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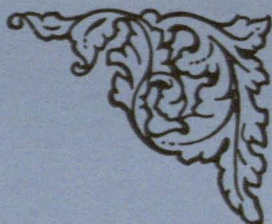
Northern
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Communications
in the
National Forests
of the
Northern Region:

A History of Telephone
and Radio

by

J. H. "Bud" Coats



Communications in the National Forests of the Northern Region:

A History of Telephone and Radio



J. H. "Bud" Coats demonstrates the heliograph to Tina Schwartzman, editor of "Communications in the National Forests of the Northern Region: A History of Telephone and Radio."



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Introduction



This history of Forest Service communications in the Northern Region covers the years from 1910 to 1977. It begins with the story of telephone--the backbone of communications during the early years when Ranger Stations were located in sparsely populated areas. The history then explains how the Forest Service made the transition to radio in the 1930's and 1940's. The final chapter covers heliographs--an infrequently used, but much cursed, device.



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The Telephone System



The history of communications in the Forest Service's Northern Region was originally drafted by J. H. "Bud" Coats after his retirement as Regional Communications Officer in Missoula. When Bud first began his job as communications officer in 1956 there were boxes of old documents and pictures sitting in the office to be tossed out. Coats, who had grown up in the communications business--both his parents were telegraph operators--was concerned that the information not be lost. When he retired in 1976, Coats decided to put the material into a history format of telephone and radio communications in the Northern Region.

The first draft, finished in 1978, was sent to a group of Forest Service retirees, 24 of whom responded with anecdotes of early communications systems. Their stories, plus information from early Forest Service

Supervisors' meetings and the Telephone Handbook have been incorporated with Coats' original history in this text.

TELEPHONE SYSTEMS

In the early days, 1910-1930, single wire grounded circuit telephone lines provided the Forest Service a protection and management communications network. They also served logging operators, local residents, and fire control cooperators. The period from 1933-1942 saw the Civilian Conservation Corps (CCC) construct many miles of metallic, 2-wire line throughout the Region. By 1950 most telephone lines had been sold to private companies or torn down, thus ending an era of telephone line construction and maintenance by the Forest Service.

1910-1930

Constructing Permanent Grounded Line

A 1910 report of District 1 (now Region 1) Supervisors' meeting in Misscula outlined the need for a communication system:

"Telephone lines should be planned so as to be of use both for general administrative purposes and fire protection. It is usually advisable to connect most of the permanent Ranger Stations with the Supervisor's Office before telephones are extended into the back country. They should usually follow the main trails or roads . . . It was unanimously agreed that telephone construction is one of the most important phases of fire construction work. It was felt that cheap lines, strung mostly on trees with split-tree insulators, should be built to such points as could be easily reached by patrolmen in the remote District where without telephones it would be necessary to make a long, difficult trip in order to secure help, during which time the fire would have to be left."

The devastating fires of 1910 emphasized the need for better telephone communications among outposts in the vast, remote areas of Region 1. The only means of moving tons of wire and materials were pack trains and men's backs, and the situation demanded ingenuity to overcome the obstacles of phone line construction.

The period from 1911-1920 was one of main trunk and spur line construction. Trunk lines connected Supervisor Offices to Ranger Districts, while spur lines went from Ranger Districts to look-outs and guard stations. In 1912, 2,200 miles of phone lines were built and 5,000 more miles of line planned for Region 1.

By 1915, the Region had a telephone engineer, R. B. Adams. He supplied diagrams and most of the material on tree line construction for the Forest Service Telephone Handbook published in 1915. Regional handbooks published in 1922 and 1924 were written by Mr. Adams. According to Clarence Sutliff, early in Adams' career he was dubbed "Ring Bell" and that name stuck.

The Forest Service Telephone Handbook explained how to construct a grounded line. According to Bert Morris:

"For anybody experienced with the manual, construction of line was a fairly fast operation. First, you would survey lines. A designated blaze indicated hang trees, and this blaze was notched on the side where the line would hang. By doing this properly, the line always pulled away from the tree instead of into it, where it might wrap itself and get a dead ground in the live tree. The old ground lines, built with split tree insulators, were designed with enough slack or droop in a line so a tree could fall across every 10 spans without pulling a hang down. Enough slack was allowed to let the wire droop as much as 12 feet."

Single wire telephone lines used by the Service were ideal for back-country use. Every electrical circuit required two conductors--one for the current to flow out on and one for its return. The single wire telephone line used the

earth for one conductor, hence the name "ground-return" line, which was usually shortened to "grounded" line. Pat Taylor described grounded line construction:

"In the old days a three-man crew was the most efficient for stringing wire to fires, constructing new line, or maintaining lines. Sometimes a packer was also in the crew to haul equipment, do the moving, and cook. When possible, lines were built along trails or roads where they would be easiest to patrol and maintain. Esthetics was not a main consideration."

"A line locator blazed the route. His major concern was to keep in sight of the trail and to stay in the timber where there were suitable hang trees. A hang tree or pole supported the wire. Accurate alinement, except on a pole line, was not important."

"One of the other men selected and blazed the hang trees, trying to place them from 120 to 140 feet apart. When he was two hangs ahead, the other man would sight through to see which side

of the hang tree the line should go so the wire would pull away from the trees forming a zigzag. That man would then move up and cut a tick on the blaze to indicate which side the wire should be pulled through."

"Just enough clearing was done at this time to allow the wire to be raised. If all the clearing was done, it would have been difficult to wade through the slash when stringing the wire." "Rolls of #9 galvanized wire were dropped about every quarter mile when the 80-lb. rolls were carried by the men. If they were following a trail, a packer dropped one mule load or two rolls of wire every half mile."

"A reel was used to string the wire. Often a simple device could be made at camp or at the Ranger Station. The base was made by driving a heavy iron pin or piece of iron pipe in the center of a heavy 4-foot long plank. The reel piece was made from two pieces of 2X4, about 3 feet long. They were joined at right angles in the center with a half lap joint. A 1-inch hole

was drilled through the center, and pins or pegs were driven into each arm to fit inside the roll of wire. A piece of bacon rind was slipped over the base pin fat side up, then the reel was slid on over the pin, and the roll of wire set on that. Two men could pull the wire along the route, while the third man tended the reel to keep the wire from tangling and to stop the pullers when the wire was all out. He then spliced the end to the wire of the previous roll and carried the reel to the next station."

"The next step was fastening the insulator to the hang tree. Usually two men did the climbing and trimmed branches off the hang trees up to 20 feet. The ground man put on the split tree insulators. These were made of porcelain, similar to half a doughnut, and two of them were secured around the #9 wire. They were hooked to a light rope hanging from the climber's belt. At about 26 feet the climber drove in a staple about three-quarters of its length and put one tie wire in from each side. The tie wire was a

piece of #12 iron wire about 22 inches long, wrapped twice around the pair of split tree insulators, twisted to keep the two halves together. Then each end was hooked through the staple from opposite directions. The tie wire end was about an inch long and bent down about 45 degrees. A 300-pound pull would straighten these out and pull down the insulator rather than break the line. Trees could fall across the line every 4 or 5 spans and just take up the slack. Additional windfalls would just pull the insulator down. About every 10 chains the wire was pulled to adjust the slack. The final step was to cut the necessary trees and branches for wire clearance."

"A linesman's outfit, carried in a packsack, consisted of one pair of climbers, one safety belt, one pair of connectors, one light rope, extra #9 wire, extra split-tree insulators, one linesman's belt, one pair of linesman's pliers, one hatchet, one set of come-alongs, and tie wires."

Theo Paullin explained

the quality of grounded lines. "These phone lines worked real good in the back country. You had to have good ground and the telephone in good repair. New batteries were put in about once a season. The lines could have windfall limbs lying on them or be under 14 inches of snow, and you could still talk."

Karl Kaufman said:

"In the days of the good old grounded lines you could talk over the lines almost all the time. We had a lookout on almost every hill before airplane patrols came into use, and the main line went along a road. We could hook onto it and take off most anywhere it was needed. Later on, they replaced a lot of the #9 grounded line with the metallic lines, but they were out most of the time - every time a tree blew over the line, someone would have to get it repaired in a hurry, otherwise a lot of the lockouts were cut of communication. We very seldom did any repairing on the grounded line, except a thorough maintenance job in the spring. Once in a great while the line would break on a

steep slope from 'iron fatigue' or game getting tangled up in it. A buck deer or bull elk would get their horns tangled up where there was too much slack in the wire and fight until they could not get loose. We would find them the next spring, dead from starving or exhaustion from fighting the wire."

Grounding of single wire lines was essential and several methods were used. Grounding at lookouts was typically by using an old Army bayonet, according to Bert Morris. "A ground wire was attached to the bayonet. A long, flexible, electric wire was thrown over the grounded line, pulled back on a clip, and the bayonet plunged in the ground. Usually the ground had to be damp, and salt affected the grounding conditions. What they'd do is urinate on it and then it worked. I remember times trying to make a portable phone work on a high granite ridge where the ground was extremely dry, and I was dry, too. No way could I get that thing to work until I got myself to a place where I could find some damp soil to put the bayonet in."

Another method was to ground the line to a spring. Bill Ibenthal said grounded line at lookouts often had to be strung down to a spring.

Emergency Line

Emergency line was different from the permanent grounded wire strung on trees. Bill Ibenthal explained that, "Good lines did not go everywhere and lots of guards were hooked in with WWI emergency wire. This was several strands of steel and copper covered with light insulation. Outpost wire was single #14 copper wire with heavy insulation."

Sam Billings described emergency wire in detail.

"Many lookouts and all fire camps in 1924 talked over so-called outpost or emergency wire. Outpost wire was insulated copper wire strung along the trails and/or cross country by two men carrying a roll of the stuff through which an iron bar or even a wooden stick had been thrust. A third man tossed the wire up onto bushes and low hanging limbs. Emergency wire was very small gage steel and copper wire

with a fabric insulation and was strung out in the same manner as outpost wire, except that oftentimes the roll was mounted on a self-winding reel on a man's back and unwound as he walked along."

"Emergency wire worked during dry weather but the insulation was so thin it rubbed bare easily and wasn't of much use during damp or rainy weather. Both wires were only 3 to 5 feet off the ground, and in some places on the ground. They were subject to much breakage as wild or domestic animals walked through them. Both wires were obtained from Army surplus stocks."

There were problems with #12 copperweld wire. Delbert Cox explained, "In the steep and heavily timbered country this wire increased maintenance costs many times. When these lines were broken the wire wound up and tangled like a broken watch spring. A better solution would have been to use a #12 galvanized line with the nicopress connectors." Ross Middlemist agreed. "Copperweld wire was harder to maintain, as a

grounded line, than the old #9 galvanized. It kinked so easily and would break every time it kinked.

Emergency wire was used in the 1930's to connect Blister Rust Control (BRC) Camps with other Forest Service offices. "By" Amsbaugh began working for the Forest Service in 1933 as a blister ruster.

