HOW THE FIRES WERE FOUGHT

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(Forests in District 1 were the scene of the terrific fires which, in the absence of sufficient trails and equipment for communication and fire fighting, were swept beyond control by the cyclonic winds of August 20 and 21 and, besides devastating some of the finest virgin timber in the country, cost the lives of seventy-four of the temporary force, injured many other persons, destroyed many millions of dollars worth of property, and lost to industry hundreds of thousands of dollars more in wages. Every circumstance which attended the origin and behavior of these fires proved beyond all doubt the ability of the Forest Service completely to protect the National Forests as soon as the Forests are fully equipped and manned for protection—and not before.—Ed.)

CHARACTER OF THE COUNTRY

District One of the Forest Service, with headquarters at Missoula, Montana, includes all of the National Forests in the panhandle of Idaho and in Montana, North Dakota, Minnesota, and Michigan. It includes 28 National Forests with an aggregate area of 29,918,043 acres. The main continental range, from whose crest the rain and snow waters make their way westward to the Pacific and eastward to the Gulf, divides the district into two natural divisions. A striking contrast exists in the type and character of the country on the east and west of the divide; and this contrast has such a vital bearing upon the fire situation that in order to understand the great fires of the past summer and the difficulties encountered in controlling them, a clear picture of the respective types of country is essential.

East of the divide the timbered areas are broken by open parks, the solid bodies of timber being confined mainly to the north slopes. The predominating species, lodgepole pine, although forming extremely dense thickets in early life, opens up somewhat as the stands grow older and carry little underbrush. The red fir and yellow pine types are open stands in which little undergrowth is found and through which travel is fairly easy. In this type of country it is possible to travel at a fairly rapid rate, either on foot or with horses, by working through the timber and open parks and along the bald ridges.

SLOWNESS OF TRAVEL

In striking contrast is the country west of the divide, which includes in this district Northwestern Montana and Northern Idaho. Heavy dense timber with heavy undergrowth and with very few, widely scattered mountain meadows, is the characteristic type of country. The predominating species are Western white pine, cedar, larch, fir, and hemlock, all of which grow in dense stands and through which, both on account of the underbrush and windfallen timber, travel with a horse is, without trails, a physical impossibility, and by foot, with a pack on one's back, a most arduous and tedious task.

Where open areas occur and travel is possible, even without trails, as in the forests of Eastern Montana, fires can be controlled if sufficient patrol is maintained during the dry season, largely because the fires can be reached shortly after being discovered. The best proof of this is the fact that no fires of any size got beyond control even during the very dry and windy season just closed, east of the divide. Many fires occurred,

but were reached and quickly put out or trenched and brought under control before attaining serious proportions or doing any large amount of damage. The point is that these fires were discovered and reached very shortly after they started, and were, therefore, controlled with comparative ease.

DIFFICULTY OF FIRE CONTROL

Fire control in such a territory, however, as the dense forests of western Montana and northern Idaho, is a most serious and difficult problem. All the big fires of this year occurred in this type of country, for very obvious reasons—the density and unbroken character of the timbered areas and the extreme difficulty and in many instances impossibility of getting to the fires when they were small.

There is only one way to meet this problem with any degree of success, and that is by increased patrol in the heavily timbered areas, with means of rapid transportation and communication in the form of trails and telephone lines. Fires must be discovered when they are small. Discovery, however, is but one factor, and although a most important one, it availeth little if after a fire is discovered it is impossible on account of inadequate transportation facilities to get to it. This is exactly what occurred during the past season. Many fires were discovered by patrolmen, but before even they themselves could get to them assumed proportions which made a large crew and an organized fire camp necessary

In many cases twenty or thirty miles of trail had to be cut before supplies and men could be put in to check the fire. Five miles per day is a high average for trail work, which in country of this character is the very roughest kind. The only available means of transportation is by means of pack horses, and in order to use even this method trails are absolutely essential.

Only one other known method can be used, to pack the supplies and equipment on man-back, but here, too, trails must be had. It is possible, of course, for a man to meander his way through the brush and windfalls with a 30 or 35 pound pack on his back, but when a number of the large mountain fires are 15 to 100 miles distant from railroads, and in many cases without trails, a man cannot be expected to make his way by hard work through the tangle of brush and dense forest at the rate of 10 or 15 miles a day and then be ready to fight fire when he reaches the scene of action. He is too badly in need of a rest before tackling the hard trenching work on a fire. Fresh men must be had in order to be effective. With a comprehensive, well-coordinated system of trails and telephone lines this can be accomplished.

THE PROTECTIVE FORCE

Each National Forest under the jurisdiction of a Forest Supervisor, with his Deputy and Forest Rangers and Forest Guards, is a unit of 1,000,000 or more acres, in some cases more than 2,000,000 acres. This means a tract of land about 75 miles long by 40 to 50 miles in width, or from 1,800 to 3,500 square miles. The country is rough and mountainous and hard to travel over.

