

were not sufficiently out of alignment to give a pull-away or where the line took a sharp turn. They were also used “along roads where it was desired to have the wire and insulator always on the road side of a tree, without regard to whether the pull is away from or toward the tree” (USDA Handbook 7). For similar reasons, the glass insulator attached to a bracket was sometimes used at turning points and at buildings (Sandoval).

Fig. 4-17. Three-Inch Staple. The three-inch staple that once held this medium round split knob to the tree in Twomile Canyon has pulled off allowing the line to fall. (GPS waypoint TM4)

Fig. 4-18. Wood Pin Hanger. This wood pin hanger is the only one I found in the entire Jemez Forest. It is located along State Road 4, west of the entrance into Bandelier. (GPS waypoint SRB2)

Fig. 4-19. Metal Hook. I found less than a dozen metal hooks used as hangers in the Jemez and I found none on the Pajarito Plateau. (GPS waypoint BD7)

The hanger method that uses a wire ring instead of staple to attach the insulator was recommended only for the small diameter trees, such as aspens. The ring, made from No. 9 wire, was to be four or more inches larger in diameter than the tie tree and could be supported at the correct height with a small tree limb (USDA Handbook 7). I found that less than 5% of the split knobs were attached to the trees by being wired around the trunk. All of the trees I found with wires or scars that may have been caused by something like the wire ring, were ponderosas, however, not small woodland type trees. Because many of these sites were also sparsely scattered, I believe that these were isolated repair jobs and not standard practice. The exception was in Los Alamos Canyon were thirteen out of twenty-six sites along the Los Alamos Reservoir Road were wire wrapped (Fig. 4-20).

Fig. 4-20. Wire Ring, Perhaps. An alternative method of hanging the split knob was to use a wire ring around the trunk of the tree. It was not a recommended practice for the ponderosa and was uncommon on the Jemez Forest. (GPS waypoint RR1)

Post-Style Porcelain Insulator

The post-style insulator was not a forestry split knob designed for use on trees. The post-style insulator was a single piece of solid or hollow core porcelain that had a large center hole for tying on the conductor, and a threaded lag screw that could be screwed directly onto a telephone pole, without requiring any attachment brackets or wires (Fig. 4-21). The color of the porcelain was either brown or white. This type of insulator was the least common of all insulator types that I found on the Jemez Forest. On the Pajarito Plateau it appears to be associated with the period of the Manhattan Project—from about 1943 to 1947—and was found in Hidden Canyon, a tributary into Los Alamos Canyon from the north.

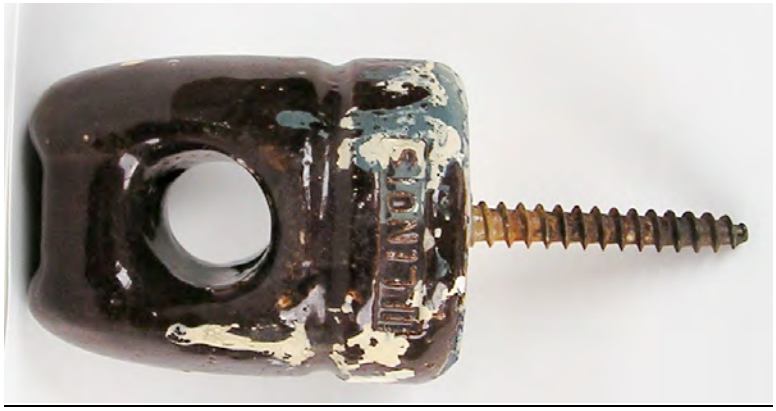


Fig. 4-21. Post-style Insulator. This insulator, designed to screw directly into the telephone pole, was the type used along a later section of telephone line that dropped into Los Alamos Canyon from the Army barracks on the canyon's north side.

Section 5: Data Analysis of Telephone Insulators Found on the Jemez Forest

Methodology

The central effort of this project was to locate, map, and document artifacts of the Jemez Forest telephone line. The purpose was to use the collected data in conjunction with historic maps to identify existing remnants of the telephone line, to estimate the period of use, and to determine the historical significance of individual artifacts. To figure out where to begin the search for the old telephone line, as well as the ranger stations and lookouts that the lines once connected, I relied primarily on information gleaned from Forest Service maps dating from 1908 to 1950. The Jemez Forest telephone line that is depicted on the Forest Service maps was a general indication rather than a precise location, partly, because the scale permitted only minimal geographical information—a half-inch square on a map might represent a square mile of rugged country. And while I frequently found no artifacts along what appeared to be an indicated alignment, I also occasionally ran across a section of line where none appeared on any map that I had looked at. It was through the interviews of several retired forest rangers and forest homestead families that I was able to locate many of the sites of the early ranger cabins and lookout structures, most of which have vanished but except a few foundation stones (Fig. 5-1).

Fig. 5-1. Solomon Lovato Looks at 1914 Jemez Forest Fire Map. Lovato (center of photo) began work with the Forest Service in 1933 and was a lookout at both Encino and Dead Man Peak. He describes to Janie and Peter O'Rourke the location of the old Coyote Ranger Station.

During a four-year period I documented over 1,300 sites containing artifacts associated with the Jemez Forest telephone line, including remnants of insulators, insulator hangers, and line wire that might still mark the tie trees along the telephone line corridor. Figure 5-2 shows all the 1300 sites within an area bounded on the east by Española, on the west by

Cuba, on the south by Jemez and Cochiti Indian Reservations, and on the north by Gallina Peak. I recorded the location of each site using a hand-held Garmin Etrex GPS device. Documentation included digital photographs of each site and a written description of artifacts. While each GPS site typically featured one tie tree with remnants related to a telephone insulator, a single tree could exhibit evidence of having had more than one insulator attached to it, in which case the artifacts of multiple insulators were included within a single GPS point. Each GPS point was assigned a unique identification number. GPS information, organized both by U.S. Geological Survey (USGS) map and by insulator type, is located in the appendix.

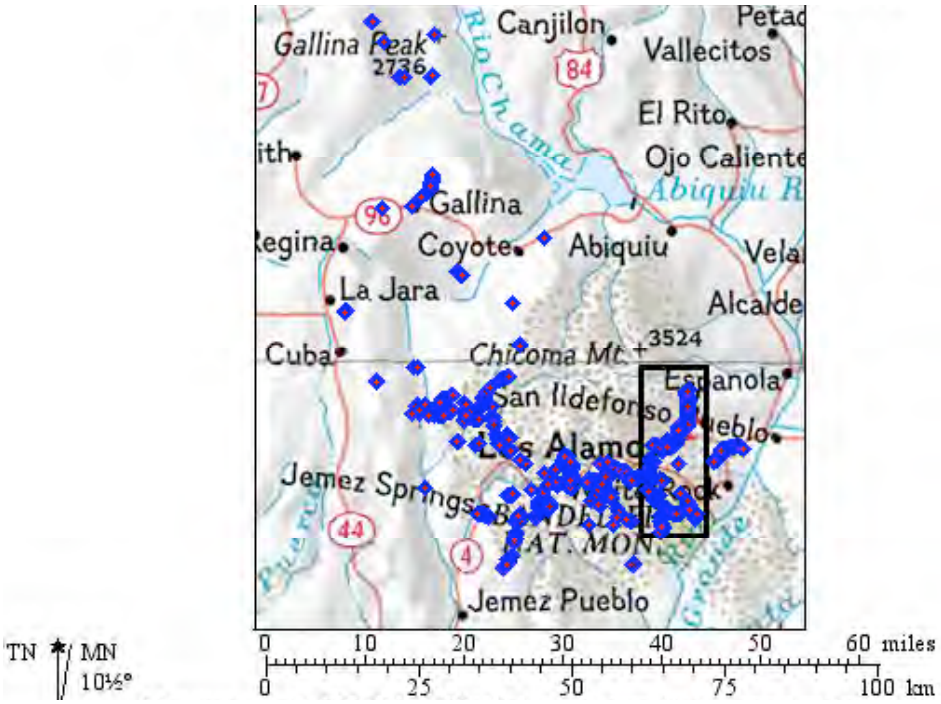


Fig. 5-2. Documented Sites on the Jemez Forest. More than 1,300 blue diamonds mark the locations of insulators documented in the Jemez Forest. The heavily lined rectangle delineates a sub-area of the Pajarito Plateau, encompassed by the Guaje Mountain and Frijoles USGS quadrangles.

The computer program I used to map the GPS points was based on individual USGS quadrangle maps. The entire Jemez Forest area is covered by approximately twenty quadrangle maps in the 7.5-minute series at a scale of 1:24000. To focus in more detail on the area of interest around Los Alamos I also used the combined areas of the Guaje Mountain and Frijoles quadrangle maps to delineate a sub-area within the Jemez Forest. While somewhat arbitrary, this sub-area, which surrounded Los Alamos and encompassed sixteen miles north to south and seven miles east to west, enabled general comparisons of frequency and distribution of insulator types between the overall Jemez Forest and the sub-area, and within the sub-area itself. I refer to the sub-area in this report as the Pajarito Plateau or Plateau (see Fig. 5-2).

When the 1,350 individual GPS points are plotted together on a map, as in Fig. 5-2, they coalesce into patterns of lines that once bent along drainages and skirted invisible human-made boundaries to connect many of the old Forest Service ranger cabins and fire lookouts, as well as forest settlements. Some of the plotted points also revealed fragmented lines or clusters that seemed to defy any linear form. By comparing telephone lines indicated on a series of historical maps to the patterns created by the GPS points, I was able to recognize corresponding similarities and matches that could then be used to estimate dates of artifacts and the telephone lines they represented.

The added information regarding the types of insulators found on different sections of the telephone line also helped to affirm the correlation to a particular time period and historic map. Of the ten basic types of insulators found in the Jemez Forest, the most unique was the glass Hemingray No. 9 with its wood bracket. The Hemingray No. 9, because of its early period of nearly exclusive use and the distinctive remnants it left behind, served as a strong marker for identifying the original and earliest sections of the telephone line. While finding a fully intact blue glass insulator was an infrequent occurrence, there were several kinds of artifacts that could be correlated back to a Hemingray type of insulator. These included wood brackets, fragments of the blue glass, vertical scars in the older trees, and the right size nails—or even a pair of nail holes—in the appropriate configuration and at the right height on the tree. The condition of the wood bracket and the overgrowth of bark also helped in assessing the age of an artifact. Some old brackets are nearly completely overgrown by the bark of the tie tree, as in Fig. 5-3.

Fig. 5-3. Bracket in Bark. The oldest insulators were sometimes completely enveloped by the bark of the tree. Just the threaded tip of the foot-long wood bracket and a piece of blue glass are all that's visible on a ponderosa in Rendija Canyon. (GPS waypoint R15)

The porcelain type of insulators that replaced the Hemingray in the Jemez Forest were split knobs, a general insulator type that was used for many years in the Jemez Forest. The split knob was not as straightforward a marker as the Hemingray for estimating the date of a telephone line. While there was a general trend in the porcelain types used by the Forest Service, evolving from small round to large oval in shape, this was not always

the case and use of some types appeared to overlap. Because the split knobs were similar enough to each other that they were essentially interchangeable, this meant that while the latest variety of porcelain might be used on new lines it was also used to update short sections of older lines; and, to further confound the evidence, isolated repairs were often made with whatever variety of split knob happened to be at hand. Because some of the split knob sites that I found included nothing more than attachment wire sticking out of a tree (Fig. 5-4), an indicator for any of the forestry knobs, I attributed such artifacts simply to the overall count of porcelain and not to any sub-type of porcelain.