"There was a great lack of telephone lines, especially in emergency situations. Iron phones were placed in various areas. In times of lightning I don't know for sure which was the most hazardous, the lightning or trying to use the phone to report a lightning fire."

"Most blister rust camps were served by emergency telephone lines. Emergency wire was usually strung across country the shortest possible distance, hopefully out of the way of deer and elk. When a break did occur, it was always a problem to find and repair it. I remember in 1934 I sent a couple of men to find the break; and when they did, instead of baring the wires, splicing them, and

tying a knot, they just tied a knot in the line and came back to camp. It took a week to find the knot and fix the line again."

Maintaining Permanent Grounded Line

Crews were sent out in the springtime to maintain grounded telephone lines to insure communication for the summer fire season. Sam Billings gave the following account of spring maintenance work:

"Both trails and telephone lines were maintained in the spring by the same crew. I was on a maintenance crew the spring and summer of 1925 on the Sylvanite District, and we were maintaining trail and line up to Roderic Mt. Lookout from Seventeen Mile Creek. It was a clear, very hot day, and the trail and line were very steep and there was no water along the way. Being the lineman on the crew and working alone most of the time, I would sometimes be ahead and sometimes behind the rest of the crew."

"At one point halfway up the mountain I had come

to where the wire had been pulled loose from the tie tree--a big, old, fire-killed Douglas-fir some 30 inches in diameter. It stood alone on an exposed slope. The next tie downslope was on a pole. The staple had pulled loose during winter and the insulator with tie wire on it had slid down the wire to the pole below. Climbing poles, especially hard, dry ones, isn't easy with long tree spurs, but I made it and recovered the insulator to which I tied a handline and pulled it back up to the tree from the ground, the tree being so big and rough it was necessary to climb it with the safety strap clear around it and fastened to my belt from the start. This required the use of both hands in order to advance the strap a foot or so at a time. In order to have freer use of my arms, I attached the insulator to the back of my belt rather than carrying the insulator and wire across my belly."

"The bark on the tree was thick, corky, and the outside burned black and very dry. As I climbed, a lot of this black char was rubbed off and

covered me from head to foot. I perspired profusely and the char mixed with that. Reaching the place where the tie was to be made, I drove in a staple and reached back to unhook the insulator, intending to swing it and wire up over my head. But it slipped from my grasp, slid down the steep sloping wire to the pole, where it smacked so hard it broke both insulators. Unfortunately, I had removed my packsack containing more insulators, tie wire, and tools, before starting to climb so had to go back to the ground, make up a new insulator, then back up the tree again, and I did the same damn thing all over again--lost hold of the insulator. This time though I had the packsack of supplies on, and I made up an insulator there and attached it. Then all there was to do was climb the pole and attach a new insulator."

"By that time it was past noon, I was hungry and very thirsty with no water. The rest of the crew had passed me before I started the first climb and had promised to leave the gallon water canteen hanging on the telephone

line up the trail a ways. Not wanting to eat my peanut butter sandwich without water, I proceeded up the trail about a mile and there was the canteen hanging on the wire with the hot sun beating on it. The water was hot but it was wet, and I ate my sandwich while wondering if I was earning my \$75 a month and found (room and board)."

Special equipment was needed for telephone line maintenance work, according to Bert Morris:

"In the beginning we had both tree and pole spurs, generally made by the Kline Company. They were very heavy, and the shape of the spurs caused them to fill with bark as you climbed up. They used to call it "government pole" when the spurs would kick out of the track and you would slide down. The usual reflex was to grab the tree hard--not easy on the arms if you were heading down fairly fast."

"I explained about this 'burning the pole' to a young kid working with me at Coram who had the habit of working with his sleeves rolled up. He

had been a rigger in the Coast Guard, but I told him, 'I don't care how good a climber you are, you aren't experienced until you've burnt a pole!' I was working as dispatcher when the kid came in one night and said, "What was it you told me, Burt, about being an experienced climber?" And I said, "Yeh, you might have to burn a pole." He said, "Well, I got my experience today." And he turned his arms up so that I could see he had taken off almost all the hide. That happened quite often."

"In later years, the Forest Service started buying Brooks climbers. They had a light aluminum or magnesium frame and the hook design was such that they never filled up with bark."

Telephone maintenance was often hazardous work as C. B. Sutliff related:

"One of the first telephone line incidents involved Jim Ryan who was Ranger on the Snyder District of the old Pend Oreille National Forest about 1915. Jim had just completed District telephone line maintenance.

His wife asked how the work was done. Jim's reply was, 'We climb trees and poles, and rehang the line wherever it has been knocked down.' His wife became concerned and asked, 'Isn't climbing trees and poles very dangerous?' Jim replied, 'No, it's very easy and safe - I'll show you how it goes.' Jim put on a pair of climbers and asked his wife to watch him climb a new 14-foot terminal pole put in at the Ranger Station (wires had not yet been hung). Up goes Jim, looking at and talking to his wife on the way. Result - Jim ran out of pole and fell to the ground breaking an ankle!"

"Cap" Evans talks about working in 1921-1924 on spring maintenance and intermittent seasonal maintenance. "It was hard work, but I found it challenging and interesting. My principal difficulty was mastering those damnable climbing spurs during which I made several bear-hug belly descents and ruined my \$18 logger boots--a major casualty considering that my monthly salary was \$75 and beans."

Karl Kaufman wondered how we lived through those days:

"One man would be sent out with climbers and belt, axe, hatchet, and a bunch of split insulators to maintain miles of line. I maintained lines alone out of the old Fairview Guard Station when I had no communication with the outside at all - 40 miles by road to the nearest phone or community. Nowadays they would send at least one or two bodyguards along, in case of an accident. In those days, if you could not handle it alone or had an accident, they would not hire you. I had a lot of near misses when my spikes slipped out of the tree or the belt gave way. We 'burned the pole' a good many times."

Pat Taylor described the maintenance procedure:

"Usually line maintenance was done in conjunction with trail maintenance, except for emergency repair. A three-man crew was the most efficient. One man went ahead with an axe, unless there was heavy sawing. One was the climber. The other, carrying the saw and linesman's pack, did the

ground work. Just to rehang an insulator only took a few minutes. Eventually hang trees fell down and different trees had to be used. This changed the slack and sometimes wire had to be cut in or taken out. Come-alongs or old fashioned fence stretchers were a very convenient tool when wire was cut and Western Union splices put in."

Splices, Insulators, and Howlers

As with any technology, an entire language developed labeling the components in the telephone communications system. Splices, insulators, and howlers were such components.

"There were several splices used to join the wire. The first was the old Western Union splice, the most common way of tying #9 wire together. Twisting the wire would break the galvanizing, and the wire would rust quickly which would cause a high amount of resistance. Later, the nicopress sleeve was introduced. It was an improvement as the joints lasted and the lines generally talked better," said Bert Morris.

Taylor described the Western Union splice:

"These splices were made with pliers and connectors. They consisted of six loose twists and six tight wraps on each end. No tag ends could stick out or they would hang up in the insulators. In the late 1930's, splicing sleeves were introduced. These were double metal tubes about 6 or 7 inches long sized for #9 wire. The wire was pushed in from each end to extend one-fourth inch past the sleeve. These ends were bent sharply so wire would not pull back through the sleeves. A pair of connectors was clamped to each end and the whole tube twisted about three twists. These were used just a few years and found to be unsatisfactory. They would hang up in insulators, the metal would rust, and connections were often poor. It took several years to get these cut out of the lines."

Several types of insulators were developed. The first ones used were white ceramic split tree insulators. Bert Morris said:

"Two halves were put around the wire and held by a tie wire. The insulator with its tie wire was carried up the tree, a staple pounded in, and one bend was made in the two ends of the wires that were left and hung through the staples. The idea was that a pull of 250 pounds would not break the line but pull the insulator from the tree."

"The early white insulators were replaced by 1935 or 1936. The old white insulators against the dark bark were a temptation for kids and people throwing rocks, and we spent a lot of time repairing vandalized lines. The replacement insulators had a brown finish which blended in with the tree trunks; they weren't such good targets, and vandalism went down considerably."

Pat Taylor talked about problems with the early insulators. "A solid white porcelain insulator was used until the late 1920's. The hole was a little too small and splices would sometimes hang up in them. Also, wire had to be cut to replace them. All

through the 1930's they were being replaced. In the 1940's nicopress splices were put into use. Each end of the wire was butted halfway into a 3- or 4-inch lead tube. A special tool, called a nicopress, was used to crimp the tube in several places against the wire. These made good splices and required little expertise to install."

Howlers were aptly named for the howling which attracted attention on the telephone line. Howlers were found mainly at Ranger headquarters, according to Bert Morris:

"These howlers were part of the portable phones. The phones had an aluminum casing with a button on the side. This button had a coil in it which let out a loud howl. When you pushed the button for the howler, the little megaphone system at Ranger headquarters amplified the howl loud enough to get the dispatcher's attention, and then you used the regular ring system. If the only phones this came in on were the ones with that howler, or if somebody happened to be listening on the line

when you hit that howler, you would almost smack his ears off. You could do the same thing with the old wall phones with the mouth piece and earpiece by rubbing the earpiece over the mouth-piece and set up a real howl. This worked well for signaling people if you had that type of phone and your generator was knocked out."

Telephones, Switchboards, and Cooperators

There were several types of telephones used by the Forest Service: wooden wall phones, Adams portable phones (named for R. B. Adams), and iron mine phones.

Sam Billings described these three types of phones and their uses:

"The telephone instrument used back then was the old wooden wall type, hand cranked generator instrument that is now a collector's item. There was also a smaller, crank instrument in a leather case that was used by crews in the field or carried in a saddlebag or car and could be attached anywhere provided one had some kind of ground rod to complete a circuit.

And there was the old iron box affair called a 'mine' phone that was used as an emergency phone at selected places usually for the convenience of the public. I guess these are still being used at some back-country areas where the #9 line is intact."

Bill Ibenenthal said, "The old wall phone was a dandy. You could talk through the receiver if your batteries were dead. We could even repair them. Lines were connected at the station by double-throw knife switches."

Wall phones and lookout sets were described by Bert Morris:

"The Kellogg or old-fashioned wall phone worked equally well with either the metallic or grounded system. They had to be hand cranked, and had a generator in them that gave the ring on the other end. Each Forest Service station or lookout had a designated ring."

The old lookout sets were headsets. They had a jack on the side, unlike the Ranger Station sets with both mouthpiece and

earpiece, so you could strap it on during fire activity and your hands were free for plotting and marking fires. When you got ready to fill out your forms, you called in your information and at the same time could keep up a conversation with neighboring lookouts or the District dispatcher. It was easy to monitor anybody's activity with these old headsets."

"If you laid down, the carbon granules in the microphone part would shake or loosen and you could barely hear the person talk. Once they stood up, then they came in quite clearly. I remember four or five guys gossiping at night and all of a sudden somebody would holler, 'Hey, get out of bed' because you couldn't hear him if he was lying down."

