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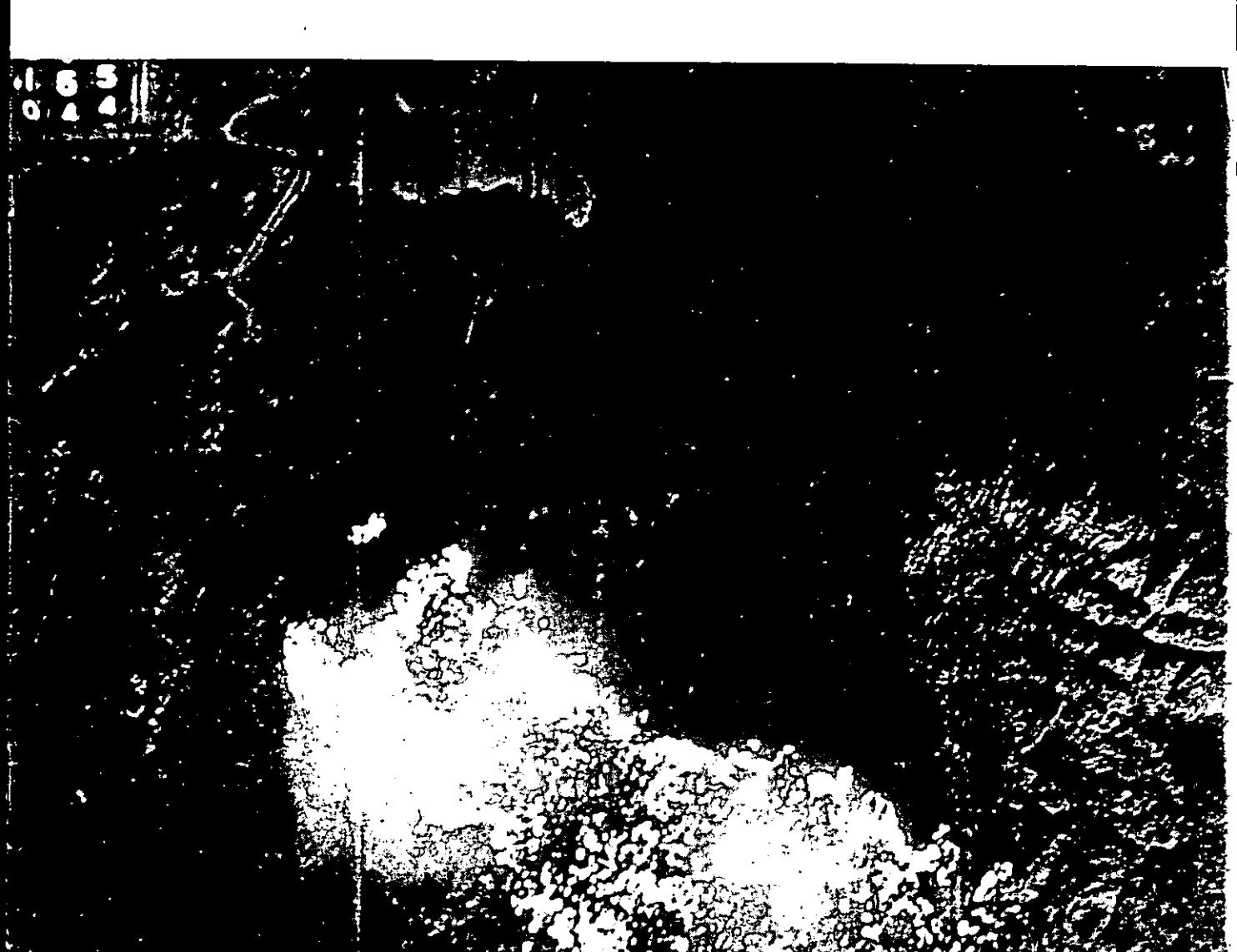
FIRE CONTROL NOTES

U.S. Department of Agriculture
Forest Service



FIRE CONTROL NOTES

A quarterly periodical devoted to forest fire control

CONTENTS

Cover—**Infrared imagery of the Gilkinson Fire, Wallowa-Whitman National Forest, Oreg., at 8 p.m., July 22, 1963. Aircraft was 8,000 feet above terrain. This imagery is transferred to aerial photos and maps to give fire bosses up-to-date information on fire perimeter, spot fires, and hot spots. See story on page 3.**

(NOTE—Use of trade names is for information purposes and does not imply endorsement by the U.S. Department of Agriculture.)

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INFRARED—A NEW APPROACH TO WILDFIRE MAPPING

ROBERT L. BJORNSEN, *Forester, Northern Forest Fire Laboratory, Intermountain Forest and Range Experiment Station*

Introduction

For campaign fires, accurate and quick intelligence is needed on the location of fire perimeters and spot fires. The fire boss and his staff need this knowledge to effectively maneuver manpower, equipment, and logistical support—particularly during critical fire periods. Airborne infrared fire mapping may provide a major advance in fire intelligence.

For 3 years, personnel of Project Fire Scan, a special program of the Northern Forest Fire Laboratory, have been testing an airborne infrared scanner. The U.S. Department of Defense is cooperating in the program, and the Electronic Command, U.S. Army Material Command has supplied the infrared equipment used in a Forest Service aircraft. Because results may significantly affect civil defense, the Office of Civil Defense is providing financial assistance and technical consultation.

Airborne Infrared Mapping

Individual sorties are scheduled so the fire boss will have optimum information. As the aircraft flies over the fire area, the scanner picks up the infrared energy emanating from hot burning fuels and surrounding terrain. The energy is converted to an electrical signal that is subsequently amplified by special electronics and re-converted to a visible light signal displayed on a cathode ray tube. Polaroid photographs of the cathode ray tube are then made. The resulting thermal imagery provides clear detail of the fire perimeter, hot spots, small fires outside the main fire perimeter, and terrain features.

When a sortie is completed, the infrared imagery is placed in a plastic tube and dropped to an imagery interpreter at fire headquarters. Perimeter and spot fire intelligence is then transferred to aerial photos and maps of the fire area. The average time from the start of a sortie until intelligence is transferred to maps is 2 hours—1¼ hours of flying time plus three-fourths of an hour for interpretation of the imagery. This interval will be reduced when operational scanners can produce better imagery in less time.

Program Accomplishments

Twenty-three wildfires, ranging from a few acres to many thousand acres, were mapped by the Project Fire Scan infrared scanner during 1962, 1963, and 1964. Fuel types varied from grass in Nevada through brush in California to mature coniferous timber in Montana. Character and control status progressed from uncontrolled spotting fires to creeping fires in the late stages of mopup. Because of dense smoke, instrument flying was often required, and much useful imagery was also obtained during darkness. Figures 1 and 2 compare results obtained from normal aerial photography with those provided by use of the infrared technique.