Fig. 5-4. Insulator Loop. An attachment wire with the insulator loop droops from a ponderosa on the old Pajarito Line. While it is evident that this was a porcelain split knob, not a Hemingray, we cannot conclusively identify the type of split knob. (GPS waypoint PT36)

Along most segments of the telephone line that I found, there was a mix of insulator types. The types of insulators in the mix and the range of that mix could help suggest the general period and duration that a segment of the line was in use. Remnants of multiple types of insulators found along a section of line, or especially on a single tie tree, most likely resulted from updates and repairs over time, evidence that would suggest prolonged use of that particular corridor. A narrow range of types that included just the earliest types of insulators could imply an early line that was shortly abandoned (Fig. 5-5).

Fig. 5-5. Hemingray and RT&SCO. Along the early branch line to Cerro Pelado the only insulator types found were the Hemingray and the early RT&SCO, a split knob. This particular alignment was abandoned by the early 1920s when the telephone line corridor was moved approximately three miles to the east. (GPS waypoint AP12)

Insulators Trace the Telephone Lines across the Pajarito Plateau

On the Pajarito Plateau I documented 441 artifact sites related to the Jemez Forest Telephone line. As seen on the two USGS quadrangles, whose combined areas define the Plateau, site numbers were divided fairly equally between the Gauje Mountain and Frijoles USGS quadrangles (Figs. 5-6, 5-7).

To determine the location of the earliest telephone lines in the Jemez Forest, I used the Hemingray No. 9 insulator as a marker (Fig. 5-8). Mapping just those sites that were likely associated with the Hemingray, I then compared their locations to the patterns of telephone lines that were indicated on the earliest Forest Service maps (Fig. 5-9). What I found is that out of the 219 Hemingray sites documented across the Jemez Forest, 96% of them correlate closely to those early telephone lines shown on the 1913 Forest Service map (Fig. 5-10). The Hemingray sites follow along those lines on the map that connected to the early ranger stations in the Jemez Forest: Stone House, Pines, Seven Springs, Blue Bird, and Coyote. The documented Hemingray sites also follow the lines shown on the Jemez Forest Fire Map of 1914 to reach up to the lookout stations established by 1914 on Guaje Mountain, Cerro Pelado, Red Top Mountain, and Cerro Pelon.

Fig. 5-6. Insulator Sites on the Guaje Quadrangle. This maps shows 237 sites related to the Jemez Forest telephone line.

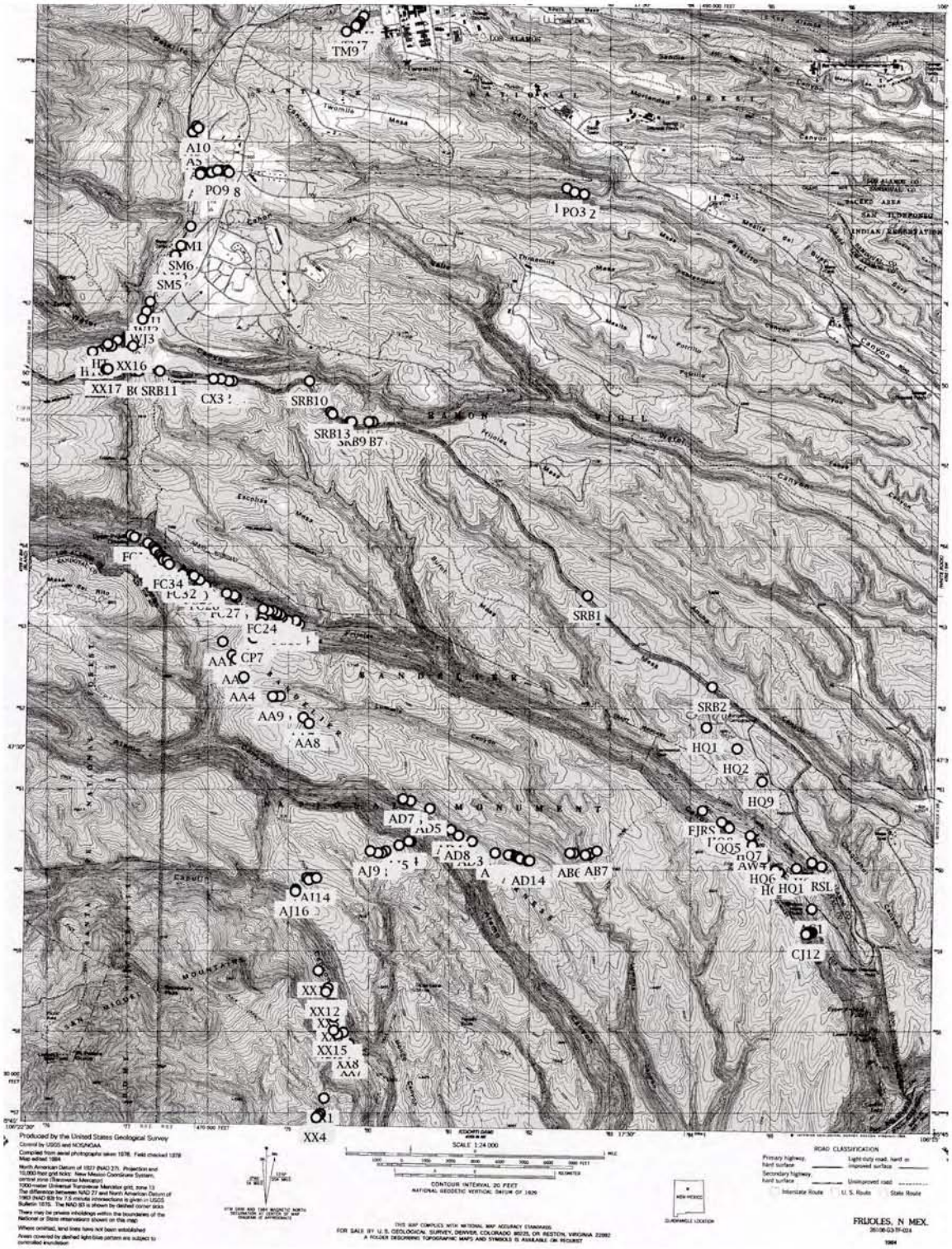


Fig. 5-7. Insulator Sites on the Frijoles Quadrangle. This maps shows 204 sites related to the Jemez Forest telephone line.

Fig. 5-8. Topless Hemingray on Fallen Snag. This Hemingray site is located along the old road that once crossed upper Frijoles Canyon between the plateau and the Valle Grande. The road and line crossed the southeastern corner of the Baca Location and once connected the Pajarito Plateau to the Jemez Mountains. The artifact exhibits the typical problems of the Hemingray glass. The glass dome cracks and breaks off when it freezes, and the wood bracket splits as the tree grows. (GPS waypoint UF10)

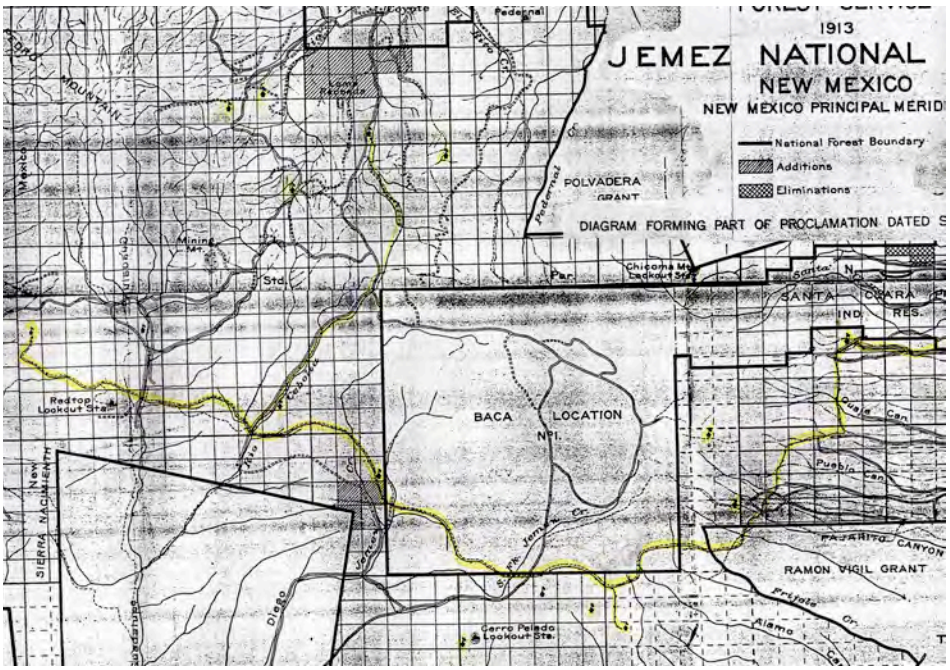


Fig. 5-9. 1913 Jemez Forest Reserve. Map shows the telephone line (yellow dotted line) connecting ranger stations in 1913: Stone House, Pines, Seven Springs, Blue Bird, and Coyote.

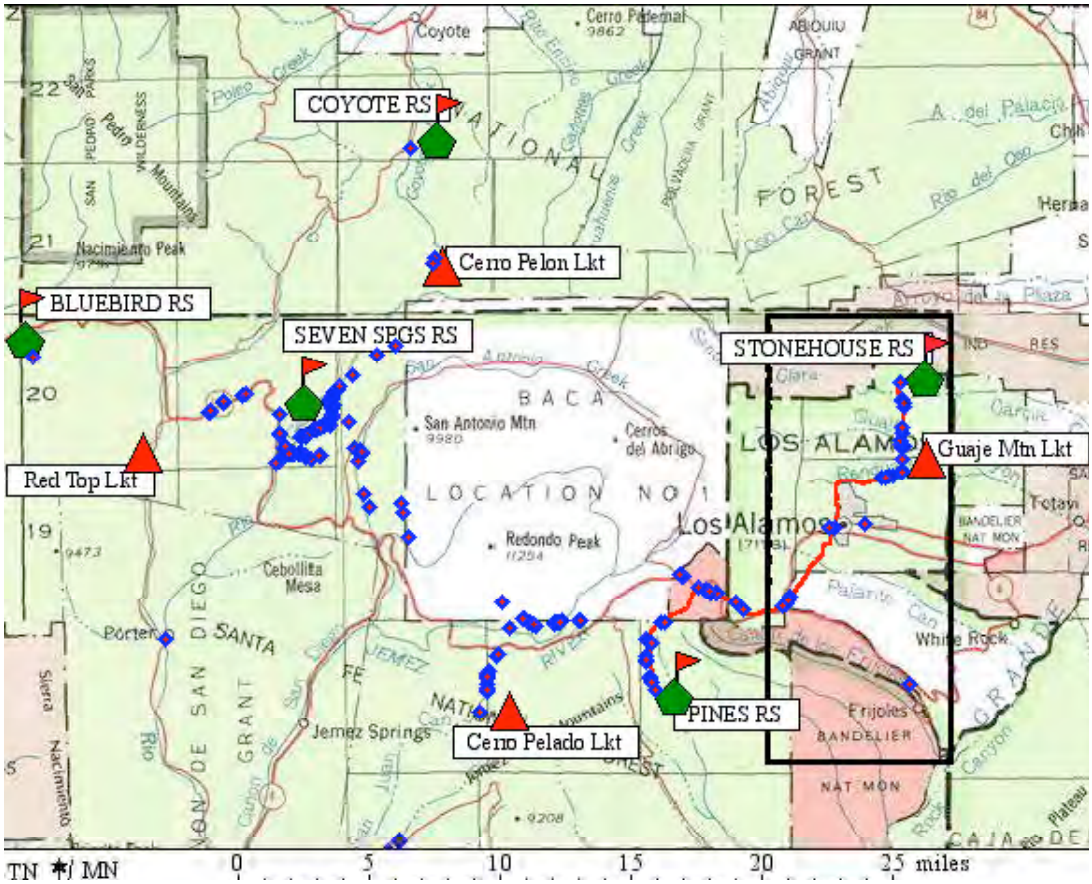


Fig. 5-10. Hemingray sites in Jemez Forest. Blue diamonds mark 219 glass sites in the Jemez Forest. Sites line up along telephone lines to ranger stations and lookouts as indicated on early maps. Heavy red line between Stone House and Pines Ranger Station traces the extent of the line in 1906. The black rectangle is the focus area identified as the Pajarito Plateau.