According to Bill Ibenenthal, "The Adams portable phone was only partially successful and the light leather case was great stuff for porcupines to eat. We had reels of copper-insulated wire where, if a grounded line was available, we could throw a rope over the grounded line, tie on,

and then take off across country to the fire camp. Then if we could get the ground rod down to moist ground we had pretty fair communications with the Adams portable telephone."

"The old cast iron metal phone, or mine phone, was weatherproof and often located at remote Forest Service cabins," according to Delbert Cox.

Karl Kaufman remembered the old switchboards in Ranger Stations. "At the old Rexford Ranger Station we had the wind gage connected to the switchboard and so many clicks indicated so many MPH wind velocity. Our clerk would take the wind gage and listen for 3 minutes at a time for the number of clicks. We had a logger in the office one afternoon and as the clerk took the receiver to her ear for 3 minutes, without saying anything, the lumberjack stood up, ready to go. He said, 'I've got to tell my wife about this as soon as I get home - a lady listened on the phone for several minutes and never said a word - I didn't think that was possible.'"

Telephone cooperators were local residents who paid a fee for hooking into the Forest Service line. The 1908 Forest Service Use Book spelled out the rules:

"Cooperation will not be accepted unless those who wish to cooperate will contribute a considerable part of the cost of the line. The use of all Service telephone lines and instruments will be free to the public unless the free use should become burdensome to the Forest officers or interfere with the efficiency of the system for Service use. The excessive use of instruments not only seriously impairs their efficiency, but is detrimental to the prompt transaction of Service business."

Bill Ibenthal recalled the following:

"Everyone from the outskirts of commercial service to Forest stations wanted a phone on our lines. They usually got them by being cooperators on the fire business. Often we really needed them to repeat messages if the signal was weak because a tree

had knocked the line into a creek somewhere. Cooperators were also a nuisance at times of fire traffic. Of course, they all had their receivers down to get the news. We could knock them off, if necessary, by prearranged code to the other party and then hit the Klaron buzzer. This would whoop up the signal to the point that I guess we broke some eardrums but it sure did free the line of extra listeners."

Sam Billings related several tales about cooperators.

"Some of these #9 lines were very extensive, such as the line from Troy to the Upper Ford Ranger Station in the Yaak, the Libby to Rexford line along the Kootenai River, and the Darby to Alta line up the West Fork of the Bitterroot. There were many others. It being the only means of telephone communication for the residents along the line, many of them were allowed to hook on through means of a special use permit. If I recall rightly, the fee charged was \$2 per year. Permittees furnished their own telephone instruments. Ring

numbers were assigned by the Forest Service and were combinations of shorts and longs--two shorts, a long, and short; a long, a short, and a long, etc. Two longs were reserved for the Ranger Stations and one long was the ring for central. Listening in on others' conversations was a sport pretty much accepted by all others on the line, but when four or five, maybe more, had their receivers down, it interfered of course with the quality of reception at the more distant stations. There was some talk among Forest Service personnel on how to put an end to this listening in, but not seriously. After all, what else was there to do at a remote Ranger Station in the winter?"

"I recall one winter day Charlie Powell at the Rexford Ranger Station called me at Warland and, after a little chitchat to give others time to listen in, told me he had a way of telling who were listening in on the line. He said he had a panel rigged up on his desk with all kinds of colored lights on it which was hooked up to the telephone line and

whenever anyone lifted their receiver to listen in, their particular color would light up. Almost immediately there was click, click, click along the line as various ones hung up. From the other end of the line came Charlie's sardonic laughter - joined by mine."

"There was one party on this line that had placed their kitchen clock on top of the wall telephone. Every time she listened in, you could hear tick tock, tick tock over the line. Charlie knew who it was and one day when talking to me by phone he said, 'I hear Mrs. So and So is listening again.' Immediately Mrs. So and So said 'I'm doing no such damn thing,' and slam went the receiver."

"Then there was the time up at Sylvanite Ranger Station when the huge Seventeen Mile Fire was going and a camp was being established up in the South Fork of the Yaak. An outpost line had been run into the campsite and a cook, a Frenchman, was setting up his part of the camp and discovered some things missing. He immediately

called the Ranger Station and those listening in heard him say in considerable anger 'Gee Ciy! 40 men - no stove pi-i-i-pe.' For years thereafter whenever things seemed to be going haywire, the above was used as an expression of frustration - at least on the Kootenai National Forest."

"Rubbering In"

The old phone lines, where everyone could listen in, provided entertainment for Forest Service employees and local residents alike. The following anecdotes illustrate this phenomenon:

Bert Morris explained:

"Each Forest Service station or lookout had a designated ring, but whenever one phone rang on a telephone line, all phones rang, so naturally if you were sitting on a lookout and things were getting monotonous, you always 'rubbered in.'"

"I can remember Supervisor Erkhart on an inspection trip at Black Bear trying to call Big Prairie. On the first ring he didn't raise the

station so he tried again. There were so many phones off the hook that it was even difficult to crank and he wasn't getting through to anybody. He finally got on the phone and said, 'Boys, please get off this line for awhile so I can get my ring through, then you can rubber in.' So everybody unplugged or hung up the receiver and he got his ring through quite easily."

"Lookouts often entertained each other with talking, singing, and playing harmonicas in the evenings when the dispatcher would not be busy. We really had quite a sociable time and I guess that day is gone forever. Remember all jobs were around the clock, 7 days a week."

"When Orson Wells put on his skit about people from Mars invading New Jersey, everyone in the country had one hell of a night. It was late fall as I recall, and only cooperators and the stations were occupied. We may laugh at it now, but it really was a scary night and the closest I have ever seen people in real hysteria - all of us."

Karl Kaufman said, "During the summer evenings I clerked at Ant Flat Ranger Station and the Upper Ford Ranger Station in the North Fork District. I could connect all the lookouts from Wolf Creek to the Canadian line and the North Fork of the Flathead. They would tell stories, sing, or play musical instruments. Those times would sure break the monotony for the lookouts."

Lightning and Big Game

Lightning could cause excitement for employees trying to communicate on the old grounded telephone lines. Another problem was keeping big game out of the wires.

The combination of lightning, old iron phones, and grounded lines could cause quite a danger. Staying on the phone through a lightning storm was not a safe practice, according to Bert Morris: "I remember a lookout working the summer of 1940 on the south side of Big Salmon Lake. His phone was one of the iron mine phones - used for emergency use along trails because they were self-contained, easy to

install, and would withstand weathering. The lookout board was on a pile of rocks at the top of the peak. About 100 feet from it was his tent with the phone inside. The first fire he saw to report got him a little excited, and he got the location, pulled out his forms, ran down to the tent, grabbed the phone handle--the lightning storm was in progress--and he got knocked completely out of the tent. He got up, made another try, grabbed the handle--another lightning strike--the same thing happened. The third time he managed to ring through to Big Prairie and the dispatcher didn't even bother to take his message. He just picked up the phone and said, 'Get the hell off that line.' After the storm calmed down he got his fire report in."

Lightning could knock out communications entirely as Morris related in this tale:

"In 1939, lightning hit Sentinel lookout and even though it was well-grounded it burnt out the generator in the phone. Frank Bailey, the lookout, took the thing apart

and called the Forest dispatcher. To call the dispatcher he waited until he heard a couple of us talking on the line and then we rang for him, and he explained the situation to the dispatcher who set up a check-in for Frank every 15 minutes. I finally figured out he could put the earpiece from his headset over the mouthpiece and make it howl to get the dispatcher's attention. Then he could rewrap the generator without interruptions every 15 minutes. Frank unrolled all the fine wire in the generator until he found the break where the lightning had burned through. He spliced the wire, re-insulated it with first aid tape, rewrapped the whole generator--about 3 days of continuous work. He got it back together and the darned thing worked. It was that simple."

All the dead wire strung around through the timber was quite an attraction to lightning, according to Morris:

"There were several types of lightning arresters. The most common arrester was the old soft one. The telephone line came

into the top of the box and went onto the phone where it was tied solid at the top of the box. There were two nickel-plated brass strips down each side with sawteeth in the edges. In the center of the arrester between the sawteeth was a carbon block which was wired to a ground immediately below it. A heavy jolt of lightning or static electricity met considerable resistance in the phone. The lightning, following the easiest path, would come down the two strips with sawteeth, jump a very narrow air gap to the carbon block, and go underground. If this arrester was well-grounded and the air gap set properly, it worked very effectively."

Fred Fite remembered an incident involving lightning. "In 1940, lightning struck the telephone line which ran from Graves Peak to the Powell Ranger Station. It started some 20-odd fires where it would jump from the split tree insulator to the tree and down to the dry duff at the base of the trees. It did this without damaging the line since the lookout was able to report over

the line. I made a drawing of this and sent it to 'Believe It or Not,' and it was printed in papers over the country."

Large game frequently got mixed up with telephone lines in the forest as in this episode Morris told:

"I was maintaining line from Mount Park to Spotted Bear where the poles were in the draws high enough to clear the ridges in between. I was up top a 60-footer--we had a break--trying to fix the line. The usual method was to splice new wire at the break, climb the nearest pole, pull out the slack, resplice it, tie it in, and go back down four or five poles each way."

"Well, this day my memory was jogged by an incident back in 1939. Frank Bailey and I had been working trail and we found a bull elk tied up in an abandoned telephone line. He had got it wrapped around his horns and died. That line was so tightly wrapped around his horns, no strapping machine could have equalled it. He had torn the ground up about 6 inches deep all around

his carcass, so it must have been one hell of a fight, even though he lost."

"Anyway, the day I was on top of the 60-foot pole, just starting to pull up slack, here come four elk down the ridge between me and the next pole. All I could think of was the power those animals had, and I knew being on top of the rather lean pole was not the safest place. That is one time I really got wires loose and dropped them quick so the elk didn't tangle up when they walked over them. But for a few minutes I was nervous, and also busy."





1933-1940



The CCC Era

The Civilian Conservation Corps Program which began in the early 1930's had a major impact on the Region's telephone system. Additional lines were needed for communication to the many CCC camps, and the CCC men provided labor for the construction and improvement of phone lines. New communications plans were prepared for all Forests in the Region in 1935, 1936, and 1937. These plans, except for the Flathead Plan, show a total of 8,187 miles of existing line, with a total planned system of 13,339 miles. Most of the additional lines were evidently constructed because a 1948 report shows a total of 12,650 miles in the Region. Many of the lines constructed between 1935 and 1940 were good quality. Policy required they be built back from the roads

to protect the scenery, which made maintenance extremely difficult.

These early formal communications plans reflect the impact of the CCC program on the Forest Service through increased need for good communications, and availability of manpower to construct high quality telephone lines. Several metallic, or two-wire, lines were constructed by the CCC crews. The Forest Service couldn't have constructed these lines without manpower provided by the CCC. However, they could not afford to maintain the lines after the program was disbanded at the start of World War II.