Figure 1.—Conventional oblique aerial photograph, Coyote Fire, Los Padres National Forest, Calif.

Figure 2.—Infrared thermal imagery through heavy smoke, Coyote Fire, Los Padres National Forest, Calif.

Improved Scanner

The experimental infrared scanner used does not meet requirements for size, weight, angular resolution, reliability, and imagery quality. A prototype scanner designed specifically for airborne infrared fire mapping will satisfy these requisites. Performance tests on the new scanner will probably be completed by midsummer 1965. Analysis of the fire-mapping capability of this scanner will be the basis for preparation of production model specifications. This scanner may be available for purchase and use during fire season 1966.

Capabilities and Limitations

Recognition of the capabilities and limitations of infrared scanning is a necessary prerequisite to effective use of the scanner as a fire-mapping tool. Use of infrared fire mapping permits the following:

1. Mapping of fires day or night.
2. Mapping of fires through dense smoke and smog.
3. Rapid surveillance during critical periods.
4. Accurate plotting of fire perimeter and spot fires.
5. Prompt determination of rate of spread.
6. Under smoky or nighttime conditions, determination of physical changes made by man since the last aerial photos were taken.
7. Perimeter intensity intelligence for efficient deployment of mopup forces.

The major limitations of infrared fire mapping are few, but important:

1. Infrared energy does not penetrate solid matter, cloud cover, or fog.
2. Few specially trained infrared imagery interpreters are available.
3. As with any airborne reconnaissance, extensive smoke pall from large fires can create aircraft navigational problems.

Conclusions

Test flights have demonstrated that campaign fire intelligence requirements can be met rapidly and accurately with airborne infrared scanners. Among other benefits, fire perimeter and spot fire intelligence from airborne infrared scanning will remove one of the fire boss's greatest problems, i.e., knowledge of the fire's location, particularly after a blowup has occurred. Airborne infrared scanning cannot solve all fire intelligence problems, but it is intended to supplement normal ground and air reconnaissance.

INFRARED FIRE DETECTION

Airborne infrared scanners also have shown great potential for fire detection. However, before this potential can be exploited, research must answer many questions about the relationships between detection probability, fire size, view angle, and vegetation characteristics. A major effort in fire detection research at the Northern Forest Fire Laboratory is directed toward these problems.*

*Hirsch, Stanley N. Infrared as a fire control tool. West. Forestry and Conserv. Assoc., West. Forest Fire Res. Council Proc.: 5-10. 1962.

CANADIAN INFRARED SCANNER

Canadian Department of Forestry,
Ottawa, Canada

An infrared scanner that may greatly improve forest fire detection in Canada will be tested this summer in the Ottawa area.

The scanner will be carried on regular fire patrol flights by aircraft of the Quebec and Ontario Departments of Lands and Forests. From mid-June through mid-August, the scanner will be flown by an aircraft of Quebec's Forest Protection Service. For the next 2 months of the fire season, the device will be carried on an aircraft of the Ontario Forest Protection Branch. The project is being co-ordinated by the Federal Department of Forestry.

Small fires may be pinpointed before they can be seen. The scanner is designed to record very slight differences in ground temperature on the terrain being scanned. These variations will activate a light signal or sound signal, or both, within the aircraft. The scanner also will produce a continuous thermal photograph or map of the terrain, permanently recording the precise location of hot spots.

A NEW EXPERIMENTAL FIRE AREA IN SOUTHERN CALIFORNIA

JOHN D. DELL, *Fire Research Technician, Riverside Forest Fire Laboratory, Pacific Southwest Forest & Range Experiment Station*

Forest fire research gained a new outdoor laboratory with the recent transfer of 13,000 acres of southern California chaparral from the Bureau of Land Management to the Forest Service. This site, known as the North Mountain Experimental Area, is in the San Jacinto Mountains. It is administered from the forest fire laboratory in Riverside, and is connected to the laboratory by roads open yearlong (fig. 1).

Site and Facilities

North Mountain is typical chaparral brushland. Elevations range from 1,500 to 4,357 feet. Three extensive drainages divide the area into a complexity of terrain representative of much of southern California's mountainous fire hazard areas.

The area will provide a site for testing materials, conducting demonstrations, and training firefighters. Seven hundred acres has been allocated as a testing site for the Forest Service Equipment Development Center at Arcadia, and 1,200 acres will be used for training firefighters. A small, functional administrative site, including a shop and warehouse, will be developed to facilitate and service projects. Additional access roads have been proposed for prospective study areas. A network of heliports and helispots will provide additional accessibility to the area, both for protection and research. The area can be used for cooperative research by other Federal agencies, by State and local fire organizations, and by university research groups. Research will not be limited to local problems; general fire control knowledge will also be sought.

Fuel-Break Construction

Since 1954, the California Division of Forestry has intensely treated land at North Mountain. Large areas of dense, highly flammable brush have been broken up by a network of strategically placed fuel breaks (fig. 2). These are wide strips of land from which heavy fuels were removed and replaced with lighter cover that offers less resistance to fire control (fig. 3). Nearly all of these fuel breaks are accessible via a well-planned road system.