Blue Glass Marks the Old Pajarito Line

Within the sub-area of the Pajarito Plateau I used the same methods of comparing the location and type of artifacts with the telephone lines shown on the Forest Service maps. But on the Pajarito Plateau I looked in greater detail to more fully understand not only the location of the original line but its later evolutions, as well. I eventually looked at all of the 441 sites documented on the plateau, and using the insulator type and the historic maps together, I estimated dates for the artifacts and for the telephone lines to which they once belonged.

First, to determine the original corridor of the telephone line across the plateau I plotted the twenty-nine sites identified as having possible Hemingray No. 9 artifacts. The result was that twenty-six of the twenty-nine Hemingray sites fell along a thirteen-mile corridor that matched George White's description of the telephone line he helped build across the plateau in 1906. These Hemingray sites also matched the 1914 Jemez Forest Reserve fire map that showed the telephone line following a trail that crossed the Plateau in a north-south direction. Part of that trail still exists, from the site of the old Stone House Ranger Station to Rendija Canyon, and is known today as the Pajarito Trail. It is along this four-

mile segment of the Pajarito Trail that I documented the highest density of insulator artifacts on the Plateau. I refer to the thirteen-mile corridor of the Jemez Forest telephone line that crossed the Pajarito Plateau, from Stone House to where the telephone line then turned westward and upward into the Jemez Mountains, as the old Pajarito Line (OPL). This OPL corridor, except for a three-mile section through the town site that was shifted in the 1930s, was used continuously from 1906 until the 1940s.

The twenty-six surviving Hemingray artifacts that were distributed along the OPL corridor were dispersed into three detached segments. Of the twenty-six Hemingray artifacts, twenty-one sites were located along the northernmost segment, between Stone House site and Rendija Canyon. The second segment was just a single tie tree with a pair of wood brackets, located in the bottom of Los Alamos Canyon. The third segment was a string of four Hemingray sites on the south end of the OPL, near Water Canyon and the hairpin turn of State Road 4, where the line headed west up into the Jemez Mountains.

There were significant sections of the OPL along which few or no artifacts were found. This was to be expected due to the disturbance from residential development along the northwest edge of the town site, Los Alamos National Laboratory expansion south of Los Alamos Canyon, and West Jemez Road reconstruction projects. Much of the OPL corridor south of Los Alamos Canyon, that which passed through Department of Energy land, I did not survey because of access restrictions. Along those segments without tie trees to help substantiate the location, I have projected the OPL corridor based on information from historic surveys and maps (Fig. 5-11).

Porcelain Insulators Added to OPL Corridor

After about 1916 the Forest Service began using the porcelain insulators that were especially designed for tree lines. The porcelain sub-type most commonly found across the Jemez Forest was the large round knob with the oval center. Out of the 762 intact and identified porcelains documented on the Jemez Forest, 240 were of this type—more than twice the number of any other porcelain type (Table 5-1). The high percentage of this single type of porcelain might be due to major construction and reconstruction of the telephone lines across the Jemez Forest, perhaps made possible by an injection of money or manpower from the CCC program during the 1930s.

Forest Service maps show that the route of the main telephone line that crossed the Plateau remained essentially unchanged from 1913 to 1936. As would be expected, there are many additional tie trees along the OPL corridor, interspersed among the Hemingray sites that exhibit artifacts related to the later porcelain type insulators. From a total of 152 artifact sites on the OPL, there are 114 intact porcelain knobs (Table 5-1). From among these intact porcelains I identified insulators from six of the nine different sub-types found across the Jemez Forest and Plateau. The most common insulator type on the OPL, as well as the Pajarito Plateau, is the Thomas flat-sided oval. Eighty-one oval Thomases were documented out of a total of the 315 porcelain sub-types found on the Plateau. The three porcelain types not found on the OPL, but found elsewhere on the Pajarito Plateau, are the large oval Knox, the octagonal knob, and the post-style insulator.

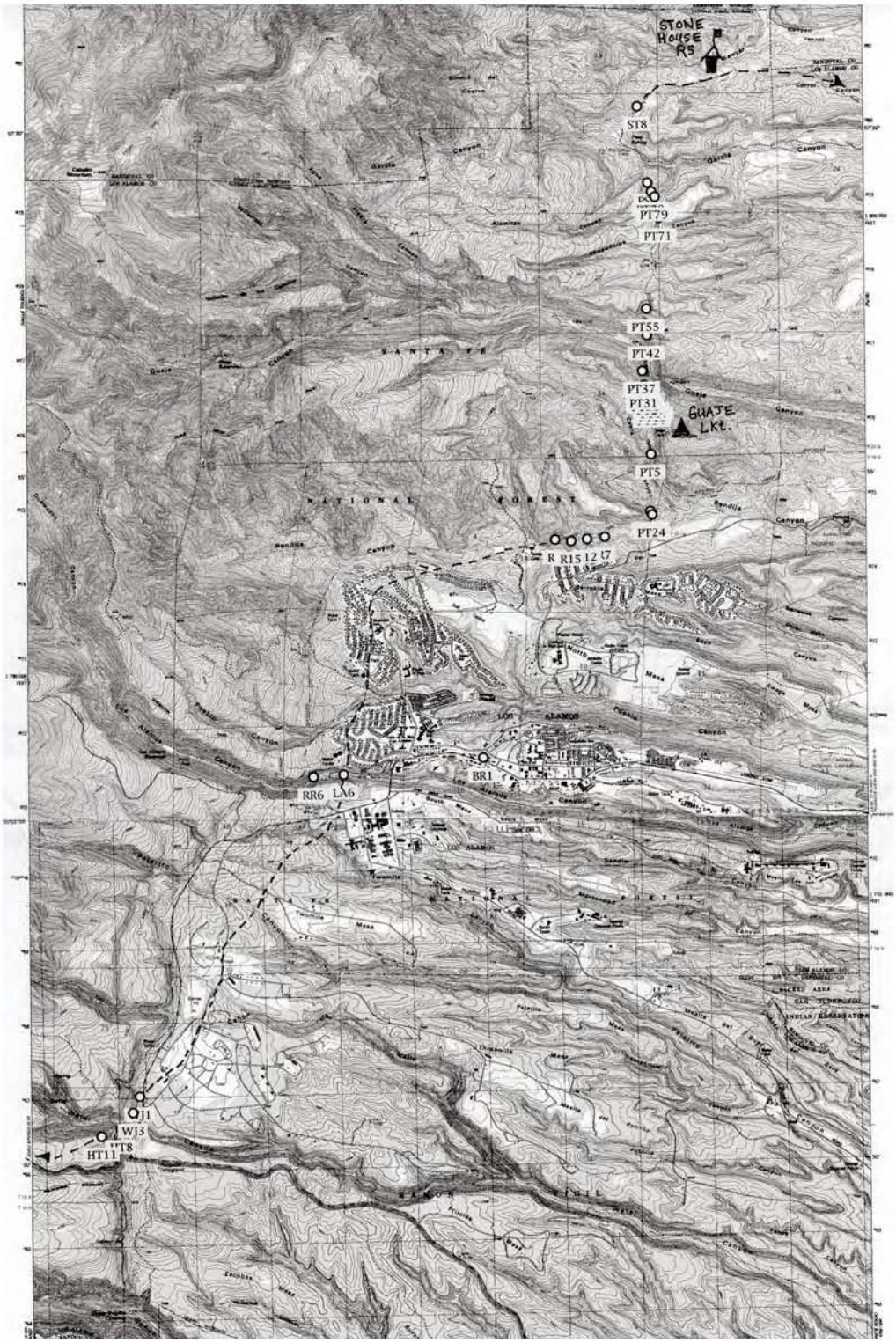


Fig. 5-11. Telephone Line Across the Pajarito Plateau. Twenty-six Hemingray sites help tie down the location of the early line across the Pajarito Plateau. The dotted line fills in the corridor and is a projection based on the 1913 and 1914 Forest Service maps. I identify this section of telephone line corridor as the old Pajarito Line, because much of it followed the Pajarito Trail across the plateau.

Table 5-1. Distribution of Insulator Types on the Jemez Forest, the Pajarito Plateau, and the old Pajarito Line

Insulators Types	Jemez Forest	Pajarito Plateau	Old Pajarito Line
Total GPS Sites	1335	441	152
Hemingray No. 9	219	29	26
Porcelain Sub-type, identified	762	315	114
Small Round	70	19	17
Medium Round	71	25	10
Large Round, Oval Center	240	43	6
Thomas, Flat-sided Oval	107	81	71
Large Oval Knox	34	10	0
Large Smooth Oval White	122	51	8
Large Smooth Oval Brown	101	56	2
Post-style	17	11	0
Octagonal	20	19	0

Stone House Segment of the OPL

Most of the porcelain sites on the OPL, like the Hemingray sites, are located on the four-mile segment of the Pajarito Trail between Stone House and Rendija Canyon. This longest and least disturbed segment of the OPL provides a comparison to the more impacted segments of the OPL. The segment exhibits three defining characteristics. First, it has a high concentration of Hemingray No. 9 sites, which can be attributed to the segment’s early origin. Out of twenty-nine Hemingray sites on the Plateau, twenty-six are located along the OPL, and twenty-one of these are along this four-mile segment. Second, this segment displays a wide range of insulator types, from the earliest blue glass of the Hemingray and the small round knobs, to the later brown oval porcelain insulators, an indication of the corridor’s use over a long period of time. And finally, nearly forty percent of the 122 tie trees along this segment of the OPL show signs of having had two or even three successive insulators attached, indicative of many years of repairs and updates.

The Thomas oval accounts for one-fourth of all the identified insulators documented on the Pajarito Plateau and half of all those identified on the OPL (Fig. 5-12). Out of 81 Thomas ovals on the Plateau, seventy-one are located on the OPL and sixty-eight of these are located on the segment of the OPL between Stone House and Rendija Canyon. Such a pervasive string of a single type of insulator suggests that this was the last major update or repair along this section of the line. Perhaps a fierce storm of some sort necessitated major reconstruction on the OPL corridor. We know that such a windstorm did occur on the Plateau in 1930, and the Thomas oval would have been a probable type of insulator in use at that time.