By 1950 these metallic lines had deteriorated badly. Although efforts were made to keep some of them in use, they gradually became unserviceable. Some were eventually sold to various telephone companies;

others were torn down. There are no longer metallic, two-wire lines in use in the Region.

The CCC program spanned the years from 1933 through early 1942. The first major telephone construction plants were set up in 1935. The work consisted of cutting cedar poles and treating line and other small poles for fences and forest signs.

"Del" Cox worked on phone line construction during this era:

"The Nezperce Forest built a 125-mile circuit from O'Hara to Kooskia, Grangeville, and Elk City. Grangeville to Elk City was a four-wire circuit, the only phantom circuit the Forest Service had. It was designed by Pacific Northwest Bell. The Nezperce Forest operated a switchboard at Elk City for a number of years."

"Telephone line construction projects in many areas were very difficult, especially along the South Fork of the Clearwater River to Elk City. Steep, rocky slopes required long lengths of compressor

hose for jackhammer drilling and blasting for pole installations; our equipment was rather limited and crude. These lines were built with CCC labor and they required spike camps along the route."

Gordon Daugherty explained:

"In 1937, a permanent CCC camp was installed at Libby and the job plan called for construction of two metallic telephone lines. Cedar poles were available from the 1931 burn on Skin Creek, Kaniksu National Forest. We equipped a truck and trailer with staked punks and hauled the poles to a treating plant near Libby. All poles used in the lines were butt-treated with at least three-eighths or full sap penetration. Constructing the 24-mile line from Libby to Warland was a tough job as the line could not be built between the road and river because it would spoil the esthetic value. It had to be located uphill from the road where we encountered slide rock, and on one stretch we had 21 rock holes to blast. The line from Libby to Warland and

another line to Look Lake were sold to General Telephone and Electric of Northwestern in the 1950's."

"Smokey" Cunningham talked about line construction in the 1930's. 'I was working in the CCC camp and the Ranger from Ashland, Doug Morrison, came up to the camp and asked me if I could take orders. I said I would try, so he said I was going to work for him building a telephone line from Lane Deer on the Cheyenne Indian Reservation to Ashland and up to Fort Howes Ranger Station. The main line was metallic and hooked onto a barbed wire line up all the side creeks.'" Bert Morris explained:

"During the 1930's the Forest Service converted grounded lines to metallic circuits because the tonal quality or clarity was much better. Also if the line was properly engineered--twisting the wires around each other without touching--the inductance which made the grounded lines so noisy could be reduced."

"Typically during the off-season, the CCC boys would log cedar poles;

and almost every station in the western Forests had a treating plant. The most common treatment system was the 'hot-cold bath' in big tanks of creosote. About 6 feet of the but was soaked in the hot bath and then the cold bath, which closed the pores in the wood and squeezed the excess preservative out."

Ross Middlemist described the phone lines on the Lolo Ranger District in 1938:

"There were five regular lookouts and five overload points on the District, with telephone lines to each lookout. One circuit was called the farmer line; it had phones at several ranch houses along Lolo Creek and at Lolo Hot Springs. These people signed up as cooperators and had a sign along the road--"Report Fires Here." Also from this line, grounded lines branched off through repeating coils to some lookouts. This line could be connected through to Missoula at the Lolo store by throwing a switch. The store charged 10 cents a call for this service."

Conversion From Grounded to Metallic Line

Single wire lines had been comparatively easy to maintain. As long as they were not near other telephone or power lines, they worked quite well. However, they were susceptible to interference or crosstalk from nearby electrical circuits. In later years the Forest Service built a number of two-wire or metallic lines. Many of these were built during the Civilian Conservation Corps days. While they were superior in many respects, they were much more difficult to maintain.

Bert Morris explained how repeater coils connected metallic and grounded lines:

"We had a 30-mile metallic line from Pierce to Bungalow in Idaho, and grounded circuits leading out from the sides to lookouts. The repeater coil was attached to the pole leading the grounded circuit into it and then came into the metallic wires. Then you could talk on it."

"The line from Pierce to Bungalow was built close to the road for easy access and maintenance. Between Old Grant Summit and Pierce there were eight road crossings. One of Shaker Hitchcock's cedar loggers was working up on the lower Grand and he headed down to Pierce with the boom up on his truck. The phone line had a 21-foot clearance and his boom was about 30 feet in the air. He took out seven of the eight crossings as he came down. He would have taken them all, but on the seventh was a pole bearing lines on one side, a cable across to another pole, and that pole braced with a dead-man. This was right along a beaver swamp. Apparently the driver was coming merrily down the road and didn't see what was coming when he hit that cable which flipped him upside down in the beaver pond. His boss told me he never showed up to collect his wages. This was during the fire season and the communications technician and I took up about four rolls of Army surplus emergency wire; he drove, I un-

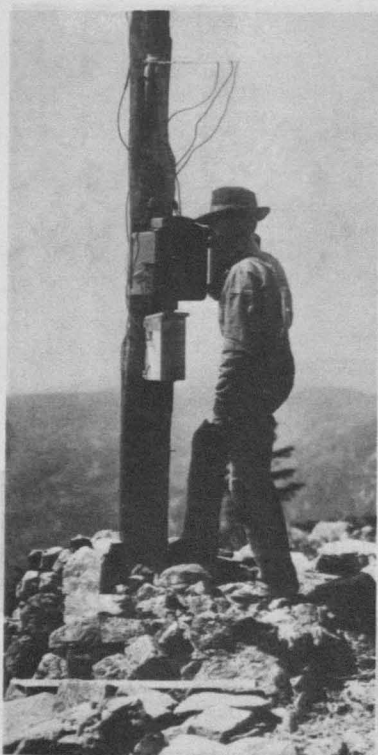
reeled the wire, and we laid the 8 miles of wire in about 2 1/2 hours." There were some advantages to the new metallic lines. "Especially in the summer, the old grounded lines would build up a charge of electricity out of the air, and as the electricity would build up or be induced into the line it would leak off. This would 'fry' the lines--it actually sounded like bacon frying," according to Bert Morris. The metallic wire didn't have this problem.

But there were also disadvantages as Sam Billings recalled:

"There was metallic line built in the late 1930's on the Fortine District. Construction was done by a crew from the Rexford CCC camp. This line was built along Highway 93 right-of-way; we were very proud of it. We felt as though we had really gone modern. However, soon after it was put in service, we had trouble with the two wires wrapping around each other at a certain point. This occurred daily at about the same time of day. When it was realized that we had a

dead line, a man was sent out in the pickup to troubleshoot, and after this had happened two or three times, he took along a cane fish pole and unwrapped the wires very quickly by running the pole along between them. There being no winds or other natural elements to cause the trouble and no close habitations, we were puzzled as to its cause. After four or five outages, it was decided to post a man at the point of trouble an hour or so ahead of the regular occurrence to see what was going on."

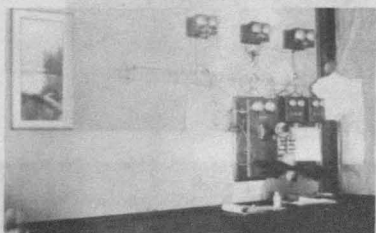
"The wires always wrapped north of the particular pole. This pole was just over the fence inside a pasture. Promptly on time a big white horse sauntered across the pasture, came right up to the pole, turned around and proceeded to rub his big, fat rump against the pole. The pole waved around some and the wires wrapped around each other. It was as simple as that. The pole was wrapped with barbed wire and we had no more trouble."



Iron mine phone, 1905-1906.



Blackfeet Forest Protection Association, near Lolo National Forest Sunset Point, 1944.



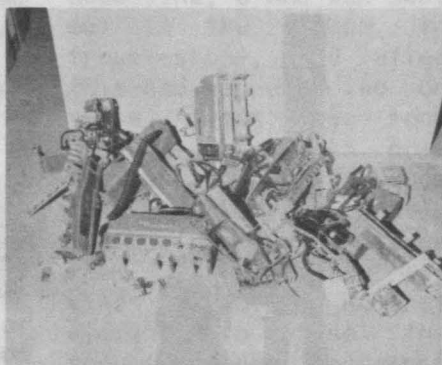
Telephone switching station, Elk City, Idaho, 1923.



Bill Apgar tuning the transmitter in the Northern Region's radio station on the University of Montana campus, 1935.



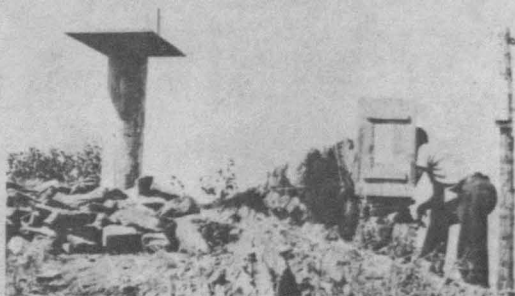
Split tree insulator holding telephone wire.



Radio fire cache after the 1961 fire season.

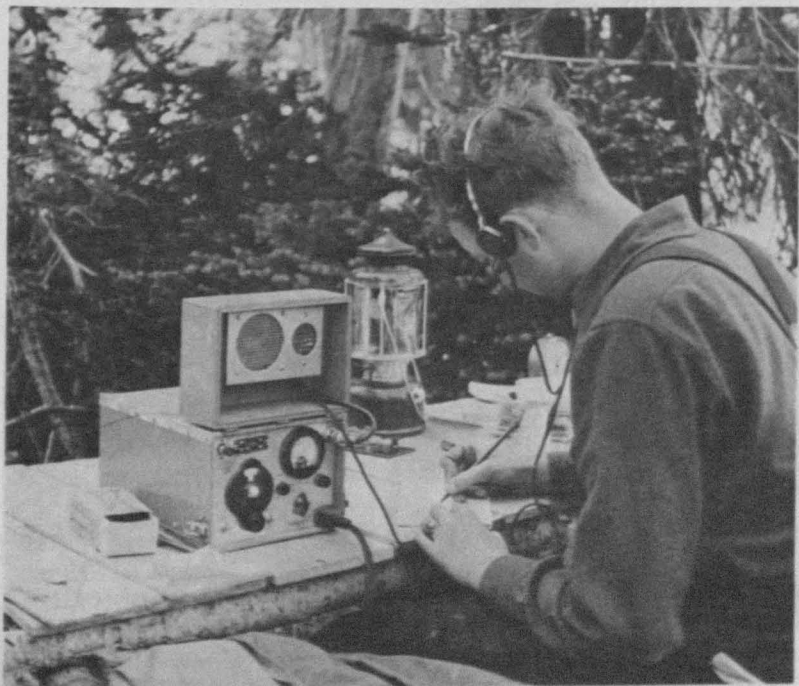


Lookout telephone headset frees the operator to complete forms while talking with other lookouts. Colt Mountain lookout, Coeur d'Alene National Forest, 1939.



Using telephone on Cold Peak Lookout, St. Regis Ranger District, Lolo National Forest, 1936.