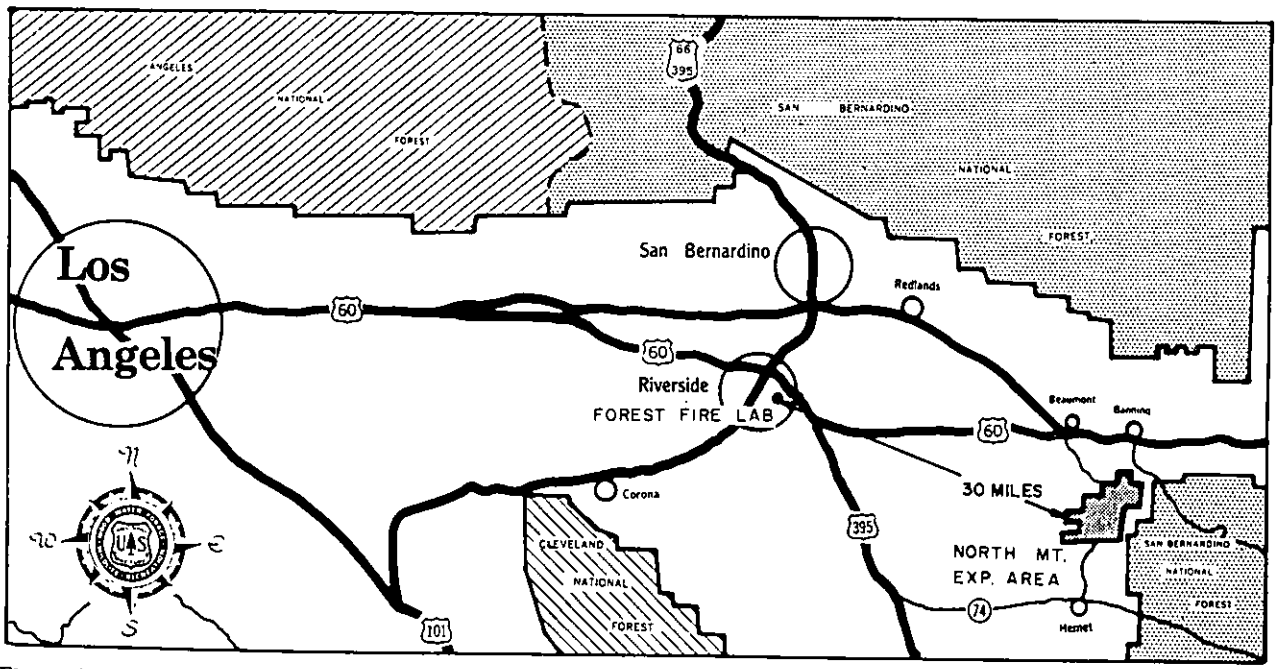

Figure 1.—The North Mountain Experimental Area is in the San Jacinto Mountains 30 miles from the forest fire laboratory in Riverside.

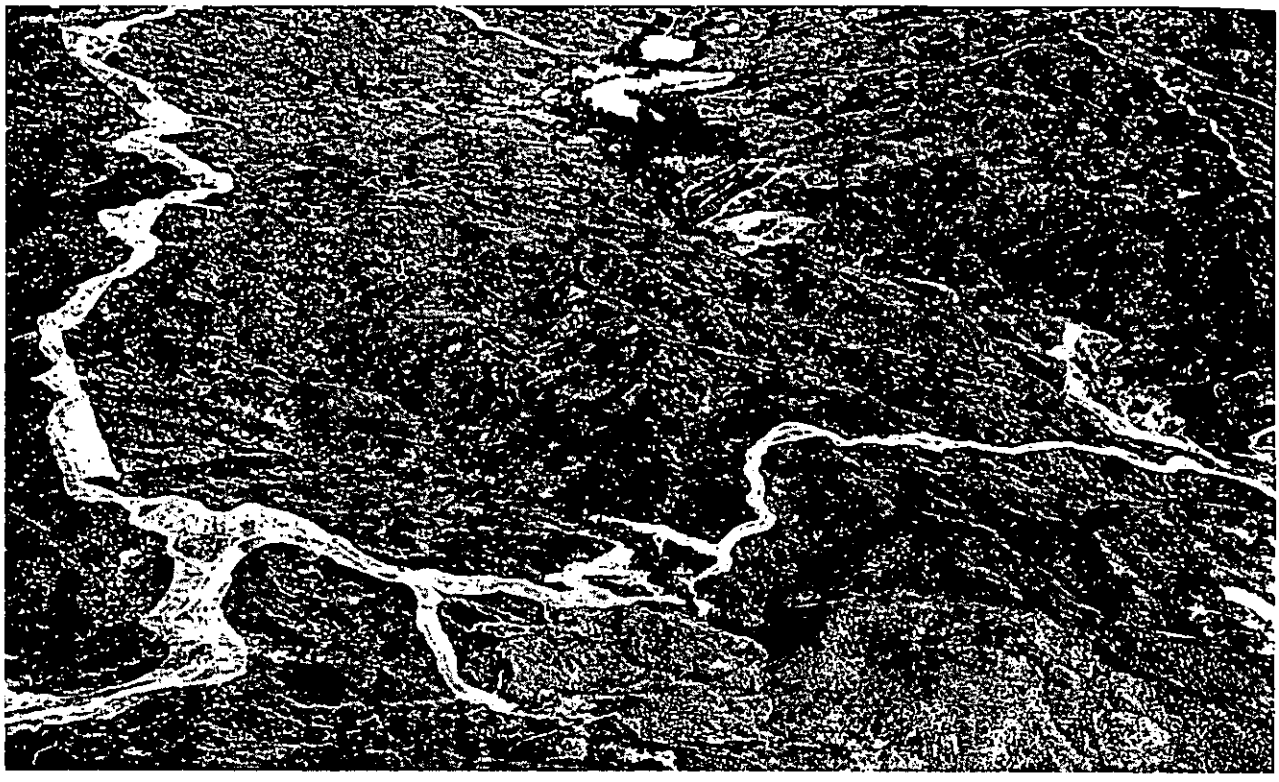

Figure 2.—Aerial view of a portion of the Experimental Area showing part of the extensive fuel-break system constructed by the California Division of Forestry.

Area's Fire Protection

Fire protection for the experimental area is provided by employees of the Riverside County unit of the California Division of Forestry, with nearby San Bernardino National Forest personnel assisting in a mutual aid zone. Within a 10-mile radius there are two Division of Forestry district headquarters and a county road camp. These units have up to 100 trained men available for firefighting. Three Forest Service fire stations are on the adjacent San Jacinto Ranger District. A new Forest Service lookout on Black Mountain covers North Mountain. The Ryan Field Air Attack Base in Hemet is only minutes away, permitting fast attack by air tankers if needed.

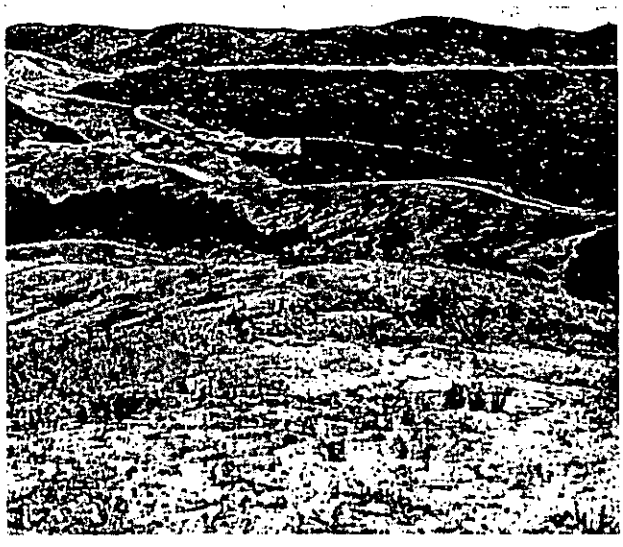

Figure 3.—A North Mountain fuel break on a ridgetop. This break is 300 feet wide.

New and Future Studies

Forest Service research started at North Mountain in 1964.