Again in 1942, a spring storm with hurricane force winds struck the Plateau (Raskob). On May 5, 1942, Fermor Spencer Church wrote in a letter to Lawrence Sill Hitchcock: "Last Thursday a tornado struck us coming down the direction of the Volcanic Peak. Nearly 250 trees were uprooted or snapped off inside our fence, not counting those grand pines

we tied our horses to near the equitation field. I enclose Ben Raskob's report…The telephone is out from Guaje to Frijoles; Andrews [Frank Andrews was Supervisor of the Santa Fe National Forest] was out yesterday and says he plans to dip into emergency funds to get a temporary phone this week" (Church).

Fig. 5-12. Thomas Flat-sided Oval. Two oval split knobs hang from a large decapitated ponderosa in Cabra Canyon, between the Pajarito Trail and Guaje Mountain. This insulator type was the most common type found on the corridor of the old Pajarito Line. (GPS waypoint PT3)

Los Alamos Canyon and Twomile Canyon Segments of the OPL

While the additional porcelain artifacts mostly reinforce the north- and southmost segments of the OPL, which are two segments already well established as the original route by containing multiple Hemingray sites, the added porcelain sites also help validate two less substantiated sections of the OPL. One such place is the OPL crossing of Los Alamos Canyon, where a single Hemingray marks the site. Because of the ambiguous character of the double-bracketed ponderosa—the tree is small, the condition of the two brackets seems too good, and the tree had once supported both north-south and east-west lines concurrently—the addition of four more tie trees aligned north to south with insulator attachments on the east and west sides—gives weight to this location as the OPL crossing point of Los Alamos Canyon (Fig. 5-13).

The four porcelain sites found on the crossing of Los Alamos Canyon include two large round split knobs and one smooth white oval. Both of these types are found on the OPL, but not in significant numbers. The large round and the smooth oval split knobs are quite common, however, on a second telephone line in Los Alamos Canyon that crossed the north-south OPL line. This second line, not shown on any of the maps I reviewed, headed west toward the Los Alamos reservoir. Interestingly, the double-bracketed tree, which also carried an east-west line, is located on the south end of the five OPL tie trees and is therefore out of alignment with the east-west porcelain line.

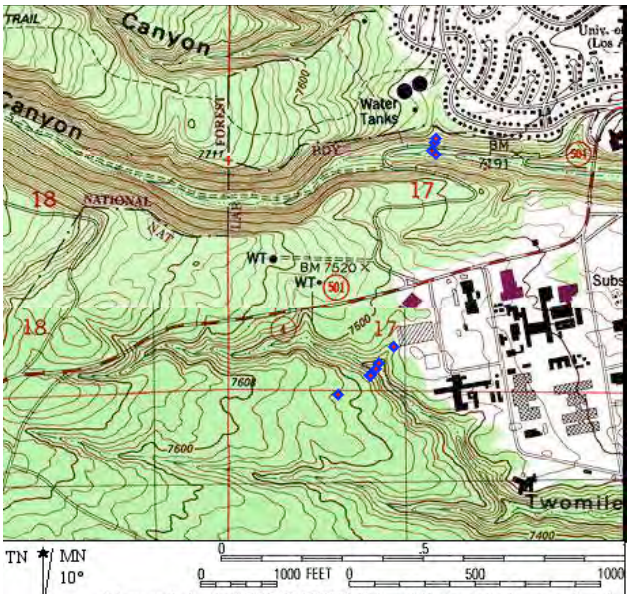


Fig. 5-13. OPL Crossing Los Alamos and Twomile Canyons. Tie trees of the OPL are shown as blue diamonds crossing Los Alamos Canyon and a tributary of Twomile Canyon. The one Hemingray site is on the southmost tie tree in Los Alamos Canyon.

The added porcelain sites also help identify a probable segment of the OPL located south of Los Alamos Canyon, near where the line crossed Twomile Canyon. The segment consists of eight consecutive tie trees and artifacts on a line that headed southwest following an old trail across a northern branch of Twomile Canyon (Figs. 5-13, 5-14). Despite the lack of Hemingray artifacts, there is a relatively wide variety of porcelain types that suggest a long period of use. That, together with the fact that three of the six identified insulators are of the early porcelain types (one little round RT&SCO and 2 medium round T-insulators), indicates that this segment was part of an older line and most likely within the corridor of the OPL.

East-West Lines in Proximity to Los Alamos Canyon

In Los Alamos Canyon I found remnants of telephone lines originating from different periods. While some lines crossed the canyon in a north-south direction, there appear to have been several renditions of an east-west line that extended westward in Los Alamos Canyon to reach toward the Los Alamos Reservoir. However, because I had no maps on which an east-west line to the reservoir was indicated, and because the lines were essentially intertwined, I segregated three different periods of lines based primarily on differences of insulator type. The locations of the artifacts of these separate lines are shown in Figures 5-15, 5-16, and 5-17.

Fig.5-14. Trail in Twomile Canyon. The telephone line crossed Twomile drainage along this old wagon trail. Janie O'Rourke examines an elaborate blaze carved on the large ponderosa at the edge of this trail.

The remnants of what appears to be the earliest east-west line in Los Alamos Canyon include three tie trees with wood brackets. One tree is located on Los Alamos Mesa, west of Ashley Pond (Fig. 5-18). It has two wood brackets, both attached to the north side of the tree, apparently to have carried two east-west lines. This tree is within the corridor of the spur line that had been built to Brook's Ranch in about 1914. It was a corridor that continued to be used at least until the 1940s by the Los Alamos Ranch School. However, the relatively small size of the tree and the good condition of both the brackets make it extremely unlikely that this tie tree was part of the 1914 branch line. It may have been part of a more recent line, perhaps a private line related to the Los Alamos Ranch School. For while the Forest Service typically no longer used the glass Hemingrays screwed to wood brackets on its forest lines after 1916, this pin-style type of glass insulator continued to be used on commercial pole lines, at buildings, and along some public roadways.

Fig. 5-15. Earliest Line Up Los Alamos Canyon. The three eastmost diamonds mark trees with wood brackets. From east to west, the one on the mesa top has two brackets both for east-west lines. The next tree to the west, in Los Alamos Canyon, has two brackets, one for a north-south and the second for an east-west line. The third has a single bracket for an east-west line. The two westmost diamonds mark tie trees with RT&SCO knobs. These early-type insulators are located along an abandoned trail in Los Alamos Canyon.

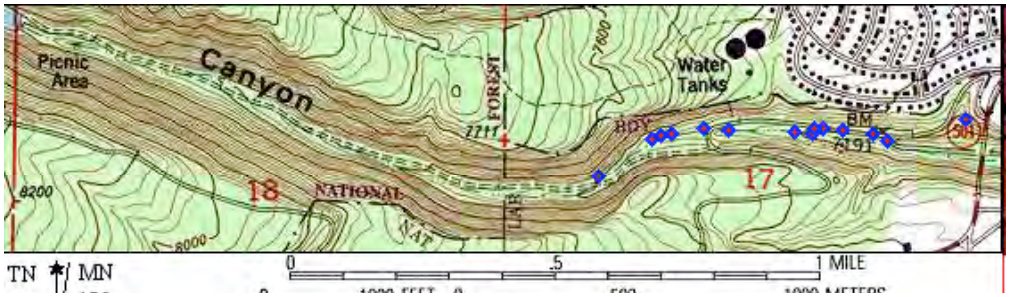


Fig. 5-16. Updated Line in Upper Los Alamos Canyon. These diamonds mark tie trees with large round split knobs and follow along the abandoned trail toward the reservoir. This appears to have just been a restringing of the first line.

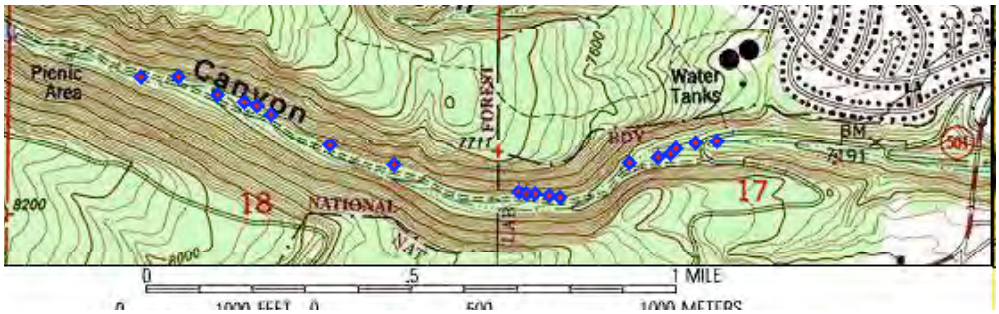


Fig. 5-17. Telephone Line along Road to Los Alamos Reservoir. These diamonds mark the tie trees with brown oval knobs or metal brackets. The tie trees follow along the current Reservoir Road, located south of the old trail. Several of the brown oval knobs are embossed with "NAT" for the National Forest. The metal pins were possibly part of a later update of the line.

Fig. 5-18. Double Brackets West of Ashley Pond. Two wood brackets are nailed to the north side of a ponderosa in a parking lot west of Ashley Pond and north of Trinity Drive. This tie tree carried two east-west lines. (GPS waypoint BR1)

Two of the trees with wood brackets for the east-west line are located in the bottom of Los Alamos Canyon. One tie tree stands east of Douglas Pond, and has already been identified as being located within the OPL (Fig. 5-19). The tree has two brackets, one oriented for the OPL's north-south line, but it also has one bracket oriented for an east-west line. The third tie tree, with a bracket on its south side, is located up canyon, one-quarter mile west of the OPL crossing (Fig. 5-20). This large ponderosa stands at the edge of an old trail that runs parallel to and lies north of today's Los Alamos Reservoir Road. Located along this old trail are two additional tie trees with the little round RT&SCO insulators, a type of porcelain that was used for a short period after the Hemingray. These early types of insulators along this abandoned trail suggest that the origin of this particular line heading west in Los Alamos Canyon was rather early, but the size of the tie trees and the condition of the brackets seem to suggest otherwise. Based on all of the seemingly contradictory evidence, I estimate that these insulators date from no earlier than the 1920s.

Fig. 5-19. Double Brackets in Los Alamos Canyon. This medium ponderosa has two wood brackets, one for a north-south line and the second for an east-west line. Although the tie tree is in the right location for the OPL crossing, its small size and the lack of overgrowth on the brackets cast doubt to its early origin. (GPS waypoint LA6)

The next rendition of the east-west line appears to have been just a later restringing of the original line using all large round split knobs (see Fig. 5-16). The corridor of the large round knob line followed the earlier line as it came down off Los Alamos Mesa and headed westward along the trail up Los Alamos Canyon (Fig. 5-21). The round split knobs may have been part of an update or repair of the line after the windstorm of April 1942. Ben Raskob, a student at the Los Alamos Ranch School, reported that heavy winds "…came down Los Alamos Canyon, spreading like water out of a hose, and spread out over the mesa at Los Alamos, as it did it lost much of its strength…. We estimated that about 75% of the yellow pines were blown over… within the school property" (Raskob).

Fig. 5-20. Wood Bracket on Reservoir Trail. A large ponderosa on the edge of an old trail to Los Alamos reservoir has a single wood bracket on its south side. Telephone wire and a piece of blue glass are still caught between the bracket and tree. (GPS waypoint RR6).