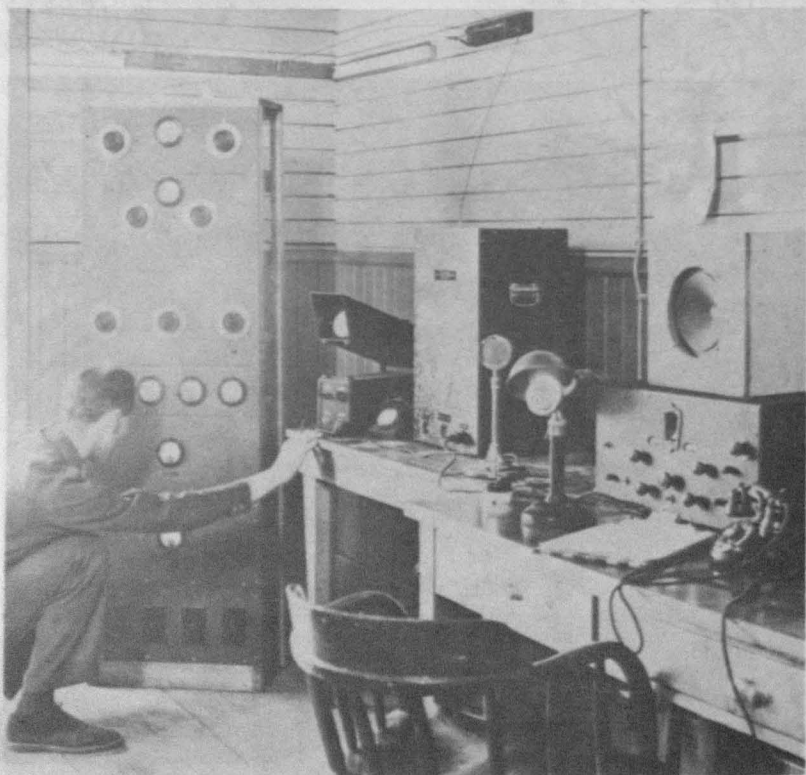
Lookout telephone, St. Patrick Peak.



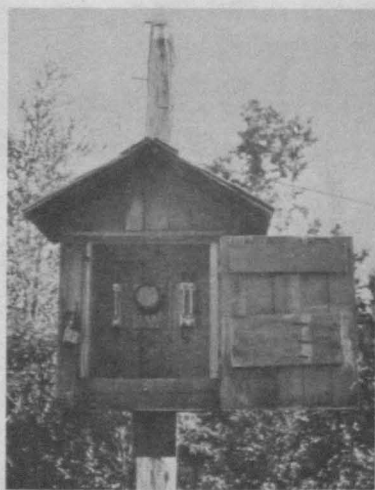
Operating SPF radio, Bull Lake fire, Kootenai National Forest, 1939.



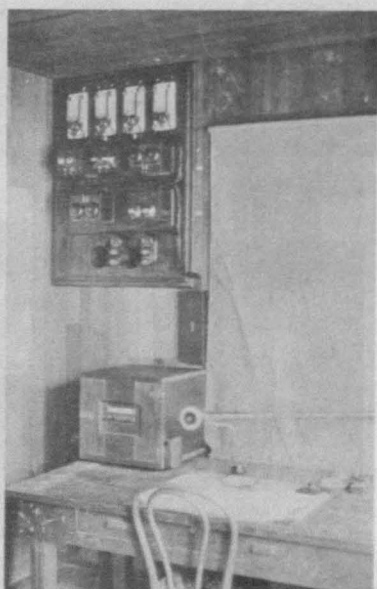
Dwight L. Beatty operating a 1930 model field set.



Bill Apgar tuning the transmitter in the Northern Region's radio station on the University of Montana campus, 1935.



Telephone repeating coils with vacuum arresters, Seeley Lake line in the old Missoula National Forest.



Cordless switchboard, Noxon Ranger Station, Cabinet National Forest, 1923.



Special portable fire radio set, operated by Bill Schendel, Swamp Creek fire, Lolo National Forest, 1938.

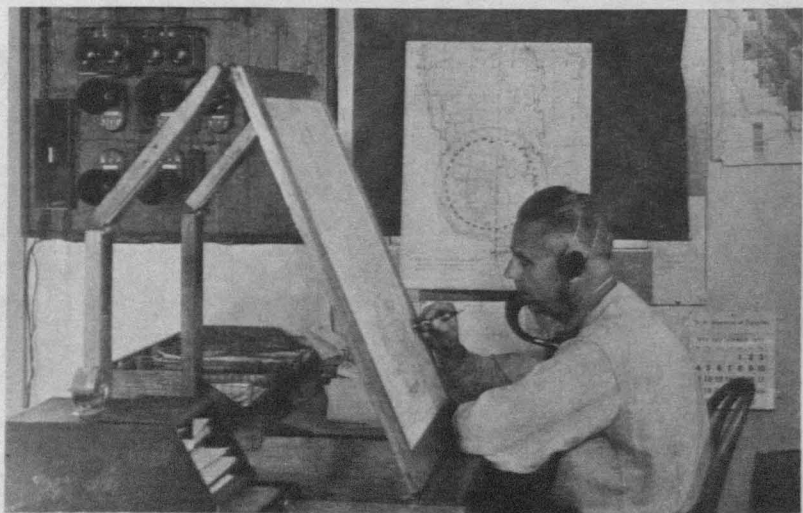


Repairing telephone line near Bumblebee Peak, Coeur d'Alene National Forest, 1932.





Loading radio equipment in Fork Tri-Motor at Misscula. Left to right: Paul Dickman, Bob Johnson, Dick Johnson (in plane) and Bill Appar.

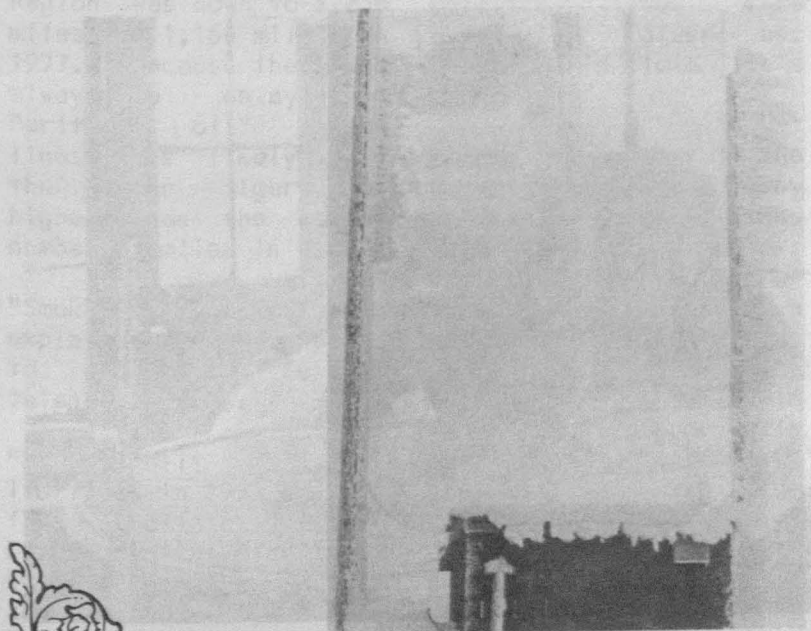


Falls Ranger District fire dispatcher, Kaniksu National Forest, plotting fire locations from telephone reports, 1932.





Civilian Conservation Corps (CCC) boys learning to operate SPF (Special Portable Fire) radio set.



Radio building on Sandpoint Baldy, Kanikeu National Forest.





Grouse Mountain Lookout, 1921.



*Reporting a fire over telephone, Coeur d'Alene
National Forest Lookout, 1932.*

End of an Era

When the CCC was disbanded at the start of World War II, the lines began deteriorating. There were not enough men available to maintain the lines, and funds were insufficient. Two other factors contributed to the demise of the telephone systems: conversion of many commercial telephone exchanges to dial--most Forest Service lines were not adaptable to dial exchanges--and the coming of FM (frequency modulation) radio systems. By 1961, telephone line mileage in the Region was down to 2,836 miles and 1,164 miles in 1977. Because there was always a delay in "writing off" unused lines it is likely that the later figure was higher than the actual number of miles in use.

"Smokey" Cunningham explained what happened to old Forest Service telephone lines.

"We had built two metallic lines in 1937 and '38 from Buffalo, South Dakota, to the old Jessie Elliott Ranger Station and into Cave Hills. These lines were later sold to the ranchers. We

had a ground line from Camp Crook through Long Pines, Montana, up to TriPoint lookout and to several ranches which was abandoned later for radios. The lines at Ashland were barbed wire hooked on to the top wire on the fences from ranch to ranch, overhead at the gates. They were okay as long as it didn't rain and get the posts wet and in the winter when the snow would drift up to the top wire. Eventually, these lines were sold to the Bell Telephone Company."

Like grounded lines, metallic lines were eventually given up. Bert Morris told this story:

"After World War II the Forest Service sold many of their metallic lines to private companies. The first time I ever ran into it was quite a surprise--here was a dial phone--I couldn't quite believe it! That was in the old Basin Creek cabin on the West Yellowstone District in 1950. The Forest Service had started to put in dial phones, and had given their line to the company because they only had to pay the flat rate, about

\$3 a month, for the service. Whenever there was trouble they could call the company. The company thought it was a great deal because there were several ranchers on the route that the Forest Service had never tied in, but the phone company was glad to connect them for the added revenue."

But the private phone companies didn't completely meet all Forest Service communication needs as Fred Fite related:

"In 1945, a fire started near Wallace, Idaho, at a time when the Regional Office was closed. Walter La Fon, dispatcher for the Coeur d'Alene, called me at my home and ordered men and supplies for this fire. Just as soon as I received the request for help, I placed a call to the Spokane Warehouse and was advised by the telephone operator that they were unable to complete the call due to trouble on the line between Missoula and Spokane."

"Whenever I had any trouble with the telephone company, I would always call the Forest Service operator Betty

Oates. This time I got her at home and she said she would see what she could do. In less than 5 minutes I had the Spokane Warehouse on the line."

"Later I found out that the very fire that I was ordering help for had destroyed the telephone line just as I had completed the call from LaFon. Betty informed me that my call went from Missoula to Butte, to Salt Lake City, to San Francisco, to Seattle, and to Spokane."

G. H. Duvendack summed up the conversion from Forest Service grounded and metallic phone lines to radio and commercial phone lines. "They had to convert to commercial lines because of the lack of adequately trained personnel to maintain phone lines, greatly expanded power lines, costs of constructing and maintaining lines by the Forest Service, and the reliability of Forest Service versus commercial lines."





Radio Communications



1919-1930

The first recorded use of radio communications in the Northern Region National Forests was in 1919. Through the efforts of R. B. Adams, Regional Telephone Engineer, four sets were borrowed in 1919 from the Signal Corps. Two of the sets were sent to Missoula. One was installed at Mud Creek Ranger Station, about 30 miles west of Missoula; the other was installed on Beaver Ridge, about 13 miles away. After some difficulty, the sets provided fairly good communications that summer.