An adequate patrol force for the heavily timbered forests should contain at least one man to every 30,000 acres. On the more lightly timbered forests east of the divide one man to every 50,000 or 60,000 acres has proved sufficient. To patrol this area good look-out points on the prominent peaks are selected, from which it is possible to see a large scope of country. Trails along open ridges are used wherever possible in connection with these look-out points.

Another important part of the protective work is the patrol of trails frequented by campers and hunters. Constant patrol during the dry season along the rights-of-way of railroads traversing the forests is one of the most important features of this work.

EQUIPMENT REQUIRED

With a well-distributed patrol force and a coordinated system of trails and telephone lines, the question of location and control is largely covered with one

Back-firing in the Bitterroot Mountains

exception—equipment. As a fire department in a city maintains engines, men, and horses, as a form of insurance against loss of city property, in no less degree is it necessary to be adequately equipped to meet a fire in the forests. There must be men, tools, and pack-trains immediately available if the fire is to be controlled, and it must be reached when it is fairly small.

During the past fire season there were at one time in the field in Northern Idaho and Northwestern Montana, on the National Forests, approximately 300 hired pack horses. This, of course, was during the very worst conditions, when the woods were as dry as a tinder box and fires badly scattered. The securing of these pack-trains was one of the chief sources of delay in getting men and supplies to the fires. By equipping each Forest with horses where transportation facilities make it imperative, this delay can be largely obviated. In addition to the horses, caches of tools, consisting of shovels, mattocks, axes, and saws, are distributed throughout the Forest. These emergency caches are for equipping at least 10 men.

UNCOMMONLY DRY SEASON

Usually the fire season begins about the latter part of July and lasts through August and early September. This year no spring rains occurred and the country began to get dry by early June. Steps were taken to prepare for a bad year. Extra patrol was put on. Co-operation was planned and effected with railroads and lumber companies, and people were warned to be very careful about burning brush to clear land. In spite of all precautions, fires originated from the burning of brush, from locomotives and logging engines, from campers, and from lightning.

The practically unbroken drouth during June, July, and August was accompanied in many localities by dry elec-

Pack Train in the Bitterroot Mountains

trical storms and almost incessant high winds. By the fifteenth of July serious fires were burning on nearly every Forest west of the continental divide, and many more starting every day.

EMERGENCY FORCE AND EQUIPMENT

By the middle of July over three thousand extra laborers were employed on the fire lines in Northwestern Montana and Northern Idaho. This force had been secured, equipped, and organized for work in the space of from two to three weeks. The labor markets of Missoula, Spokane, and Butte had been called upon, and furnished the bulk of the men. Tools, thousands of mattocks, shovels, and axes, were drained from the mercantile stores wherever available, until their supplies were exhausted and special orders had to be rushed through in order to complete the equipment of the men.

The country had been scoured for pack animals, and trains of from 5 to 40 horses each secured to transport the supplies and equipment of the fire fighters into the hills. The heavily timbered country afforded practically no feed for the horses, and the packing of horse feed, besides the supplies and equipment, had to be provided. Experienced packers had to be obtained to handle these trains in the hills. Any one familiar with western mountains will appreciate the importance of this one item alone.

The inaccessibility of the territory lying immediately contiguous to the Idaho-Montana divide in the Clearwater and Cœur d'Alene Forests made it necessary to equip the pack trains in Montana and have them drop over the divide on to the Clearwater and St. Joe River drainages. Trails from the Montana side were accessible, but when the top of the divide was reached, in most cases trails had to be cut to get the pack horses through. With this done and

the camps established in the field near the bigger fires, reconnaissance to locate any other fires had to be made. Fires were located, but owing to the impossibility of getting a pack train and supplies into them without trails, they had in some cases to be left burning.

FATAL DELAYS

With adequate patrol, trails, and telephone communication, these fires ought to have been discovered and somebody been on the ground within 5 to 8 hours after the first smoke was seen; instead, it actually took from one to five days. If help was needed after the fire was reached, the Forest Guard or Ranger would have, without trails or telephone lines, a trip of from 30 to 60 miles on foot to get it. This would consume from 1 to 3 days. If necessary to return with a bunch of men, imagine crawling through the brush with packs on your backs to get to a fire, or else cutting out miles of windfall and brush.