Fig. 5-21. Large Round Knob along Trail toward Reservoir. A large round knob with an oval center hole sticks straight out from a large ponderosa that stands along the old trail up Los Alamos Canyon. It probably belonged to an update of an earlier line. (GPS waypoint RR22)

The next generation of an east-west telephone line in Los Alamos Canyon was a slight relocation of the line south of the old trail to follow along the north edge of today's Reservoir Road (see Fig. 5-17). The main type of insulator found on this alignment is the smooth brown oval knob—a type used in the 1930s and especially in the 1940s. However, in addition to the split knob style, there are also four tie trees each with metal brackets that once had pin-type insulators screwed to them (Fig. 5-22). The tie trees with metal bracket are located toward the west end of the Reservoir Road. The metal pins, not seen elsewhere on the Jemez Forest line, may have been installed during the Manhattan Project by the Army when they were working on the dam and pipeline to the Los Alamos Reservoir. Although the Los Alamos Ranch School had received a permit to build a large dam up in Los Alamos Canyon in the 1920s and revised it again in the 1930s, it was the Army that finally completed the full project in 1943.

Fig. 5-22. Metal Pin on Reservoir Road. This tree is located along today's Reservoir Road. The metal pin was not Forest Service type and was probably related to the Manhattan Project's efforts to complete the reservoir in 1943. (GPS waypoint RR23)

Changes to the Old Pajarito Line

Realignment between Rendija Canyon and Los Alamos Canyon

Based on Forest Service maps, the path of the original telephone line across the Pajarito Plateau was significantly modified in about 1936 when the middle section of the OPL, between Rendija Canyon and Los Alamos Canyon, was straightened to head south from Rendija Canyon, rather than circling west around the town site. The realignment shown on the 1937 Santa Fe National Forest map reveals a shift of the crossings of both Pueblo Canyon and Los Alamos Canyon approximately one mile further to the east from where each of the original crossings had been. I documented 48 tie trees or insulator sites along

the realigned section of the telephone line between Rendija Canyon and Los Alamos Canyon. There are 43 intact insulators and all are the smooth D-1 style insulators, a porcelain type predominantly used on the plateau during the late 1930s and early 1940s.

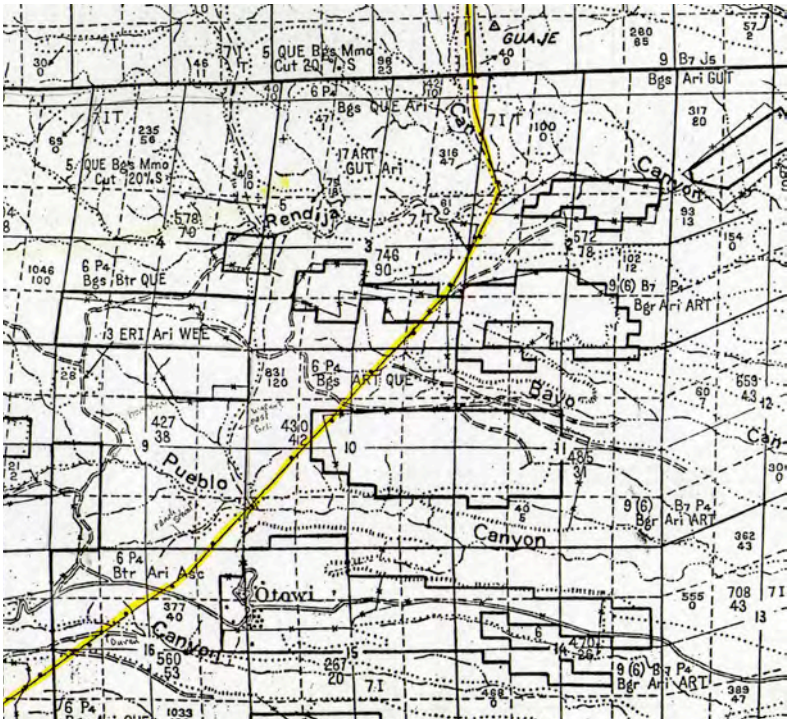


Fig. 5-23. 1937 Santa Fe National Forest Map. In about 1937 the OPL was realigned to cross both Pueblo and Los Alamos Canyons further to the east. The new line passed through the Los Alamos town site west of Ashley Pond.

The 1937 Santa Fe National Forest map shows the modified line no longer circled to the west of the townsite but headed south almost immediately at Rendija Canyon (Fig. 5-23). However, the location of the artifacts that I actually found indicate that the line turned west in Rendija Canyon a short distance, until it reached the narrows where it then turned southward following a Homestead Era road that passed east of the Dot Grant Homestead to the edge of Pueblo Canyon (Figs. 5-24, 5-25).

South of today's Diamond Drive, the tie trees follow a trail down into a thumb-shaped north drainage of Pueblo Canyon. The tie tree at the bottom of Pueblo Canyon and the one on the south rim both have strain insulators, a type used at points along the line where there was an extreme change in direction or height (Fig. 5-26). From the bottom of Pueblo Canyon the line jumped up to the south rim of Pueblo Canyon on its way across Los Alamos Mesa.

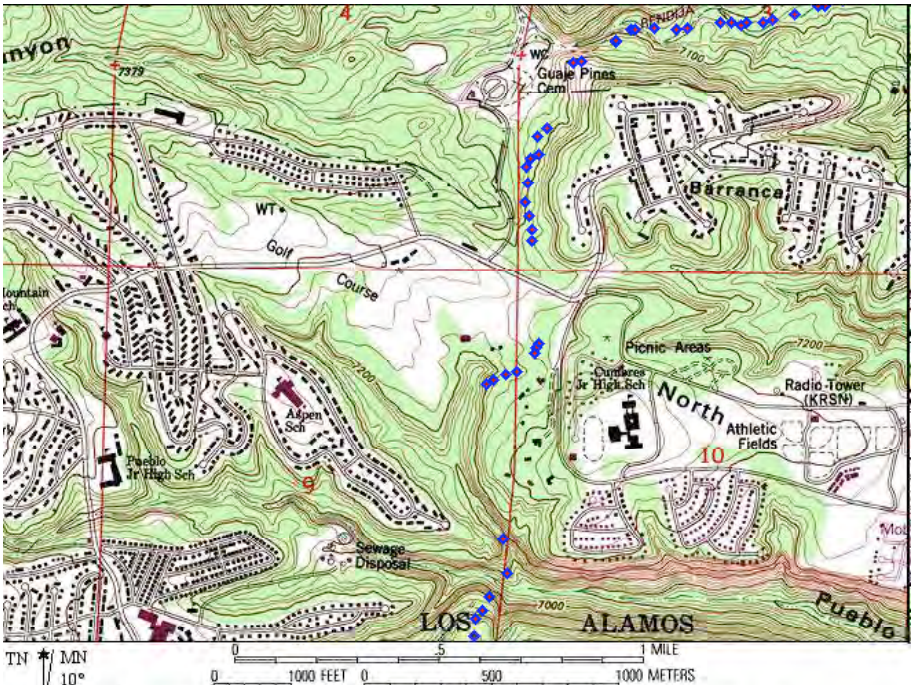


Fig. 5-24. Relocated Pajarito Line. The diamonds mark tie trees along the line where it turned south at the Rendija narrows following a homestead road to the edge of Pueblo Canyon. The line dropped into Pueblo Canyon along a thumb-shaped drainage.

Fig. 5-25. Dot Grant Homestead Road. Brown oval knobs are found along this Homestead Era road that passed to the east of the Dot Grant homestead. The relocated section of the OPL followed it from Rendija Canyon to Pueblo Canyon.

Fig. 5-26. Double Strain Insulators. This medium-sized ponderosa with two strain insulators is located near the bottom of Pueblo Canyon. The line jumped to the south rim of Pueblo Canyon where there was a second tree with a strain insulator to help support the line under stress. (GPS waypoint PC12)

From the south rim of Pueblo Canyon the telephone line headed southwest, crossing Los Alamos Mesa west of Ashley Pond. The tie trees and artifacts show that the line dropped into Los Alamos Canyon from the north, along what is known as the Dead Man Trail (Fig. 5-27). Crossing Los Alamos Canyon the line then followed the Duran Road as it climbed southwest to the south rim of Los Alamos Canyon (Fig. 5-28). The telephone line would have rejoined the original alignment of the OPL somewhere near the Twomile Canyon crossing.

Hidden Canyon Line Between Army Barracks and Los Alamos Canyon

There is a short line of eleven post-style insulators that drops down into Los Alamos Canyon from the north rim, heading west along West Road (Fig. 5-29). The post-style, developed in the early 1940s to speed up line installation by eliminating the multiple-part attachments, was very uncommon on the Jemez Forest (Fig. 5-30). Out of the eleven found on trees on the Pajarito Plateau, all were found on this section of line in the north drainage of Los Alamos Canyon known as Hidden Canyon. The north-most insulator was on a ponderosa (tree has since been cut and removed), next to what had been an army barracks in the 1940s and later Girl Scout lodge. This segment of line parallels the smooth oval line to the east that drops into Los Alamos Canyon along the Dead Man Trail. This Hidden Canyon line is not shown on the maps that I have seen. The location, the insulator type, and the insulated wire attached to the insulators suggest that this segment was probably related to the Manhattan Project Period of the 1940s.

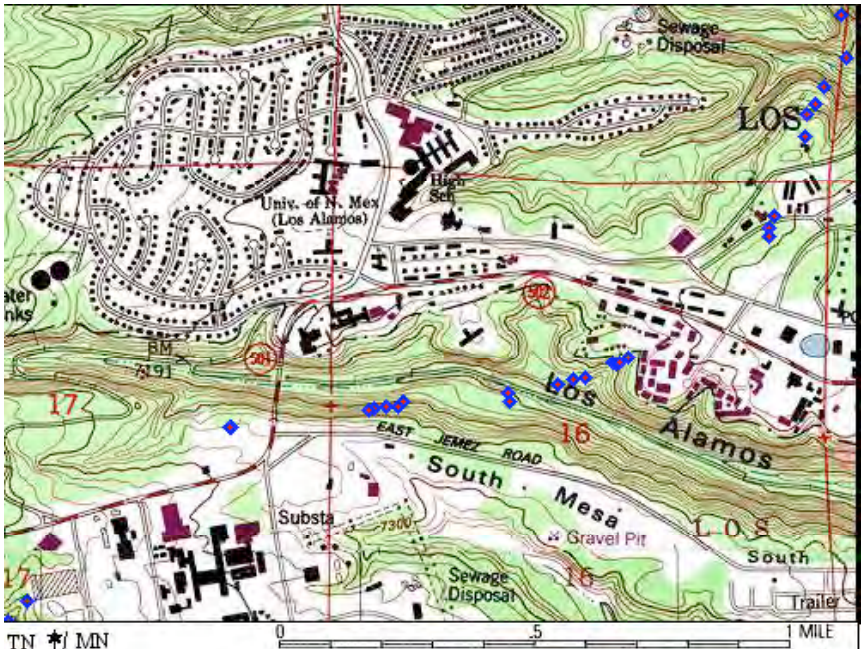


Fig. 5-27. New Crossing of Los Alamos Canyon. The blue diamonds mark tie trees along the relocated line that crossed Los Alamos Canyon by dropping down the Dead Man Trail on the north side and angling up the Duran Road on the south.