Vic Miller helped install antennas for the radio test between Mud Creek and Beaver Ridge in 1919. They hung one antenna 103 feet high on a "tamarack" tree. This was the first wireless tried in the back country. Due to the success of these units, arrangements were made to secure larger sets from

the Navy in 1921. They were used successfully between two stations. While the radios worked fairly well, they were extremely bulky and heavy--not suitable for portable use in the field.

C. B. Sutliff remembered R. B. Adams' testing of early day radios. "Equipped with two of the first sending and receiving sets to come out, Adams went to the Kootenai National Forest to test them. Adams set up one set at the Ranger Station and sent a forest guard with the other set to a lookout point several miles away. Instructions to the guard were to get his set operating and then keep talking for 1 hour. The guard took along a book to read from, for the test. It was Darwin's Theory on Evolution. Adams almost had apoplexy because he could not stop the reader."

In the spring of 1927, Dwight L. Beatty, Forest Inspector in Region 1, conducted a demonstration from a site near Missoula to his home, using a small, portable, one-tube radio he had constructed. The demonstration was conducted as part of a fire conference in Missoula. Beatty was directed to follow up on the program during the fall and winter. At that time little had been done to test radio signal absorption due to green timber and mountains. Varicus experts were not very enthusiastic about the possibilities and offered no assistance. There was no suitable equipment available that would meet the radio specifications.

Securing equipment for the tests proved difficult, but two sets were finally received in September 1928. Not built to specifications, they were bulky and heavy and "the wiring was a mess." After the wiring was corrected, the first tests were made near Newport, Washington. Although the weather was bad, the tests indicated that a radio signal could

get out of the tall timber and provide useful communications. It was obvious that lighter, more compact, and more efficient apparatus was needed. The only way to obtain the necessary equipment was to design and build it. Satisfactory transmitter-receiver sets were constructed the following winter. Following a series of tests in 1929, the sets were considered adequate enough to continue with the project.

Design work started in January of 1930 on a new field set. The set was built and tested, and the Spokane Radio Company constructed several additional sets. They were delivered in June 1930.

These sets were used on the Columbia Forest in Washington. Seven portable sets were located at varicus points on the Forest and others were sent out with improvement crews. Although there were some problems due to interference and equipment failures, the project was considered a success.

Radio in the 1930's

In 1932, Bill Apgar was in charge of the Forest Service Savenac Nursery at Haugan, Montana. In addition to being a forester, he was an amateur radio operator. He was selected to conduct the early radio tests, and Regional Forest Inspector Frank Jefferson instructed him: "The experiment that I have in mind is that of using radio for the sole means of communication on fires remote from telephone lines and the general plan which I have in mind is that on call, you, with an assistant, will immediately proceed to the designated fire, install one radio set at the nearest telephone communication point, take the second set into the fire, and establish communication between the two sets. The portable sets will be for use in scouting service on the fire itself. In carrying out this assignment, you can expect to be called to any fire in the Region to which you can be expected to go, establish communication, and return within the 5-day limit."

A series of tests were made between Savenac and

Calder Ranger Station. Although the sets at Savenac were extremely low power, the tests indicated that with increased power some useful communications could be obtained.

Bill Apgar reported that, "The use of radio service in 1933 showed a decided advance over that of the previous year. Fire communications were still the major activities, but other uses have continually arisen and the results show that radio communication is becoming more and more important in Forest Service work. During 1933, 59 radio sets were in use in the Region."

In December of 1933, flood conditions destroyed main telephone lines in the Clearwater National Forest; radio filled the gap during this period. Radio communication was established in the spring and fall between the Savenac Nursery and various planting camps. Because of the equipment available in the 1930's, much better communications could be achieved using Morse code rather than voice transmissions. Apgar organized a group

of 26 amateur operators to provide communications for the 1933 fire season.

However, that fire season was very mild and none of the radio operators were used. They did get a good workout in 1934, which was a bad fire year.

But the 1933 fire season had demonstrated the potential for improved communications with a balance of both radio and telephone. It was determined that the Region needed a full time communications officer. Apgar was relieved of his Savenac Nursery duties and assigned to Misscula as the Northern Region's first full-time communications officer. Regional Forest Inspector Frank Jefferson outlined some of his duties:

"The job is to work out a proper balance of use between radio and telephones for communication purposes in this Region. Radio could be used effectively for: regular communication to guard, road, trail, fire, and other camps remote from existing telephone lines; for inter-District communication in areas where

atmospheric conditions interfere materially with telephone service; and for emergency guard communication where a considerable investment would be required to establish telephone service."

"Your immediate job is to get into effective use the radio sets which are now in the Region, and in doing this it should be kept in mind that we don't want to 'high-pressure' anyone into radio use. Radio must prove by demonstration to the satisfaction of Supervisors that it is the most desirable means of communications to meet a given situation."

Bert Morris related:

"It is easily understandable why the Forest Service switched from telephone to radio. For one thing it took great numbers of men every spring to maintain the telephone lines so they would work reasonably well. With the radio system, normally one radio technician could take care of the radio during the winter, replenish all the components, repair the radios, and have the system

operating for the summer. There was very little trouble for the people that used them. The system was extremely mobile--you could take it anywhere. The old telephone lines were restricted to where they had been put up, although emergency phones and wire could be stretched out several miles to a fire camp, but they did not give the communication system that radio did. Radio allowed you to talk with aircraft and people out on the fireline. As the wages for men and the cost of lines increased, the cheapness of radio became an advantage."

There were 102 two-way radios in use in the Region during the 1934 fire season. Some were in key locations on the Forests, and others were in fire cache units, ready for shipment to fires as needed. Eighteen licensed amateur radio operators were available in Missoula, Spokane, and Kalispell.

In 1935 the Missoula radio station was moved to the University of Montana campus. The following year a building was built on the Farviews hill in southern Missoula

overlocking the old airport. At the time this site was remote from electrical noise or interference for the high frequency AM radio systems then in use. This building was used as the Forest Service radio station for 36 years.

In 1971, the remaining radio equipment was moved to the Aerial Fire Depot west of Missoula, and the Farviews building was abandoned. This move was triggered by the shift from AM to very high frequency FM radios.

During the rest of the 1930's there was no great change in radio equipment, except for the addition of the SPF (Special Portable Fire) line of radios. These portable sets (in the 3 to 4 MHz. band) for field use were a real work-horse. They were still in limited use through the 1960's. A few sets in the 30 MHz band were also used; they were then called ultra high-frequency. These were AM sets and worked quite well over line-of-sight paths, but World War II ended further development of them. None are now in use in the Region.

Quality of Radio Communications

"By" Amsbaugh explained:

"Radios were not as foolproof as some might want you to believe. Mostly we needed expertise in setting up and operating the old SPF sets. A common occurrence was that someone was told to set up the radio and report in. If the aerial didn't fit between the two trees they picked out, they would cut it to fit. Of course the poor communication was always blamed on the radio, or the location, or that nobody was listening. It was never 'I fouled up the aerial.' In the early stages changes were coming so fast that new radio technicians were always adding various relays and resistors so that the set would get out of kilter and you couldn't talk across camp. Until you could get someone to remove all the extras and put the set in the same shape as when it was built, you couldn't do much with radio."

"Most of my contact came on fire use and many

times I wished for a one-way radio--one you transmit on, but it wouldn't receive--especially to Forest and Regional sets. But radios did contribute to a much closer correlation of crews on the fireline and enhancement of opportunities to avoid disasters."

Fred Fite stated that, "I was on many fires from 1934 to 1944 and never once did I have a radio on a fire that wouldn't work or that no one with a radio would answer. But up to the time of my retirement in 1962, I can't recall a single time when radios were a success between a fire camp and Regional headquarters. In the 1950's when the radio station was built and a Regional net set up, we had fairly good communications between the Forest headquarters and the Regional Office, but I must say that of the thousands of calls I sent and received, more than 90 percent were by telephone."

As a CCC boy in 1936, Bert Morris used the SPF (Special Portable Fire) sets.

"Typically with everything the Forest Service did in those days, it had to be portable by mule. It took two heavy boxes, or side packs, and the mule groaned when it was loaded down. The boxes were gray with red stripes going around them to indicate Regional fire cache material. One box held the radio, with tubes, and auxiliary equipment--a pair of tree climbers, belt, antenna, extensions, mike, the A-poles, and all the papers. The transmitter-receiver sat on top the battery box and there were connectors to get down to the batteries."

"The old SPF sets were basically a short-wave, AM-type operation. As such they required a good antenna. The prefabricated antenna was a T-type. On each end of the antenna was a long linen cord with a lead weight. To set it up, the operator would go to the nearest tree, throw the lead weight over one branch, go in the opposite direction to another tree, throw the lead weight over another branch, pull up the two ends, and tie them at the bottom of the tree. That would string the T-part of the antenna up

tautly. Then he'd bring the lead end down to his set."

"The microphone on this set was intriguing--it was also the loudspeaker for the receiver. The microphone was a little wooden box about 4 inches square with a very coarse brass screen in the front. Typically the way the radio was set up, the operator would have to get down on his knees, bend way over, get his lips close to the brass screen, and holler quite loud. In those days every call to a radio set had to be fully recorded in longhand. If the call went out the message was written in longhand before it was transmitted, and when a call came in it was copied in long hand. Both messages were copied with carbon and filed for later review."

"We thought radio was just about the ultimate in communication - for the boss to go over and write down a message, hand it to the radio operator for transmitting, and get a reply back within a matter of minutes."

"The SPF set used a lot of batteries. And in

those days the Forest Service had one word: "Do it cheap." The dispatcher in Big Prairie had figured out he could take all the old flashlight cells that hadn't been used the year before or hadn't frozen and solder them together to make his own radio batteries. The resulting pile was not beautiful but it worked."

Sam Billings told about his first experience with radio in 1936 at the Edna Creek fire camp:

"The radic worked very well, as I recall. We received a Weather Bureau forecast the third day of the fire that for accuracy couldn't be beat. They forecast that about 10 a.m. an east wind would start that would gust up to 30 miles an hour over the fire and that at about 11 a.m. we would get a light rain lasting for possibly half an hour. The wind blew the west side of the fire clear out of control, and for nearly an hour there was an awesome column of black smoke from that part of the fire. At 11 o'clock exactly, it started to rain and in a few minutes was dripping off the tarp covering the

radio; in 20 minutes it stopped but it was enough to give us control of the fire."

Bill Ibenenthal told about the SPF sets.

"Generally, they filled a real need on fires. If your base was located in a hole, it often happened that performance was spotty. Then too, the SPF usually came with an operator - usually a kid with an idea that he knew something about radios. When the kid started work he wanted to be a real reporter, and he would enjoy stirring up everyone with startling and imaginative details on the fire. We section bosses soon learned to tell them - no messages go out unless written by the boss!! Then, too, they thought pliers and a screwdriver would improve reception. Result was usually a blackout. That could be cured by telling the lad to leave the set works alone; if he caused it you to work, then he could take the messages out on foot."