The extensive fuel-break system at North Mountain provides researchers with opportunity for such studies as the joint research project recently begun with the Agronomy Department of the University of California at Riverside. Researchers are investigating effects of herbicides and chemicals on certain brush species, adjacent soils, and seedling and sprout growth. Also to be studied are the physiological conditions

affecting shrub resprouting and the effect of soil moisture management on the establishment of woody and herbaceous seedlings.

Other parts of the broad program of developing chemicals and techniques to control sprouting brush include a planned scrub oak control study and additional studies involving fuel-break sterilants.

A seed production and storage study will attempt to find the seed yield of chaparral species and determine how long seed will maintain viability in the soil. This study will also investigate the effects of fire on seeds.

Fire behavior specialists are conducting fuel volume studies. These studies represent an attempt to determine principles and methods of fuel measurement which may serve as a basis for a comprehensive fuel survey and classification system. Some areas at North Mountain will be allocated for test burn plots for fire environment studies.

Studies of live and dead brush fuel moistures may soon provide important knowledge on forest fire behavior in chaparral. Diurnal fuel moisture variations in chamise and other flammable species are being studied during critical fire danger periods.

Meteorologists from the Forest Fire Laboratory are learning more about fire weather and are testing new instruments and equipment. Recently they studied the valley wind convergence zone in the Wolfskill Canyon Area to determine some of the mechanisms that produce down-canyon afternoon winds (fig. 4). Personnel from the U.S. Weather Bureau and California Division of Forestry assisted.

Researchers from the Engineering Department at the University of California at Los Angeles and from the Forest Fire Laboratory are examining the feasibility of using waste water from local valley communities to supply nearby mountain areas with scarce water for fire control and for green fuel-break irrigation. North Mountain may be used as a pilot study area for such a project.

Summary

This area provides forest fire researchers with their own field laboratory. Here research projects may be undertaken, studied, and analyzed without conflicting with other land management uses. The new North Mountain Experimental Area and the Forest Fire Laboratory at Riverside should provide a highly effective combination for improving our knowledge of fire and its control.

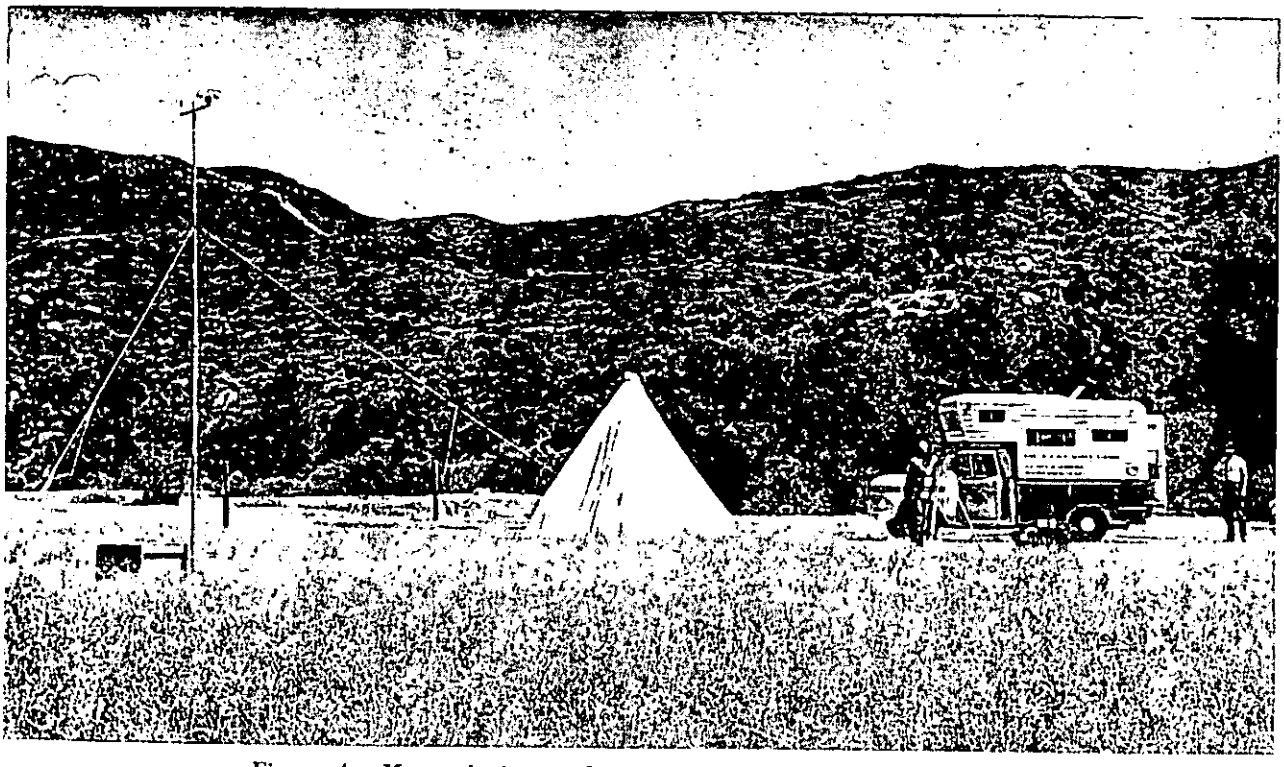

Figure 4.—Meteorologists studying fire weather at North Mountain.

PREVENTION OF FIRE CAUSED BY ELECTRIC FENCERS IN WASHINGTON STATE

LOREN A. TUCKER, *Supervisor, Fire Control Division,*
Department of Natural Resources, State of Washington

Electric fence controllers should control livestock but not set fires. Some fencers have a self-maintaining feature—they burn off the weeds that grow up around the wire so the farmer does not have to mow them.

In 1964, Washington's Department of Natural Resources analyzed the State's fire reports of miscellaneous cause and determined that self-maintaining electric fencers were starting an alarming number of fires. A recheck of fire reports indicated that all fires set by fencers were started by a type which the Underwriters' Laboratories would not approve. The Underwriters has certified several makes of fencers as fire safe but has never put its label on the weed burner models.

The Department's Fire Control Division began to attack this fire source. On June 2, 1964, the Board of Natural Resources promulgated Resolution 54. It declared that fencers which had not been certified by the Underwriters' Laboratories as fire safe could not be sold without a bright red warning label. The label, which is furnished to dealers by the Department, contained the statement seen in figure 1.

Since the label warns the prospective purchaser that he can use the uncertified fencer for only 5 months, the Department believes the weed burner controller will no longer be popular.

The Washington State Department of Labor and Industries has agreed to join with the Department of Natural Resources in the enforcement job. Department of Natural Resources men have contacted every known outlet of fencers in the State and have distributed about 15,800 labels.

The Underwriters' Laboratories has cooperated with the Department of Natural Resources splendidly and is prompt in notifying the Department as soon as another fencer is certified. There are many approved "certified fencers" on the Underwriters' lists.

