

Appendix III

Source Materials

The Gaylord A. Knight Collection (GAK) consists of approximately 6 cubic feet of primary source materials relating to Forest Service communications history. Knight began to compile it before his retirement from the Forest Service. The materials represented some 75 unique documents at the start of the project to produce this history. Over the life of the project, I made additions from the files of the Forest Service Electronics Center and materials I gathered on numerous research trips. They included originals, carbons, and reproductions of correspondence between various individuals involved in the communications program. These documents, filed chronologically in the collection and fully referenced in the notes following each chapter, make up the vast majority of source materials used in this book. In addition, some 40 hours of taped interviews that I made with two dozen people are included in the collection. I have cited these conversations throughout the text and relied on them to fill many gaps not documented by other resource materials.

Because of the nature of the subject matter, a sizeable representation of photographs and schematic drawings was also included in the history. Those marked "NA:95G" are from the Forest Service negative collection (Record Group 95G) in the Still Pictures Division, National Archives, Washington, D.C. Other numbered photos are in the Forest Service photo library. A third group, referenced "History Section" was originally contributed to the Electronics Center by W. Foy Squibb, Harold K. Lawson, and Logan M. Belleville, and these pictures are also to be included in the Knight Collection. The collection also includes miscellaneous published and unpublished documents used in the history: communication conference reports, copies of Regional newsletters, Radio Laboratory newsletters, radio equipment bulletins, and National Forest communication

plans. Several sets of field diaries from Laboratory personnel were also used, but it was not known at the time of publication whether these would be retained in the collection or returned to their respective owners.

Few secondary source materials were available for this history. Among the most relevant--principally materials in *American Forestry*, *Forestry Kaiman*, *American Forests and Forest Life*, and *Journal of Forestry*, the texts had often been supplied originally by the staff of the Radio Laboratory and, therefore, were available in other Laboratory documents. These, too, are cited in the notes following each chapter.

Another category of source materials, perhaps unique to the subject involved, was the actual radio and telephone hardware. Gaylord Knight also initiated this collection, which was completed by William B. Morton. It includes one each of all but two of the various Forest Service radio types and models, as well as an incomplete composite of telephones and switchboards. On several occasions, I returned to the storage facility on the grounds of the Department of Agriculture's Agricultural Research Center at Beltsville, Md., to turn the dials, tweak the knobs, flip the switches, and obtain a feel for these instruments. I was thus able to identify subtle differences in construction, evolutionary design stages, size, shape, and component layout, gaining a more thorough understanding of the Radio Laboratory engineering effort.

An overview of the Forest Service is available from numerous publications. I placed considerable reliance upon Dr. Harold K. Steen's *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 1976) and Herbert Kaufman's *The Forest Ranger: A Study in Administrative Behavior* (Baltimore: Johns Hopkins University Press, 1960) for the administrative context in which the radio and

telephone history took place. Also worthy of note was the four-volume set of personal reminiscences published by Region 1, *Early Days in the Forest Service* (Missoula, Mont.: Forest Service, Region 1, 1944, 1956, 1962, 1976).

The expanded archival (Knight) collection used to document this history was stored in the Forest Service's Southern Regional Office in Atlanta, Ga., at the time of publication. Some historical radio file material and many photos were stored in the Electronics Center at Beltsville, Md. Access to the documentation may be secured by contacting the Forest Service History Section, Washington, D.C. Some radio sets are stored in the Forest Service's Southern Regional Office in Atlanta, Ga. The main collection is at the Electronics Center. There were no plans at the time of publication to make the radio and telephone equipment available for public display or inspection.

Appendix IV

Early Communications on the Clearwater National Forest, Idaho

(The following summary is excerpted from The Clearwater Story, an anecdotal history of the Clearwater National Forest, Northern Region, by Ralph C. Space, former Forest Supervisor, published by the Region and revised in 1981. This portion is on pages 58 and 60 of the revision and has been edited for reproduction.)