Fig. 5-28. Smooth Oval Knob on Line. This smooth type of oval split knob was found along the Duran Road where it climbs out of the south side of Los Alamos Canyon. The thimble and staple have pulled out of the tree, taking a wedge of wood with them. A long length of telephone line, edging the old road, is still strung through the split knob's center hole. (GPS waypoint D36)

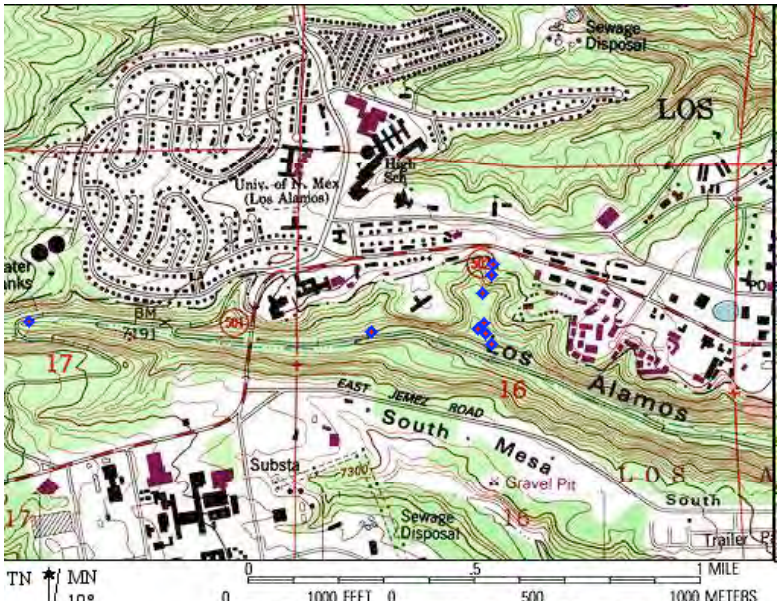


Fig. 5-29. Post-style Insulators. This segment of post-style insulators drops into Los Alamos Canyon from the north. The line parallels the oval split knob line that follows the Dead Man Trail shown in Fig. 5-27.

Fig. 5-30. Two Post-style Insulators in Hidden Canyon. These two brown post-style insulators are not forestry split knobs but are a single piece that was designed to screw directly into posts. The wire found on this segment of line is an insulated type of wire. (GPS waypoint H5)

Realignment of the OPL south of Los Alamos Canyon and west of Anchor Ranch

During the 1930s and 1940s the main telephone line south of Los Alamos Canyon appears to have been shifted slightly westward, at least twice. The maps dated 1936 and before show that the original north-south corridor for the OPL crossed the Anchor Ranch property, located north of the Ramon Vigil Grant, passing to the east of the Anchor Ranch house. By 1938 the telephone line is shown to turn westward above the ranch and then to elbow sharply south, as it passed to the west side of the ranch buildings (Fig. 5-31).

In November 1938, Mr. O.M. Linn, manager of the Anchor Ranch, wrote to the District Forest Ranger in Española, J.A. Rodriguez, regarding a "…slight change in the routing of the telephone line thru property of the Ancho[r] Ranch." In his letter, Mr. Linn wrote that he approved of the line's new location and also described a previous realignment in 1936: "…as the line alreaddy [sic] crosses this property, and has been so maintained of a good many years and as part of this line nearly two years ago was changed from the east center of our south field, to run further west near the road, both routes being on this property….I see no reason why this part of the line should not be moved again, as it now has been, a few hundred yards west, and going directly south from a point a few hundred feet to the northwest of the Anchor Ranch buildings, to the north line of the Vigil grant" (Linn).

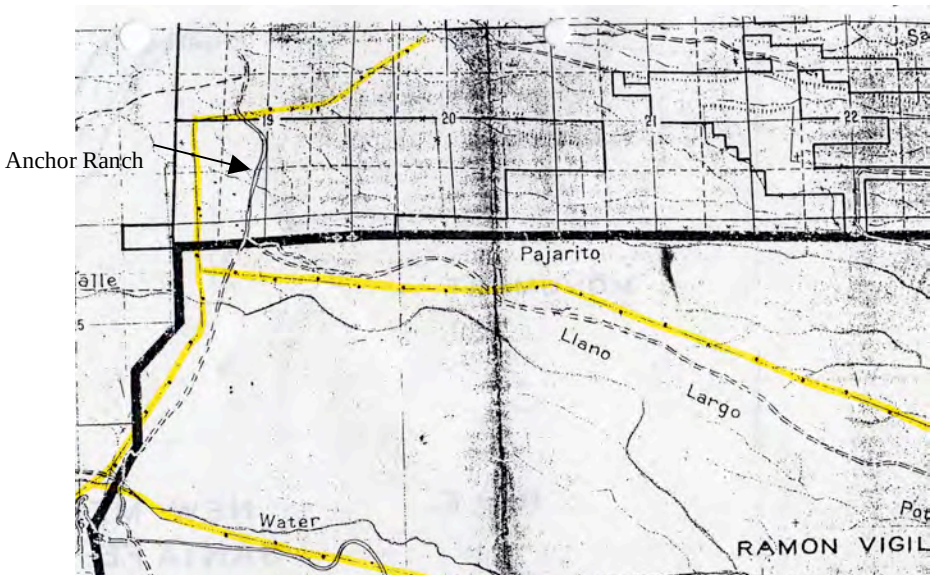


Fig. 5-31. Northwest Corner of Ramon Vigil Grant. This 1940 Santa Fe National Forest map shows the changes to the telephone line that occurred in the late 1930s and early 1940s. The main line that headed south of the Twomile Canyon turned to the west above the Anchor Ranch and then turned abruptly south to the Ramon Vigil Grant's north boundary. From there the line skirted the Grant's west boundary until it turned west up into the Jemez Mountains. A branch line headed east from the main line just south of Ramon Vigil Grant boundary following the Llano Largo Road. The grant belonged to the federal government by this time.

I found a segment of telephone line artifacts that appear to match the realignment of the OPL west of the Anchor Ranch as shown on the 1940 map (see Fig. 5-31). The line of eleven tie trees starts northwest of the old Anchor Ranch house and heads south, ending just north of the Ramon Vigil Grant's north boundary (Fig. 5-32). Of the seven insulators identified, four were large round split knobs with oval centers and three were brown oval split knobs—both were types used during the late 1930s and early 1940s. I was unable to survey the area north and east of the Anchor Ranch to see if there were artifacts related to the original line east of the ranch because of access restrictions.

Continuing along the north-south corridor, east of today's West Jemez Road and north of Water Canyon, there is a segment of five more tie trees (Fig. 5-32). The three intact insulators are all white ovals, the flat-sided Thomas that was so prevalent along the section of the Pajarito Trail between Stone House and Rendija Canyon. This segment crosses what was known as Sawdust Pasture, the mesa north of Water Canyon and where the Buckman sawmill once stood, and the location of the CCC camp when it was moved up out of Frijoles Canyon in October of 1939 (U.S. NPS Custodian).

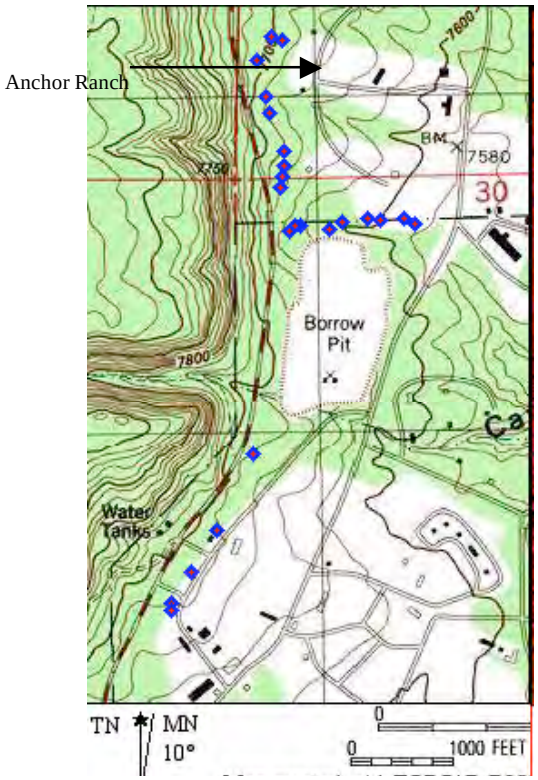


Fig. 5-32. Telephone Line along West Jemez Road. The diamonds that follow along the east side of today's West Jemez Road mark tie trees that once belonged to the realigned Pajarito Line and date to the late 1930s. The line passed to the west side of Anchor Ranch house that once stood near the curve of road shaped like an anchor. The segment of artifacts shown heading east along the Ramon Vigil Grant's north boundary is part of a line constructed in about 1939 that went to the Forest Service cabin in Pajarito Canyon.

Telephone Lines to Pajarito Canyon

Just inside the north boundary of the Ramon Vigil Grant I documented a line of tie trees heading east from the main north-south telephone line that was following West Jemez Road (see Fig. 5-32). The tie trees are small to medium in size and parallel the fence posts of the Ramon Vigil Grant's north boundary (Fig. 5-33). The only type of insulator found along this segment was the D-1 oval split knob, manufactured by Knox (Fig. 5-34). The Knox oval, probably used in the 1930s and 1940s, was not commonly found in the Jemez Forest—I documented a total of only thirty-four. Out of the ten Knox ovals on the Pajarito Plateau, eight are along this branch line. There had been an early branch built in 1914 along this same general corridor to Pajarito Canyon, but that line was abandoned in the 1920s. After the federal government bought the Vigil Grant in the 1930s, a telephone line was reconstructed along the same general corridor to a ranger cabin in Pajarito Canyon. The location of these artifacts, the insulator type, and the relatively small size of the tie trees all indicate that this is a remnant of the later line constructed to the ranger cabin in Pajarito Canyon in the late 1930s.

Fig. 5-33. Ramon Vigil Grant Boundary Line. The tie trees with Knox Oval split knobs were on small to medium ponderosas to the south (right) side of the Vigil Grant boundary fence posts seen marked with orange tape. In the 1930s the federal government bought the Vigil Grant and worked to improve the soil and grass lands. The rangers were stationed on the grant in a cabin down in Pajarito Canyon.

Telephone Lines East of Pajarito Cabin

During and just after World War II there was the need to secure and improve communications from Los Alamos to the outside world. Over a period of four to five years, various telephone lines were built heading directly eastward from the Pajarito Cabin and the Los Alamos town site to connect directly with Española and Santa Fe. I found a three-mile-long string of telephone line artifacts located east of Pajarito Cabin (Fig. 5-35). The location of the artifacts appears to match the telephone line drawn onto the 1946 Atomic Energy Commission Forest Fire Control Map (Fig. 5-36). However, the segments of varying types of insulators and poles indicate that the lines of which the segments were once part of may have originated during slightly different time periods.