Results of this prevention effort will not be available until at least one above normal fire season passes. However, the reactions of those affected by the Resolution indicate that the required results will be obtained.

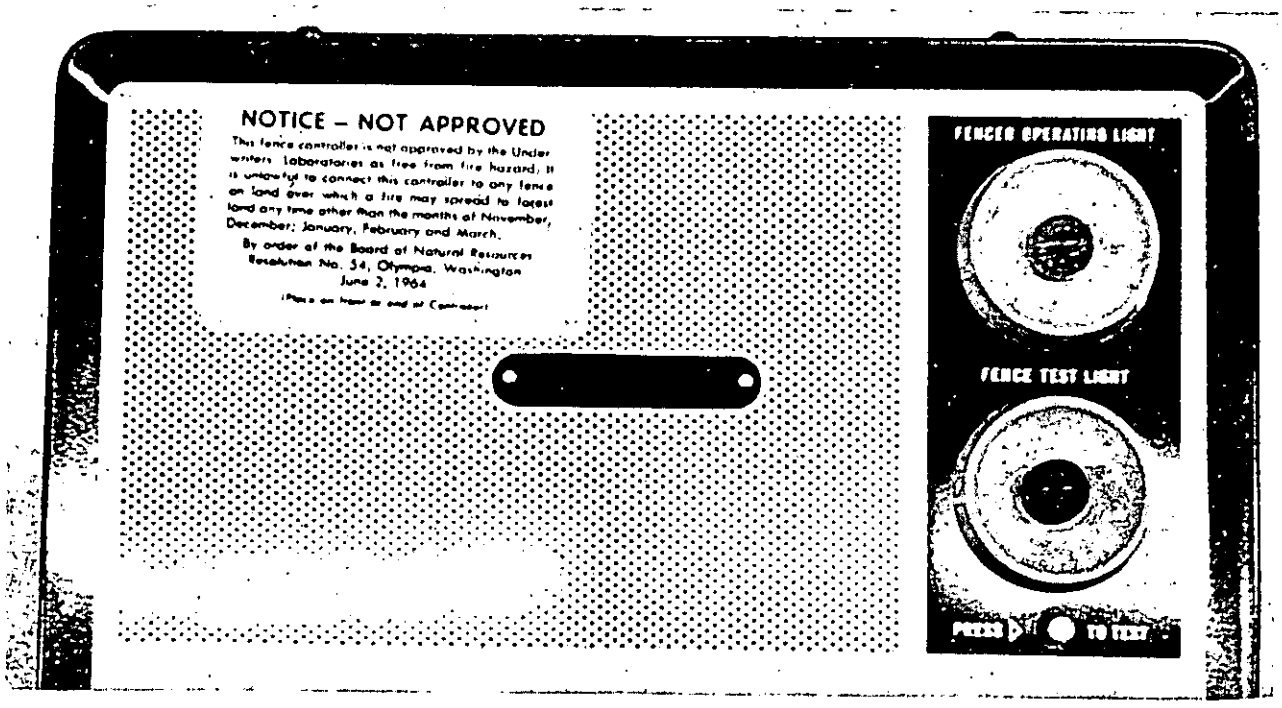

Figure 1.—Uncertified fencer bearing Washington Department of Natural Resources warning label.

EXPERIMENTAL PARADROP OF TRACKED PERSONNEL CARRIER FOR USE ON INACCESSIBLE FIRES

JAMES W. THURSTON, *Anchorage Fire District Supervisor,*
Bureau of Land Management, Alaska

Introduction

Helicopters often have been used around the perimeters of large fires in the remote portions of interior Alaska. Because they are expensive to operate and their logistical requirements are great, Bureau of Land Management fire control personnel look for other methods of meeting these transportation needs.

Many of the hours flown by helicopters assigned to project fires involve movement of personnel, equipment, and supplies from one portion of the fire perimeter to another. Much of this activity, such as food distribution, is routine; if needs are anticipated, the speed of a helicopter is not required. Use of tracked vehicles capable of transporting personnel and negotiating streams, lakes, and swampy areas is considerably less expensive. Due to the vast distances separating the road net from these fires, aerial delivery of these machines is necessary. When the fire is out, these vehicles can be driven cross country to the nearest airstrip at leisure, and flown back to the fire-control headquarters.

The feasibility of delivering these vehicles by parachute was explored. Through the cooperation of the U.S. Army, Alaska, a carrier was rigged for paradrop by the USARAL Support Command's parachute maintenance branch at Ft. Richardson. The experimental drop was made from a U.S. Air Force C-119 Flying Boxcar.

Description of Carrier

A Bombardier BB Carrier was used. It has a cross-country cruising speed of 15 m.p.h. and is amphibious when equipped with an outboard motor. It has a water-cooled, four-cylinder, 57-hp. Simca Flash Special engine. The vehicle rides on tracks 27 inches wide which are supported on rubber wheels. It is approximately 94 inches long, 72 inches wide, and 46 inches high. Up to six men or 1,000 pounds of cargo may be moved. For added utility, mounts were installed to accommodate a small hydro pump and a 55-gallon water tank.

Rigging

During the fire season the Bombardier sits on an 8-foot-square drop platform. For added strength, ¾-inch plywood on a 2- by 6-inch frame was used. Two lengths of 18-inch-wide honeycomb cardboard 6 inches thick were placed under each track. The center hull of the vehicle was also supported by four columns of the same material. Fourteen lengths of parachute webbing on the sides, front, and rear secured the platform to the carrier. Lifting eyes, able to withstand a 4-G opening shock, were welded to the four corners of the carrier frame, and the cargo sling was attached. The rear engine mounts were also strengthened to stand opening shock. An Army Type G-11A 100-foot cargo parachute was attached to the sling, with its 15-foot extraction parachute (fig. 1). The final rigged weight, including the platform, cardboard, and parachute, was 2,730 pounds.