Think of the time consumed! Fire has the peculiar faculty of showing no disposition to wait. Perhaps on account of this delay a fire which in the first place covered only a few acres has in the absence of any restraining influence covered one or two thousand acres, or perhaps fifty thousand acres. Don't think this improbable; visit some of the great areas of charred stumps and snags, where once stood timber worth on the stump from $2.00 to $4.50 per thousand board feet. These were some of the difficulties encountered in the dry season of 1910

THREE THOUSAND FIRES PUT OUT

By the middle of August, over three thousand small fires had been put out by the patrolmen and over ninety large fires brought under control by organized crews of from twenty-five to one hundred and fifty men. Fires once brought under control were repeatedly fanned into new life by high winds, and racing up into the crowns of the trees, jumped across the trenches which restrained them.

The weary fighters had to drop back and throw up a second or third or even fourth line of defense. New fires were starting every day, and the dense smoke made it extremely difficult to locate them, except when close to roads or railroad rights of way. With the force of men in the field, however, assisted efficiently by ten companies of Federal troops, and the organized pack-train system of transportation, most of the fires were well in hand on Saturday, August 20.

WHEN THE HURRICANE CAME

On the afternoon of that day a hurricane, strong enough in many localities to uproot whole hillsides of timber and force men out of their saddles, swept over the Forests adjoining the Montana-Idaho state line. The gale continued for fully twenty-four hours and fanned every smouldering fire in its path into uncontrollable fury. They flamed up into the crowns of the trees and spread through the adjoining timber, much of which was uprooted before the fires reached it, with incredible rapidity.

The roar of these fires was heard for miles and was likened by some of the Rangers in their path to the noise of a thousand freight trains crossing simultaneously as many steel trestles. At many points these fires jumped rivers a quarter or half a mile wide, and in several instances leaped across canyons a mile or more in width, from ridge to ridge, leaving solid strips of green timber untouched.

Cinders, ashes, and burning embers were carried many miles. The nearest fire to Missoula, Montana, was about 12 miles, yet cinders as large as robins' eggs fell in the streets, and the clouds of smoke and ashes were so thick that the electric lights were lit at 3 o'clock in the afternoon. The sun shining through these clouds gave a vivid, lurid glare as of a great conflagration. For many days it shone only as a great round blood-red disk.

WHERE THE MEN WERE KILLED

It was the top fires of August 20 and 21, driven by cyclonic winds, which wrought the destruction of life and property in Idaho and Montana this summer. Within forty-eight hours a strip of country along the Bitterroot Mountains, at least one hundred and twenty miles in length, extending from the Clark's Fork River to the head of the Selway Fork of the Clearwater, and from twenty to thirty-five miles in width, was more or less completely burned over. Seventy-four employees of the Forest Service, all temporary laborers, were killed, and as many more injured.

The rescue of the injured and missing men and of the settlers and prospectors and others endangered in the mountains necessarily took precedence over fire fighting for several days, but by August twenty-fourth the combat with the fires was resumed at nearly all points and continued until the early September rains largely eliminated further danger.

Of all the causes of forest fires, lightning alone is not controllable. It is, however, possible by an adequate system of patrol, communication, and transportation, to discover and get to all fires soon enough to put them out. Since lightning is one of the most prolific causes of the more remote fires, the importance of catching them when they are small cannot be too strongly emphasized. But the inadequate trail systems on the Forests, owing to the size of the country and the insufficiency of funds to build any but those of the most urgent character, made it impossible to get to a great many of these fires until under the stimulus of the winds and dry weather they had become too large to be handled by a few men.

It is exactly analogous to the position a city fire department would be in if the streets were kept continually blocked and each time a call was made work would have to be done to clear the streets before the engines could reach the fire. Is it necessary to emphasize the importance of sending in the alarm quickly and getting after the fire before it gains headway? If the Forests are to be protected from fire, trails must be put through them.

THE SECRET OF FULL CONTROL

Summarizing the essential things to do to make the location and control of fires in the National Forests possible:

(1) A comprehensive system of ridge and stream trails which extend over the entire Forest. These trails average in cost from $60.00 to $100.00 per mile, with an 18-inch tread and 8-foot clearing. Each Forest should eventually have from 200 to 400 miles of trail.

(2) A system of well-selected look-out points and ridge trails, so coordinated as to give primary control of all districts for locating fires.

(3) A coordinated system of telephone lines extending up the main streams and tapping by tributary lines the look-out points.

(4) The purchase and maintenance of pack horses fully equipped with pack saddles. These horses can be used for building trails and, when the emergency arises, put on duty packing fire supplies.

(5) The location of caches of tools throughout the Forest at strategic points. These tools should consist of mattocks or grub-hoes, saws, axes, and shovels, enough to equip 10 men from each cache.

(6) A patrol on heavily timbered areas of at least 1 man to 30,000 acres, and in the more open regions of 1 man to 50,000 or 60,000 acres.

TRENCHING AND BACK-FIRING

So much for general control. Now as to the methods of fighting the fires when reached.