One of the greatest handicaps to the early day Forest Ranger was lack of an adequate communication system. Up to 1910, there was no means of transmitting messages faster than by saddle horse. The need for better communications was so emphasized during the severe 1910 fire season that the Forest Service embarked on a telephone line construction program. It also equipped lookouts with heliographs.

The heliograph was an instrument for conveying messages by code using mirrors and a shutter to flash rays of light from the sun. It was not very effective for Forest Service work because of its limitations. It could not be used at night; cloudy weather made it inoperable; many men were not patient enough to learn the code; it took a lot of time to send a message; the instrument had to be reoriented almost continuously due to the earth's rotation; and it could not penetrate smoke or haze. It was better than nothing, however, because some messages did get through.

The Forest Service recognized these handicaps and set out to establish a telephone system that would link every lookout to a Ranger station and every Ranger station to the Supervisor's office. The first few of these lines were made of No. 12 galvanized wire hung on solid insulators spiked to trees. Maintenance on these lines was slow and expensive. Trees often fell across and broke lines, tearing off the insulator as well.

In 1911, Ranger William Daughs invented the split tree insulator. He whittled the first model out of a piece of Douglas-fir bark. Its two parts were wired together so that the telephone line rode in an oval hole in the center. The ends of the wire binding the insulator together were bent into hooks and hung on a staple driven into the tree at the proper height.

The insulator let the telephone line ride free so that when a tree fell across it, the line seldom broke. Slack wire would be pulled from both directions to let the line fall to the ground with the tree. If more than one tree fell across the line, the insulator unhooked from the staple and came to the ground. The maintenance men would cut the windfall off the line and replace the insulator on the staple. The split tree insulator was soon adopted, and No. 9 galvanized wire, which was much stronger than No. 12, became the standard. These innovations made telephone line maintenance easier and cheaper, but it still required a lot of tree climbing.

By 1915, there was a telephone line to each Ranger station except the Fish Lake District on the Lochsa. A few lookouts also had lines. Chamberlain Meadows, Elk Summit, and the North Fork-Fish Lake Districts were connected by lines to Montana. By 1917, almost all working lookouts and Ranger stations on the National Forest had telephones.

After World War I, the Forest Service was able to get "outpost wire" from Army Surplus. It was an insulated wire that was hung on trees or other natural supports without insulators. It was a big help in providing communication to trail and fire camps. The "outpost wire" came in quarter or half-mile rolls placed in a frame

attached to a man's back like a pack board so that the wire reeled out as the man walked. Another man followed and placed the wire over tree branches and bushes with a forked stick to get it off the ground and above wandering big game. However, where there were no tree branches or other vegetation to hang it on, game frequently got tangled in it.

In 1933, the first practical radios made an appearance. They were used to communicate from fire camps to Ranger stations and from Ranger stations to the Supervisor's office. These sets were very temperamental and special training was needed to keep them in operation. "Ham" operators were hired to operate the sets on fires.

The conversion of the communication system from telephone lines to radios was very gradual, spanning a 40-year period from 1934 to 1975. Starting in 1934, a number of Forests and Ranger Districts in the Northern Region (R-1) were combined; this cut down the need for telephone lines. When smokejumping became practical, some firemen and lookout stations used primarily in fire suppression became outdated. The major change came when air detection replaced lookout detection, starting as an experiment in 1944 on the Bob Marshall Wilderness Area and soon spreading to all Forests. The transition was so slow that telephone lines gradually fell into disuse without being removed from the ground. The wires were a hazard to game and, although a special effort was made to get them out of the woods, sections of the old telephone lines can still be found.

After World War II, the Forest Service moved rapidly to the use of improved radios. The Clearwater now has none of its own telephone lines; the last one was taken down in 1975. Today the Clearwater Forest uses an extensive radio system and the modern commercial telephone system for communication.