Dropping

The carrier was dropped at an altitude of 1,500 feet. The wind was light and variable, with a surface speed of 5 to 8 m.p.h. Extraction of the load and subsequent deployment of the cargo canopy was normal. A 15-foot chute was used to pull the load from the aircraft. The opening time of the cargo canopy was

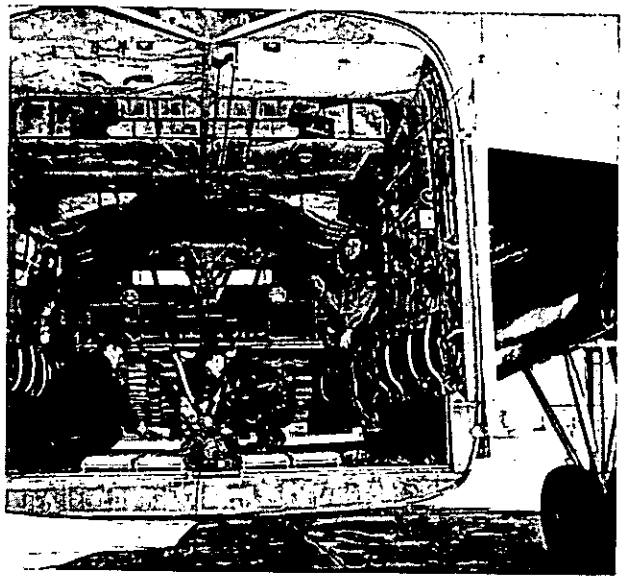

Figure 1.—Front view of Bombardier rigged for drop with a 100-foot cargo parachute. (U.S. Army photo.)

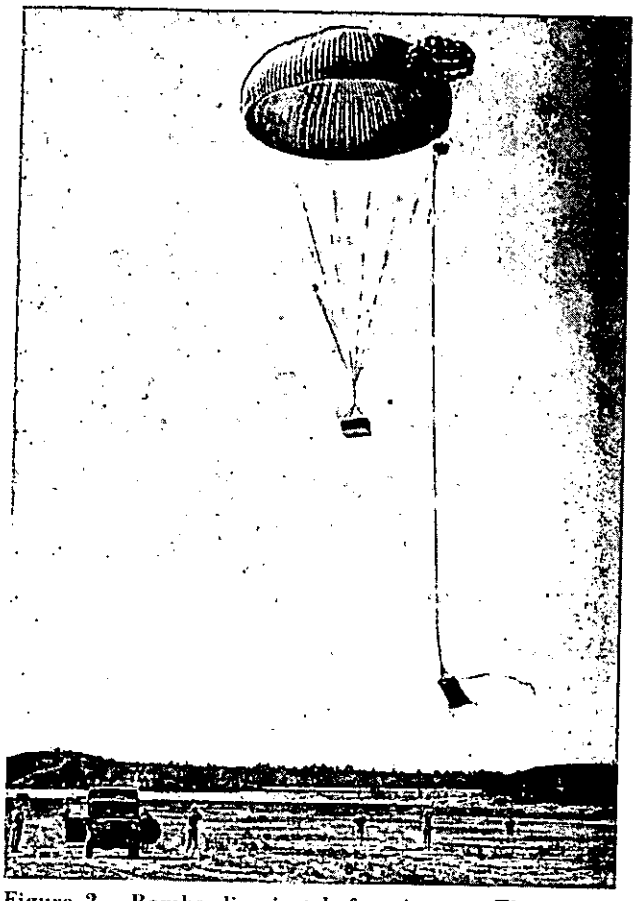

Figure 2.—Bombardier just before impact. The extraction chute in the foreground is falling free.

6 seconds, considerably longer than the normal opening time for personnel chutes. Immediately after the cargo canopy came out, the extraction chute broke free and fell separately. Once the canopy was fully deployed, and throughout the descent, oscillation was negligible (fig. 2). The platform and carrier landed in a flat position, skidding after impact approximately 10 feet over level ground in the direction of the surface wind.

Inspection After the Drop

Immediately after the drop, ground inspection revealed no damage to the Bombardier (fig. 3). The platform was also undamaged; however, it is considered expendable. The honeycomb cardboard remained intact, showing only dents from the wheels and metal cleats of the tracks. Within 10 minutes after the drop the carrier was driven off the platform in good operating condition.

Conclusions

Aerial delivery of personnel carriers appears feasible when a suitable drop zone is available within a few miles of the fire. Although further tests in various drop areas must be evaluated, steep ground and/or timbered areas probably should be avoided because the cargo may overturn just prior to impact or may roll on impact. The flat and rolling tundra plains of interior Alaska have many square miles of suitable drop area. Military aircraft and riggers are able to paradrop loads up to 18,000 pounds; therefore, aerial delivery of even heavier equipment to remote fires can be considered.

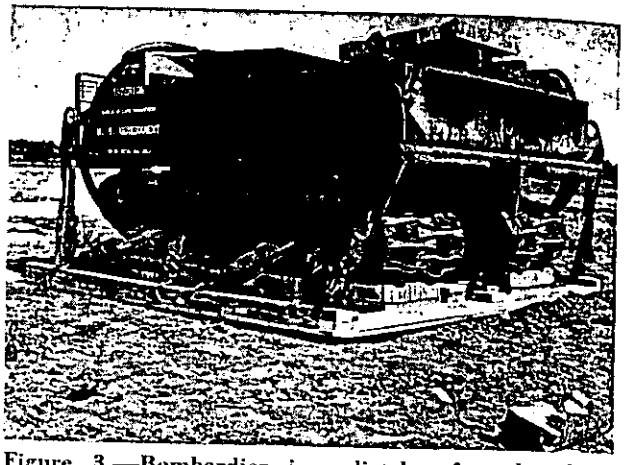

Figure 3.—Bombardier immediately after the drop.

HALLIE DAGGETT

Adapted from the LOG, *California Region, U.S. Forest Service, November 15, 1964*

On Monday October 19, 1964, death brought an end to the colorful career of Hallie Daggett of Etna, Siskiyou County, Calif.

Daughter of a Salmon River pioneer miner, Miss Daggett became the first woman lookout in the United States in June 1913 at Eddy Gulch Lookout on the Klamath National Forest. The ranger took her up to the log cabin and left after giving her a rough map of the area. He instructed her to report any fire she saw by calling him on the grounded telephone line connected to his office at Sawyers Bar.

The idea of a woman being a lookout was novel to the people of the area, and she had many visitors to that lonely spot. People wondered if a woman really had what it took to be a lookout. However, she established a tradition, for more than half of the lookouts in California are now women.

THE HELICOPTER CARGO NET

JEFFERY R. DAVIS, *Supervisory Smokejumper,*
Aerial Fire Depot, Missoula, Mont.

Introduction

The 8-foot-square helicopter cargo net, with a connecting "spider" suspension system, provides an efficient implement for transporting cargo used in Forest Service field operations.[1]

The net, suspended below the helicopter and released by the helicopter bombshackle device, facilitates handling of odd-sized cargo bundles without prepackaging. It will easily accommodate the helicopter's maximum payload.

Type VI nylon webbing is the most satisfactory material used in the nets. Type VIII cotton webbing may also be used; it satisfies minimum tensile strength and construction demands. Nylon is preferred because it costs less, is more durable, and has less bulk and weight.

The nylon "spider" suspension system, connecting the four corners of the net to the helicopter bombshackle (fig. 1), is constructed of 1-inch tubular webbing.