Post World War II Radios

After World War II, development was directed towards FM equipment in

the 30-40 MHz band. No battery-operated radios suitable for lookout use were available commercially; the Forest Service radio laboratory developed the TF lookout set. It could be used either as a base station or repeater, and proved to be one of the finest radios of the time. By 1948 or 1949, several of these were in use on two or three of the western Forests; others were added in 1950. The SF (hand held portable) and the KF (mobile radio) were developed at about the same time. The SF had excellent range, but the set was poor mechanically and difficult to keep in operation. By 1960 most of these were phased out in favor of commercially available equipment, usually Motorola or RSMC (Radio Specialty Manufacturing Company).

Not all SF sets were discarded then as Bert Morris told:

"Louie Felton worked as a recreation guard at Lincoln and later as electronic technician. I remember back in 1960-61 when one of my old SF sets quit on me and I said, 'Louie, what can be done for this?' I knew

if I had to send it to Helena it would be 3 or 4 days before I got it back. Louie said, 'I'll take a look and see what I can do.' He opened the set up and said, 'Oh, here it is--there's a wire loose, I can fix it.' There was a maze of tiny wires running all over the place down in that radio set. Louie took a big old soldering iron and a blow torch and soldered that back together. The darn thing worked perfectly for the rest of the year."

"Morris recalled that after WW II we got into the days of the old FM sets. These sets were elongated square boxes. The sides were stainless steel. They had a bright shiny mirror finish on three sides so you could signal an airplane if the sun was out and you were at the right angle with the darn thing. Then someone could find out exactly where you were if you were talking to them and they were in the air."

"We also had the old M sets from 1946 to about 1953. It was a tall radio with lots of tubes in a black box. It had a few dials on it to twirl

and a microphone that looked like a 1918 telephone desk set. You had to put out a long antenna high in the trees that was every effective when properly installed. In fact, I believe that was the trouble--they were too effective. The FCC (Federal Communications Commission), about 1953, stated we were taking up too much of the band from commercial users, and that we had to get out of that frequency."

With the coming of good FM equipment, including repeaters, radios had a strong impact on Forest Service communications. Air patrols became more practical; many lookouts were eliminated. Some high frequency AM equipment was tried in aircraft, but it was cumbersome and not very useful or reliable. By 1956 most of the northern National Forests in the Region were well equipped with low band radios (30 to 40 MHz.) The Deerlodge and Beaverhead Forests were partially equipped with high band (162 to 174 MHz.) equipment. "Skip" interference in the low band was causing considerable interference. A long range program was initi-

ated to convert all systems to high band. The program was completed in 1972 with the conversion of the Lolo Forest.

Bert Morris used the FM set on the Lincoln Ranger District:

"The FM high band was supposed to stop skip. This skip was quite a phenomenon. Certain times of the year it would get real bad. The summer of 1961 was a bad fire year for the entire Region. One noon I was sitting in the office at Lincoln and heard a call for Lincoln and I answered. The call was for the Supervisor of the Lincoln Forest in New Mexico--the skip was coming in that good. The gal in the Supervisor's Office answered me back when I apologized for answering her call. She said they'd been listening to my traffic for 2 days and were doing their best to stay away from the band so that I could get through."

"The summer of 1951 we had a radio operator who was handling the FM from our base camp, and we were trying to get messages from the fire camp down to the base camp, and the skip was so

bad that we couldn't get through. Finally, this radio operator started using some rather rough language, and I told him that he could be canned for that. His answer was not printable. I don't know where the two lady lookouts were that were conversing, but they were exchanging recipes while we were trying to get priority fire traffic through, and it was understandable that the operator would get mad."

Bill Apgar, the Region's first communications officer, retired in 1954 and was replaced by Roy Weeman from the Rocky Mountain Region. Weeman died in 1956, and Bud Coats was assigned to the position. His first project was to design and construct a Region-wide radio net for aircraft communications, which was in use throughout the Region by 1958.

In addition to helping the smokejumper and aerial cargo dropping programs, the new air net was of great use to the retardant dropping program. Without good communications, such a program would have been extremely difficult to manage.

A radio fire cache unit was started as far back as 1933, and was gradually revised and improved. With the advent of portable FM equipment in the late 1940's, communications around firelines was greatly improved. But fire camp to Ranger Stations and other outside points, until the 1967 season, depended on the old high frequency AM equipment. During the bad 1967 fire season, some crude "service net" radio systems were developed using surplus low band equipment. Its success prompted the development of the successful high band service net units now in the cache.

The current Region-wide network of high band radios provides up-to-the-minute communications for Forest Service personnel, especially in fire control work. Since the 1930's, when Regional Communications Officer Bill Apgar was instructed not to "high-pressure" anyone into radio use, the radio has become an integral part of Forest Service communications.



Heliographs



While the heliograph was used by the Forest Service with only limited success, it did play a part in communications for a time. The heliograph is a device consisting of a tripod, two mirrors, and a shutter. Two people could communicate by reflecting the sunlight with the mirrors, using the Morse code, or a simpler code developed in later years. However, it frequently did not work that way. The following comments suggest it was universally disliked.

In 1967, Red Stewart wrote to the Northern Region News:

"In the summer of 1915, I was employed as a fire lookout on Hallard Peak in the Clearwater Forest, near the southern boundary of the St. Joe Forest. That was the first year, and insofar as my knowledge is concerned, the only year in which the Forest

Service, at least Region 1, employed that invention of the devil known as the heliograph. The heliograph was a communicating device, much used by the Army in its campaigns against the plains Indians. Some enterprising genius along about my era had a real brainstorm and came up with the idea that the heliograph would be a good communication technique to supplement the woefully inadequate Forest Service telephone line systems for fire reporting purposes. In the early winter of 1914 and 1915, forestry students at the University of Montana were interviewed as to our aptitude in the use of the heliograph. Well, we passed the course - not because we were proficient, but more because, as I recall, there were only four of us to be interviewed. We were promised jobs as fire

lookouts, effective July 15, 1915, and were instructed to learn the Morse code and to become proficient in its use."

"My assignment was Mallard Peak. This bare rock heap had been occupied as a lookout only the year before. It was totally undeveloped. The trail leading to it was little more than a game trail and barely passable. The map board was a wooden post wedged into the rocks with a wooden box top nailed to it. The heliograph was my sole means of communication."

"As I have said, the heliograph was an invention of the devil. The contrivance, mounted on tripods, had a mirror and shutter arrangement designed to enable the operator and receiver to send and receive messages in Morse code. Well, as Norman Mailer, the modern four-letter-word-user would say, 'Oh! dear!-- you just couldn't do it.'"

"For instance, if the day was cloudy you couldn't operate; and a partly cloudy day pretty well stopped you, too. We amateurs weren't any

great shakes as operators. This is how the gadget worked. You aimed the machines at your object and adjusted the mirrors to get the proper sun reflection. Then, with the shutter, you sent flashes and hoped the other guy would be alert enough to see and acknowledge. Then, you proceeded to transmit your message. In about 2 minutes, you could almost bet that your receiver would interrupt your transmission with the universal signal that either you were out of focus (the sun left you), or were behind a cloud, or that you were using your own code instead of Morse."

"So it went. I tried sending messages to Pot Mountain, many miles to the south, to Elk Prairie 20 to 30 miles to the north, and to Pole Mountain about 13 miles to the north. Only Pole Mountain responded with any degree of satisfaction."

"The summer rocked along without much lightning. However, in late August we had some, and I had a fire to report on the St. Joe. So, okay--the rusty heliograph! After

several attempts I finally alerted Whitey on Pole Mountain. I began 'Fire on--' Whitey interrupted--flash-flash--'out of focus.' I began again 'Fire--' but by then cloud cover. Then a few more attempts to transmit. As far as I ever got was, 'Fire on the north slope of--' before the cloud intervened and shut off all transmission. I said 'To hell with it' and took off to deliver the message in person 13 miles away. The above attempted correspondence took at least 1 hour. Anyway, I was damn sick of living alone at Mallard Peak and wanted the companionship of the lumberjacks at Pole Mountain where they had a real cook. Pole Mountain then was a St. Joe summer Ranger Station and was connected to Avery by a sometimes-working phone line. As far as I was ever to know, the use of heliographs in 1915 was an utter failure. I never heard of them being used again, and believe me I never recommended it."

"Now, I understand Region 1 has found a contraption of some kind--a contrivance of tripods and mirrors. They asked me what I thought it was,

and I told them it was one of those damned old heliographs and that they should throw it on the dump. Seems like they wanted to send it to the Chief as a museum piece though."

Stewart's letter was published in the April 5, 1968, Northern Region News. Soon afterward Albert Cochrell, retired Nezperce Forest Supervisor, was heard from:

"Red Stewart must have gone off on a timber survey job somewhere and forgot to take along a walkie-talkie or he would have known there was a 1916 chapter to his heliograph story. The adjoining Fish Lake District tried out the contraption in 1915 on Moose Mountain, Osier Ridge, and Blacklead Lookouts with results about like those experienced at Mallard Peak. However, in addition to Red's minor problems of the sun moving or a cloud shutting off the power supply, we also found that atmospheric conditions, or just plain gremlins, caused the Morse code dashes to break up into dots. Very confusing and inaccurate when trying to read a message."

"During the winter some enterprising Ranger came up with a new code comprised entirely of dots. So 1916 was a new deal and, with the late Karl Klehm on Osier Ridge and yours truly on Blacklead, we pretty well mastered the thing and exchanged messages almost daily throughout the season. Of course, there wasn't anything very exciting about shuttering your way through a long message and keeping the thing aimed right at the same time, but we could do it."

"This second chapter is about as brief as the first because I never knew of any organized effort to use the equipment again, but I didn't want Red to have all the credit for not being able to master the devil's own invention while the Army thinks it was great."

An article in Arizona Highways has this to say about the system:

"The first telegraph line in Arizona began functioning in 1871. It did not take the Apaches long to discover, however, how easy it was to cut the singing telegraph wires and thus communications.

General Miles' idea abbreviated such breaks. He installed heliograph stations on 7 strategically located mountain peaks across the territory. These flashing communications the Indians were unable to break . . . thus Miles' command soon achieved a coordination unheard of previously. One time the Miles stations transmitted a message 800 miles over impassable mountain terrain in less than 4 hours. Largely through this engineering accomplishment did the U.S. Army in that year (1886) bring to a close perhaps the most fantastic chapter in American warfare."

"Neither General Miles, his men, nor anyone else in those days would have believed it if anyone had predicted that, within 80 years, the Miles heliograph system would have proved itself a prototype of a highly sophisticated Space Age Communications System. Today everyone of the peaks used by General Miles as heliograph points is a relay point in the major microwave network that ties Arizona to the rest of the Nation and the rest of the world via almost

instantaneous radio, telephone, and television networks. One such station is called Heliograph Peak."