Fig. 5-34. Knox on Branch-line to Pajarito Cabin. This oval split knob was found along the line built around 1939 to the Pajarito Ranger Cabin. (GPS waypoint PO7)

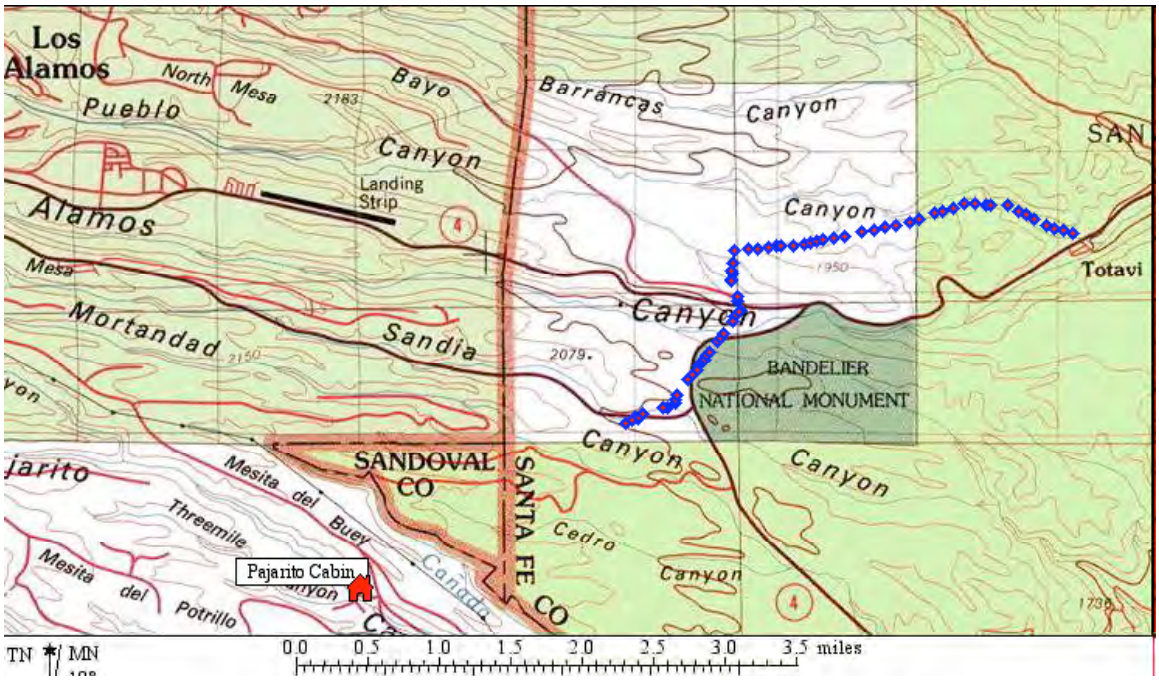


Fig. 5-35. A Line of Artifacts East of Pajarito Cabin. This continuous line of artifacts actually contains segments of three types of insulators: oval split knobs, post and poles each with a single wood bracket, and a pole line with two cross arms carrying multiple glass insulators with wires.

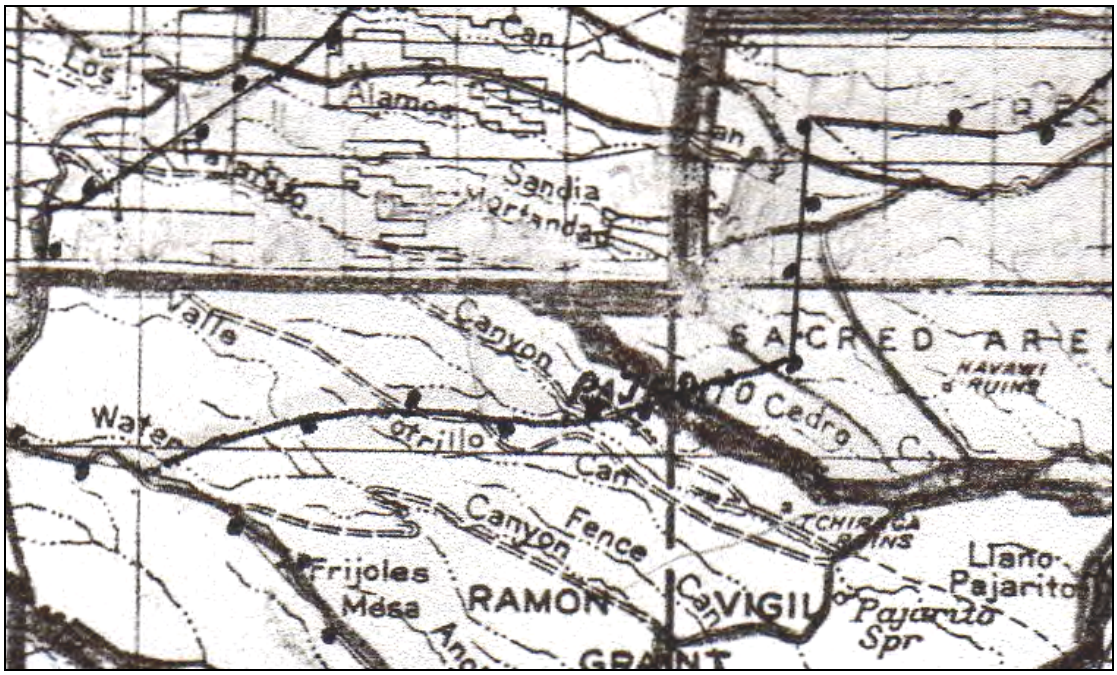


Fig. 5-36. Telephone Line to Pajarito Cabin Drawn on 1946 Santa Fe National Forest Map. A telephone line was brought directly from Española to the Pajarito Cabin in 1943. There appear to have been several renditions of a telephone line from the Pajarito Cabin eastward that generally followed the same corridor. On this 1946 Atomic Energy Commission Forest Fire Control Map, the Pajarito Cabin is located just below the letters "PA" of the handwritten "Pajarito."

Within the north-south leg of the line of artifacts between Pueblo Canyon and Sandia Canyon, I found two separate segments of tie trees that contained white oval split knobs, a type used on the Jemez Forest in the 1930s and 1940s (Figs. 5-37, 5-38). One segment was in Pueblo Canyon and the other in Sandia Canyon, but they had probably once been part of one continuous line. It is possible that these two segments were part of the Española-Cañada Telephone Line project. The Army proposed, in February 1943, that the Forest Service survey for a by-pass telephone line that would be built from Española directly to the Pajarito Cabin. The path of the line went through Cañada del Buey on its way to the Pajarito cabin. The Cañada in the project name may refer to the Cañada del Buey. I did see an oval split knob—at about the right location for the line—in Cañada del Buey several years ago.

In between the two segments of the oval insulators in Pueblo and Sandia canyons, there is a solid line of slender telephone poles that crosses west of Duchess Castle and Tsankawi Ruins as shown in Fig. 5-39. The poles, supported by juniper posts, each had a single, wood side bracket for an insulator. The dome of a clear glass Hemingray was found on the ground still screwed on to its wood pin. These tall poles (Fig. 5-40) may have been part of the line built by the Mountain States Telephone Company in 1947. The line joined to Mountain States east-west telephone line located south of Seven-Bump Mesa in the Otowi Section. The line was for joint use by Bandelier and the Forest Service and gave them direct connection to Santa Fe and eliminated the Forest Service line that went north to Española.

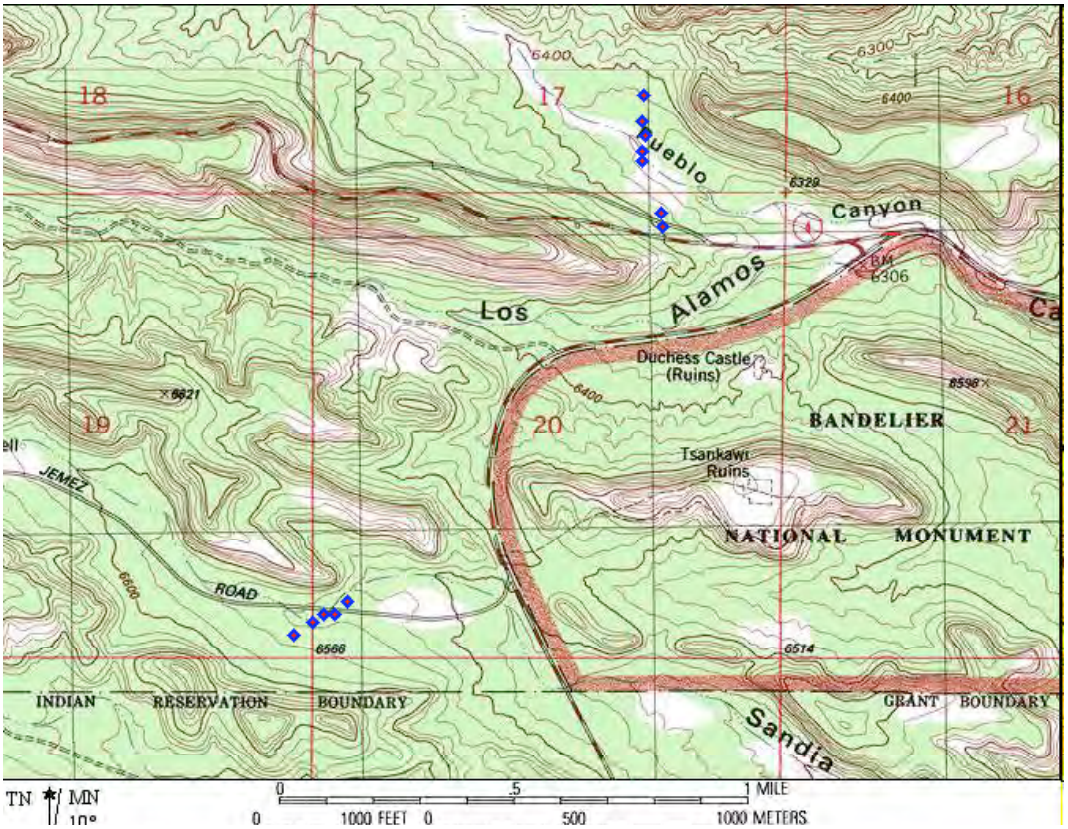


Fig. 5-37. Two Segments with Oval Split Knobs. These two segments of artifacts may have been part of the line built in 1943 by the Forest Service as the Española-Cañada telephone line, a line that by-passed the Forest Service line and directly connected Española to the Pajarito Cabin.

Fig. 5-38. Oval Split Knob in Otowi Section. This forestry split knob is located in Pueblo Canyon. It may have been part of the Forest Service line built in 1943 to connect Pajarito Cabin directly to Española. (GPS waypoint PU5)

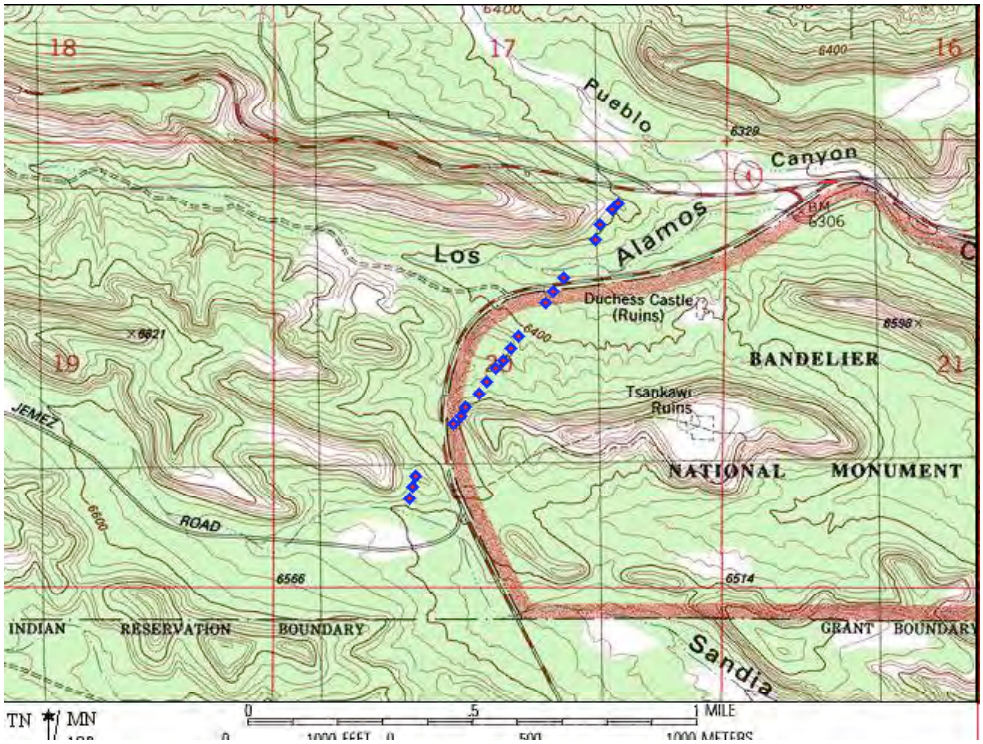


Fig. 5-39. Location of Pole Line with Single Wood Brackets. Clear glass Hemingray insulators were used along this line.