Fires are of two classes—ground fires and top fires. The ground fires are always the first to start, and the top fires occur only under high winds. Fire runs up hill rapidly under high winds. Trenches from 2 to 4 feet wide are dug down to mineral soil and all the inflammable brush and débris possible thrown away from the fire in order to give the men an opportunity to make a stand. If

the fire is creeping very slowly it can usually be stopped upon reaching this line. If fanned by a breeze, it is necessary, if the wind is in the right direction, to start fire all along the trench and back-fire.

The trenches are located along the ridges or follow the contour of the hills. Advantage is taken of streams and other natural fire breaks, such as rock-slides, to help out in making the trenches. In many cases back-firing is done at night, even against the wind, by clearing out the timber to a width of 20 feet along the trench. The clearing of the timber is to prevent a flare-up and jump across the line.

FIRE-FIGHTING CREWS

Individual fire-fighting crews include from 12 to 20 men. These men are equipped with mattocks, axes, and shovels. The proportion of each kind of tool varies in accordance with the character of country. In open yellow pine, shovels are mainly used. In dense cedar, hemlock, and white pine, mattocks and axes are most useful. Each crew is equipped with 2-man cross-cut saws to cut out large fallen timber. With a 20-man crew in dense timber the distribution is about 10 mattocks, 5 shovels, and 5 axes. Enough shovels, however, must be provided to supply each man, since the shovel is the most effective tool after the trenching has been done, and patrol on the trench to hold the fire from crossing is the important work.

Depending on the country, a crew of 20 men can cut from ¾ to 1½ miles of trench in a day. It is clear from this why so many men are required on the fire line. A large number for a short period is essential in order that the fire line can be put in as quickly as possible.

In placing the fire trench many experienced fire fighters differ; some fight up close to the line, not giving any more than they can help; others get ahead of the fire line and trench and back-fire to stop it. The method of fighting close is most applicable when the fire is creeping slowly down a hill. On account of the fires' quieting down at night, the close fighting can usually best be done at that time. In all of the methods the object is to get the ground fire surrounded on all sides by a trench dug to mineral soil and all inflammable débris removed so that it cannot cross the line.

Fighting ground fires is hard, mean work. Digging through the forest litter and usually rocky soil in the heat of an August day, with the smoke and ashes smarting the eyes and irritating the throat, is no child's play. There is no danger until high winds change the ground fires to top fires. The violence of a top or crown fire depends upon the one factor upon which the failure or success in holding a fire depends—the wind. There is no known way to fight a fire of this character when the wind is very high, except to back-fire from a considerable distance, where advantage can be taken of natural barriers, such as roads or bare ridge tops.

FULL CONTROL POSSIBLE

The question will be raised as to whether it is possible to protect these areas from fires and whether or not it is worth while. Appreciating even the full significance of the catastrophe of this year, there is not the slightest doubt but that with an adequate trail, look-out, and telephone system, and a sufficient equipment of tools, the fires can be controlled. The fundamental factors in the whole situation are telephone communication, trail transportation, and man patrol.

Now, granting the practicability of locating and controlling fires, the question, "Is it worth while?" has been raised many times. The estimate of valuable timber in the present district of periodical fires in the National Forests of Northern Idaho and Northwestern Montana is approximately 80 billion feet. Conservatively valued at $2.50 per thousand feet, this represents a total money value of some $200,000,000. The recent fires covered two watersheds where sales had actually been made aggregating in stumpage value $850,000.

This timber has all been killed by fire, resulting in an actual reduction in stumpage value of at least a half, which represents a loss of $425,000 to the nation. Probably not over 50 per cent of this timber can be sold in its present condition, which increases this loss to over $600,000. These sales aggregated 200,000,000 feet, and for every one thousand feet lost, there is lost $10.00 in wages to the community. Realize, please, that this represents but two small watersheds not aggregating over 15,000 acres. These two areas are selected because they represent not estimates but actual purchase prices obtained under competitive bids.

The immediate work which now faces the Service in this district is the disposition of the dead timber while still merchantable. The mapping, estimating, and appraisal of the burned areas is being aggressively pushed in order to prepare for sales as soon as possible.

THE FIRE FIGHTERS

By Arthur Chapman

"Where's Smith and Hennessy, Edwards, Stowe—
  Where's Casey and Link and Small?"
The ranger listened, and murmured low:
  "They're missing, Chief, that's all.

"Where the smoke rolls high, I saw them ride—
  They waved good-bye to me;
Good God! they might as well have tried
  To put back the rolling sea.

"I rode for aid till my horse fell dead,
  Then waded the mountain stream:
The pools I swam were red, blood red,
  And covered with choking steam.

"There was never a comrade to shout 'Hello,'
  Though I flung back many a call:
The brave boys knew what it meant to go—
  They're missing, Chief—that's all."

—*Denver Republican*