"Just be patient, Red. Possibly some day Mallard Peak will be a worldwide relay station for some communication system not yet thought up."

This was too much for Jack Parsell, who wrote:

"I am happy to learn that Albert Cochrell and Carl Klehm were successful in the operation of the heliograph. I didn't know that anyone had ever made the silly thing work."

"In 1917, I was assigned the lookout job at Fish Butte on the old Selway Forest, now a part of the Clearwater Forest. The Ranger packed in our camp and placed it in the saddle about 1 mile northwest of the lookout. He told me the lookout equipment was in a certain package and that full instructions for the installation and use were included. He then took off and left me to figure the whole thing out."

"The package contained a map board, an alidade, the necessary forms, the heliograph, along with all necessary instructions for their installation and use."

"It was quite an undertaking for me, since so far as map reading was concerned I didn't know a contour from a bull track. I finally learned to orient the map board and make some locations, but that heliograph really had me beat. I must have had the same trouble as the fellow on Coolwater Lookout with whom I was to communicate. He would no more than get started when it would appear as though the sun was setting and go out of sight. We never succeeded in getting a message through. One day I spotted what appeared to be a smoke near Rocky Ridge. I took a reading and tried to report to Coolwater. Again I failed, and after about an hour of trying, I took another look at my fire. It had not increased in size but had moved about 2 miles up the ridge. I concluded it was a band of sheep moving to a new range."

In this case the heliograph saved me the embarrassment of sending in a false alarm."

"This adds another chapter to the heliograph, 1 year later than Albert's and Carl's experience with the device. Maybe someone else has a later date."

Jim Urquart had the last say:

"Red Stewart, Albert Cochrell, and Jack Parsell, please move over and make room for another heliograph operator."

"During the summers of 1916 and 1917, I served as smokechaser at Pot Mountain, Clearwater National Forest, and was exposed to the heliograph. In 1916, the lookout at that point was a man who had training and experience with this equipment in the Army Signal Corps. The heliograph provided was in one piece. We used Morse code. Heat waves, or something, made dots out of the dashes. In 1917, we had what appeared to be better equipment, larger mirrors, a shutter on a separate tripod, and an improved code. Primarily, we tried to

communicate with Sheep Mountain and the Nub Lookout to communicate with Sheep Mountain and the Nub Lookouts. We also tried Osier Ridge, Moose Mountain, and I recall a few weak flashes from distant Black Mountain.

"About midseason 1917, we received a night telephone message stating that Henry Thompson had been killed near Pierce, Idaho. Henry Knight, Thompson's stepson, was the smokechaser at the Nub. We were asked to send a message informing Knight and asking him to meet the late Ed Gaffney with horses at Dead Horse Camp. We started signaling the Nub shortly after sunup and were surprised by an immediate and splendid flash. We sent the message. In due time, back came the code for 'repeat last message.' We repeated. Then came the code for 'I understand.' Knight made the trip which required crossing the canyon and river, North Fork of the Clearwater, many miles with no trail. After many, many hours of effort extending over a period of two summers, we had this one outstandingly successful experi-

ence with a heliograph. This message was, no doubt, our most urgent one. Possibly well trained operators could have done better. Now a kind word in behalf of this GI equipment. Sitting in the hot sun hour after hour, day after day, could produce a coat of tan equal to any seen on a beach."





Conclusion

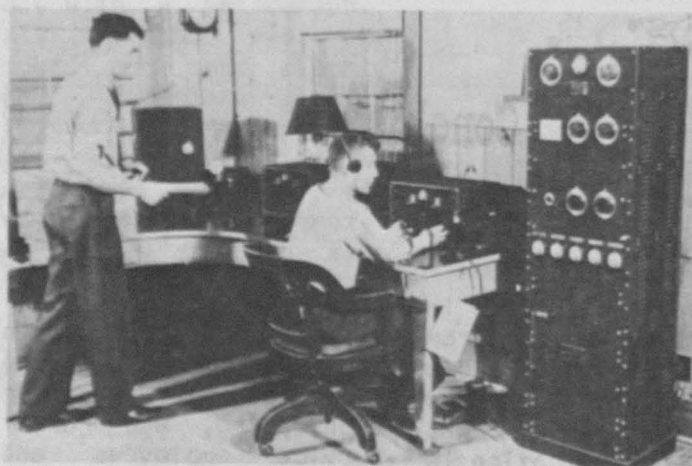


Communications systems in the Northern Region from 1910 to 1977 have had a lively history. The telephone system was vital to communication in the vast, remote, forested lands of the Northern Region in the early years. In 1948 there were 12,650 miles of phone line in the Region; by 1977 the mileage had been reduced to 1,164. Heliographs were used on lookouts in some areas, but not to any great extent. Although the first recorded use of radio by the Forest Service in the Region was in 1919, the radio did not come into widespread use until the 1940's. Today all Forests in the Region are equipped with high band radio equipment.

The world is now connected by complex, sophisticated communications systems. Tales of the early days when the Forest Service was setting up communications

recalls an era now lost--where mules packed in the equipment, phone lines had to be restrung each spring, and Forest Service employees and area residents could follow all the local developments on the "party line."





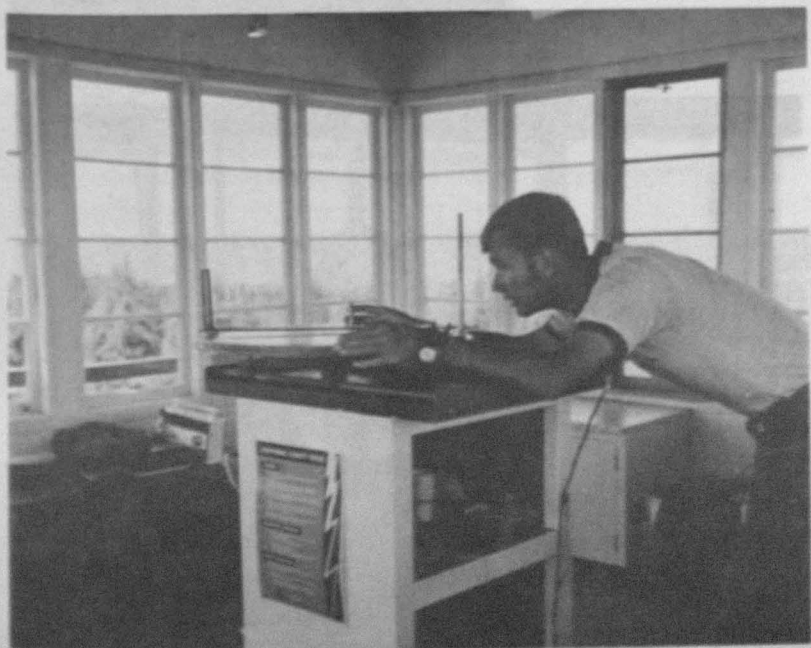
Operating the Missoula Radio Station, 1937.



Region I's radio station, Missoula, Montana, 1938.



Hogback Lookout, Helena National Forest, 1969.

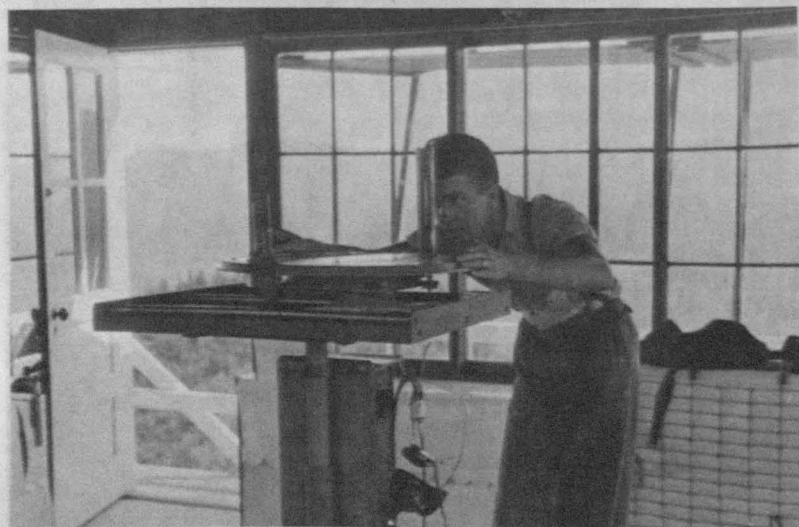




Lone Mountain Lookout, Gallatin National Forest, 1921.



Lookout construction, 1929.



Cold Mountain Lookout, Coeur d'Alene National Forest, 1939.

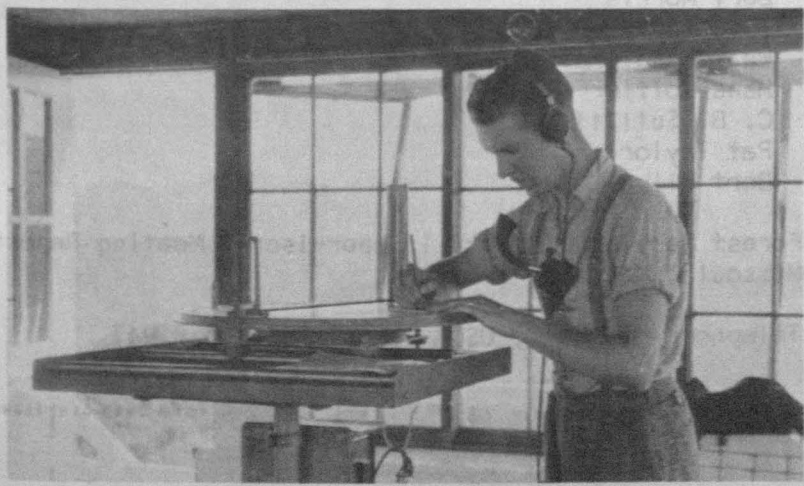


The following forest
stories to this history

John Amisegger
"Oy" Westberg
Sam Billings
Fred Barnett
"Ole" Cox
"Smoky" Cunningham
Gordon Dougherty
C. H. Davenport
"Cap" Evans
Sam Evans
Fred Fitz
Lester Gardner
Ray Haring
Bill Hentzel
Karl Kautsky
Ross Kautsky
William Moore
Bert Morris



*Cold Mountain Lookout, Coeur d'Alene National Forest,
1939.*





Sources



The following Forest Service retirees contributed stories to this history:

John Aemisegger
"By" Amsbaugh
Sam Billings
Fred Burnell
"Del" Cox
"Smokey" Cunningham
Gordon Daugharty
G. H. Duvendack
"Cap" Evans
Sam Evans
Fred Fite
Homer Hartman
Ray Hilding
Bill Ibenthal
Karl Kaufman
Ross Middlemist
William Moore
Bert Morris
Theo Paullin
Walter Peterson
Hans Roffler
C. B. Sutliff
Pat Taylor
Bert Wilke

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