Fig. 5-40. Pole Line with Single Brackets. These two poles line up to carry the wire north toward the Otowi Section where it joined the Mountain States line. The connection gave Bandelier and the Forest Service a direct line to Santa Fe.

I documented a line of almost ninety telephone poles oriented east-west for a distance of two miles, from north of Tsankawi eastward to Totavi (Fig. 5-41). The poles had two cross-arms that once carried twelve glass insulators and wires (Fig. 5-42). A side bracket attached to the poles themselves accommodated one additional line wire. The insulators were different types of Hemingray glass. The larger styles, No. 42 and No. 45, were for telegraph lines. The smaller styles, No. 16 and No. 17 were for long distance or rural telephone lines. The side bracket carried the No. 16 and No. 17 style of Hemingray.

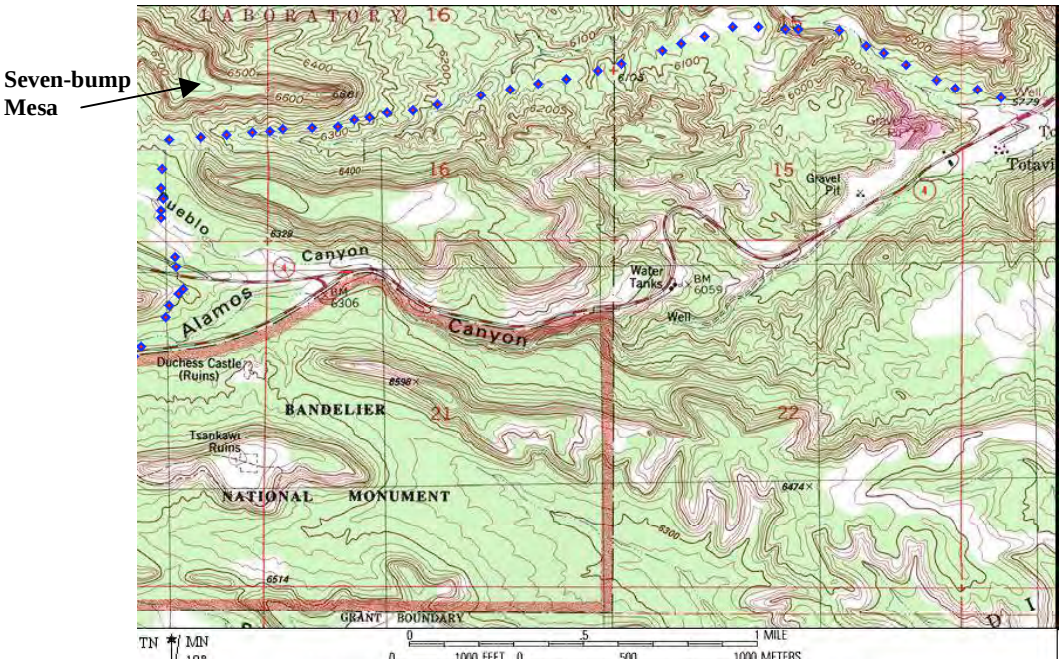


Fig. 5-41. Telephone Line Built by Men from Nearby Pueblos. The east-west line of artifacts, located north of Los Alamos Canyon, probably mark the corridor of the pole line originally built in 1943 by the men and boys of San Ildefonso and Santa Clara Pueblos.

Older looking poles and brackets were occasionally found along the line, suggesting that there had been a previous pole line along this corridor (Fig. 5-43). It may be that the previous one was the line built by the old men and the young boys of the San Ildefonso and Santa Clara Pueblos (Hackenburg).

Fig. 5-42. Broken Arms of the Mountain States. It once carried twelve wires on two cross arms to bring phone and telegraph service to Los Alamos.

Fig. 5-43. Two Generations of Telephone Poles. This desiccated cross arm and bracket leaning up against a creosoted pole suggests that an earlier line may have preceded the current standing poles. This earlier line may have been the original one built by the men from San Ildefonso and Santa Clara Pueblos. This pole is located in a north branch of Los Alamos Canyon.

The side brackets on the Mountain States pole line may have been added to carry the Forest Service line (Fig. 5-44). The Forest Service line came from Pajarito Cabin northeast to join the pole line in the Otowi Section of Bandelier.

Fig. 5-44. Side Bracket on the Pole Line. The side bracket and insulator may have carried the single Forest Service telephone line that joined the Mountain States pole line in the Otowi section of Bandelier.

Works Cited

Andrews, Frank E. "Right-of-way, Telephone Line." Memo to District Forester. 11 Dec. 1911. Santa Fe National Forest Archives, Santa Fe Office.

Armitage, James A. "Fire Lookout." *New Mexico Magazine*, Jan. 1949: 14+.

Baker, Robert D., Robert S Maxwell, Victor H. Treat, and Henry C. Detholff, *Timeless Heritage: a History of the Forest Service in the Southwest*. College Station: Intalgio, Inc., 1988.

Boyd, Georgie. Interview with Peggy Pond Church. 12 Oct. 1979. Los Alamos Historical Society Archives, Los Alamos, NM.

Brook, Harold H. Letter to Dr. Edgar Hewitt. 11 Nov. 1911. Los Alamos Historical Society Archives, Los Alamos, NM.

Caldwell, Lewis and Mary Fenton Caldwell. Personal interview. 4 Dec. 2004.

Church, Peggy Pond. Notes on Ashley Pond Correspondence. Collected by Linda Aldrich from Chapin Collection, Bentley Historical Collections, U. Michigan.

Curry, Betty-Jane. Personal Interviews. 2004-2005.

Frey, Evelyn. Interview. By Chris Judson. 1979. Bandelier National Monument Archives.

Gish, Elton. E-mail interview. 26 Aug. 2005.

Goforth, Linda. E-mail interview. 8 October 2005.

Gonzales, Frank. Personal interview. 27 May 2004.

Hackenburg, Herb. "New Mexico and the Telephone: A Short History." *The Makers of New Mexico/US West*. n.p.: n.p., [1998?], N. pag.

Harman, J. M. Letter to District Supervisor of the Santa Fe National Forest. 29 Mar. 1943. Santa Fe National Forest Archives, Santa Fe Office.

Hernandez, John and Eleanor Hernandez. Personal interview. 16 Feb. 2005.

Hoard, Dorothy. *Los Alamos Outdoors*. 2nd ed. Los Alamos: Los Alamos Historical Society, Los Alamos, NM, 1993.

Jastram, Jane. "Know Thy Neighbor: A.J. Abbott." [Nogales Newspaper?] 29 Dec. 1950.

Jemez Division Santa Fe National Forest. Telephone Directory. USFS: n.d. Los Alamos Historical Society Archives, Los Alamos, NM.

Linn, O. M. Letter to J. A. Rodriguez. 4 Nov. 1938. Santa Fe National Forest archives, Santa Fe Office.

Pickens, Homer. Interview. "A Forest Ranger In Los Alamos in the 1930s." By Otto Frisch. 7 Dec. 1967. Los Alamos Historical Society Archives, Los Alamos, NM.

Pinchot, Gifford, ed. *The Use of the National Forest Reserves*. Washington: Government Printing Office, 1905.

Raskob, Ben Green. "Los Alamos Experiences Heaviest Windstorm in 12 Years." Report to Director of Los Alamos Ranch School. 6 May 1942.

Ringland, Arthur. "Right-of-Way Leases." Memos to Forest Supervisor. 20 May 1911 and 16 Dec. 1911. Santa Fe National Forest Archives, Santa Fe Office.

Rumsey, Chas. B. "Española–Coyote Phone Line." Voucher for reimbursement for field expenses. 1908. Santa Fe National Forest Archives, Santa Fe Office.

Sandoval, Gilbert. Personal interview. 7 Dec. 2004.

Schmeltzer, H.D. "Fire Lookout." *New Mexico Magazine* Nov. 1936: 16+.

Tod, Jack H. *A History of Electrical Porcelain Industry in the United States*. N.p.: n.p., 1977.

United States. *Presidential Proclamation of the "Jemez Forest Reserve."* Washington: Government Printing Office, 1905.

United States, Dept. of Agriculture. Forest Service. "The First Environmental History," *Centennial Mini-Histories of the Forest Service*. N.p., n.d., n.d.

---. ---. Forest Service. *Handbook on Construction and Maintenance of the National Forests' Telephone System.* Washington: Government Printing Office, 1925.

---. ---. Forest Service Southwestern Region. "The Early Days: A Sourcebook of Southwestern Region History." *Cultural Resources Management, Book I.* Washington: Government Printing Office, 1989.

---. ---. Forest Service Southwestern Region. "The Early Days: A Sourcebook of Southwestern Region History." *Cultural Resources Management, Book II*. Washington: Government Printing Office, 1991.

---. ---. Forest Service Southwestern Region. "The Early Days: A Sourcebook of Southwestern Region History." *Cultural Resources Management, Book III*. Washington: Government Printing Office, 1992.

---. ---. Forest Service Southwest Region. "Lookouts in the Southwestern Region." *Cultural Resources Management, Report No, 8*. Washington: Government Printing Office, 1989.

United States, Dept. of the Interior. National Park Service. "Bandelier National Monument Custodian Reports." *Southwestern Monuments Report*. Multiple vols. Western Museum Laboratory: WPA, 1933–1940, 1946–1947. Bandelier National Monument Archives.

---. ---. NPS. "Celebrating the CCC Legacy: Youth Service Then and Now." Proc. of the CCC Alumni, 29 Mar. 2003.

Wang, G. L. "By-Pass Telephone Line from Española to Pajarito Cabin." Memo to Ranger Rodriguez. 16 Feb. 1943. Santa Fe National Forest Archives, Santa Fe Office.

White, Ben. Interview. *History of Telephone Service in Sandoval and Rio Arriba Counties*. By H.W. Aden. 2 Nov. 1965. Los Alamos Historical Society Archives, Los Alamos, NM.

White, George Miles. *This is My Life*. Ts. 1958. Los Alamos Historical Society Archives, Los Alamos, NM.

Williams, Gerald W. "Early Years of National Forest Management: Implications of the Organic Act of 1897," USDA Forest Service. Washington: Government Printing Office, n. d.

Wirth, John D. and Linda Harvey Aldrich. *Los Alamos: The Ranch School Years, 1917–1943*. Albuquerque: U of New Mexico Press, 2003.