The nets can be used in any area or job where helicopters can operate (fig. 2). More than 50 have been constructed at the Aerial Fire Depot parachute loft in Missoula, and these are now used on many National Forests in Region 1.

Value

The net is particularly useful in transferring cargo from wilderness forest fire sites to more accessible

Continued on page 16

[1]Detailed plans are available on request from the Regional Forester, U.S. Forest Service, Missoula, Mont.

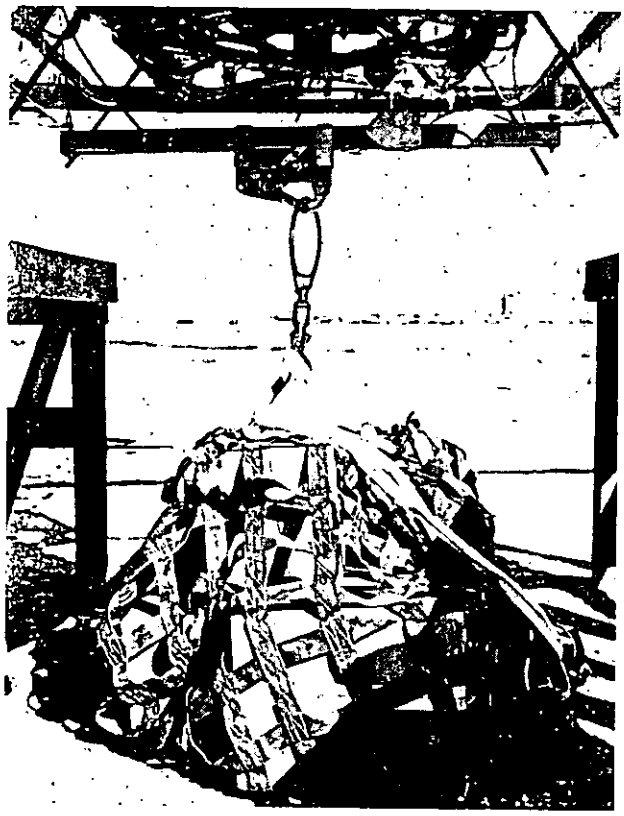

Figure 1.—Helicopter cargo net loaded and secured to helicopter bombshackle by nylon suspension straps.

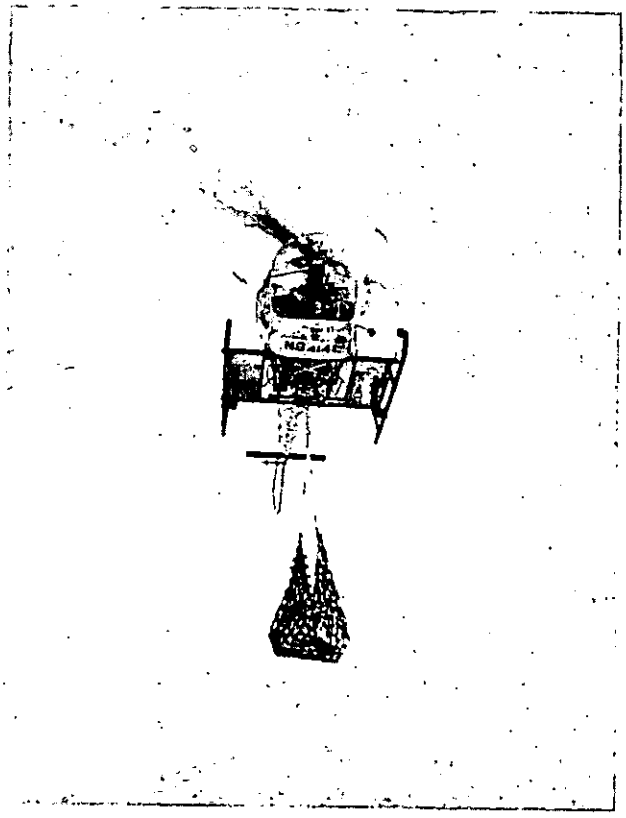

Figure 2.—Helicopter in flight showing cargo net in operation.

Put on 3x5 plain card
need to write him

NORTHERN CHEYENNE MODEL FIRE DRAG

W. Howard Welton, *Forester, Bureau of Indian Affairs, Lame Deer, Mont.*

While grass fires have low resistance to control, rapid action is needed to keep them small and to suppress them. We designed an effective chain drag that can be handled by one man and can be kept in vehicles normally used where grass fires occur. The first unit was built during the 1964 season. No grass fires subsequently burned, but results from experimental fires were rewarding.

The unit consists of six ⅜-inch chains 3½ feet long bolted to an angle iron bar and dragged by a boom on the front bumper (fig. 1). Four-inch crossbars of ⅜-inch-round steel bars are welded to the last 33 links of each chain. The crossbars are welded on opposite sides of parallel links, giving the unit uniformity. All bolts must be riveted (fig. 2).

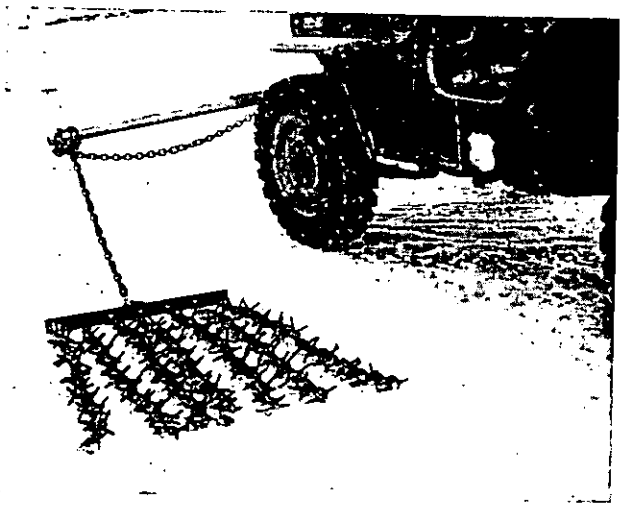

Figure 1.—The fire drag in operation.

The boom is made of two sections of pipe. The outer pipe has an inside diameter of 2½ inches. It is fastened to the front bumper by U bolts made of ⅜-inch steel rod. The inner pipe has an inside diameter of 1½ inches. Both pipes are drilled with 9/16-inch holes 1 inch from each end. The larger pipe is also drilled about one-third of its length in from each end. The inside pipe is held in place when not in use by dropping a ½-inch bolt through the end holes of both pipes. The bolts are drilled at the bottom and fastened with cotter pins. When the boom is to be used, the bolts are removed, the inside pipe slides outward two-thirds of its length, and one bolt is placed through its end and the corresponding hole in the outer pipe. The second bolt is replaced in the end, which now extends to the side of the vehicle.

The drag is pulled by placing the grab hook of any size of tow chain in the middle link of the yoke (fig. 2), and fastening it to the boom with a clove hitch. The end bolt runs through the clove hitch and holds it in place at the end of the boom. The length of hitch must be adjusted to prevent the rear wheel from running onto the drag during turning.

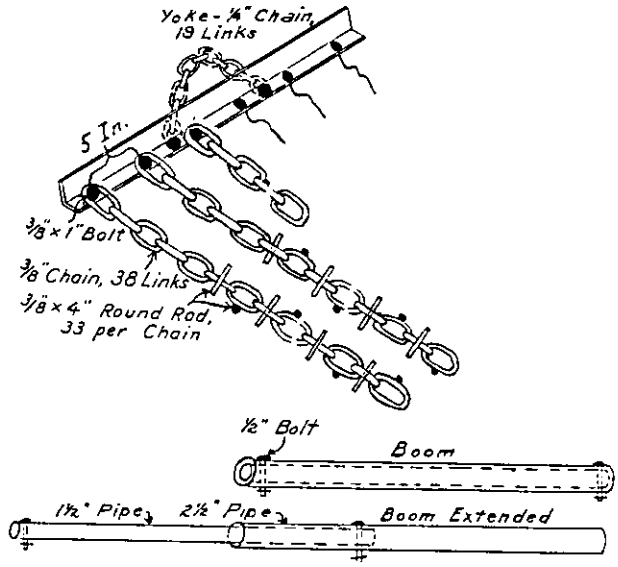

Figure 2.—Diagram of fire drag.

The drag moves forward or backward, so the operator can back up to cover the missed portion of a fire. It is also effective in mopping up because it will separate and smother burning manure. While the jeep appears to be the optimum vehicle (fig. 1), any vehicle that can reasonably negotiate the terrain involved can be equipped and used.

Specifications for the fire drag follow:

Material	*Estimated cost*
1 — Angle iron (1½ × 1½ × 3/16 × 27 inches)	$ 0.70
1 — Chain (¼ × 17 inches)	.32

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FIRE PREVENTION MESSAGE FROM THE AIR

BRANCH OF FIRE CONTROL, *North Central Region,*
U.S. Forest Service

Forestry technician Ross K. Marion of the Clark National Forest in Missouri observed an aircraft towing a banner over Poplar Bluff one day and noticed that everyone was watching and reading the message. He felt this would be a good way to present a fire prevention message to the many deer hunters and other users of the National Forest.

Ross's suggestion was adopted, and a banner is now being towed on the Clark and Wayne-Hoosier National Forests of the North Central Region. The banner has 18 nylon letters 5 feet high and reads "Prevent Forest Fires."

The aircraft towing the banner (fig. 1) is equipped with a PA system, and the pilot broadcasts another message. Flights are conducted over towns, recreational areas, and football and baseball games — any place where there are large crowds within or adjacent to the Forest protection area.

This method of fire prevention has reached many people, and the cost of this operation is far less than for the normal direct methods. Many favorable comments have been received from the public; the banner apparently is a very effective prevention tool.

The Regional Forester, Milwaukee, Wis., will furnish on request detailed information on purchase costs and operational procedures.

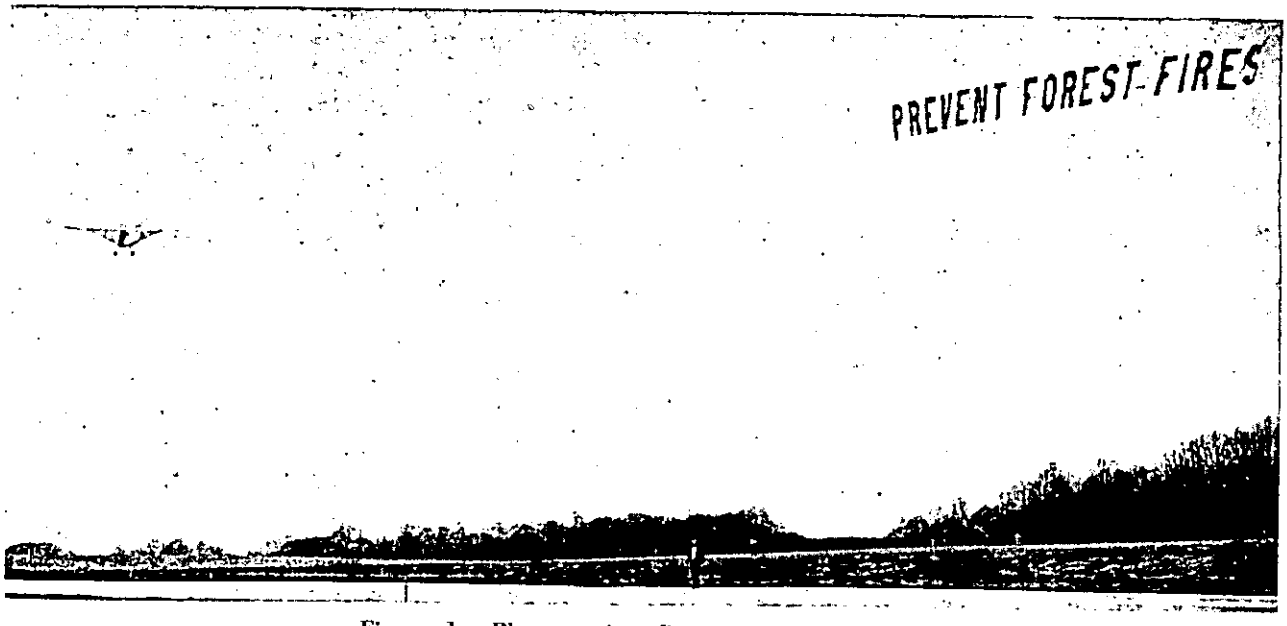

Figure 1.—Plane towing fire prevention banner.

Fire Drag — *Continued from page 12*

6	Chains (⅜ × 42 inches)	7.70
198	Round bars (⅜ × 4 inches)	4.95
1	Pipe (2½ inches i.d. to fit bumper)	5.10
1	Pipe (1½ inches i.d. to fit bumper)	2.40
8	Bolts (machine ⅜ × 1 inch)	.30
6	Flat washers (⅜ inch)	.05
2	Lock washers (⅜ inch)	.05
	Welding	30.00
	Total	$51.57

Every 15 seconds a fire breaks out some place in the United States, according to the National Fire Protection Association.

Preplanned escape measures might save up to 85 percent of all lives lost in home fires, National Fire Protection Association studies show.

FIRE TIMEKEEPER'S "CREW ORGANIZER"

STANLEY S. TORNBOM, *Timber Management Assistant,*
Deschutes National Forest

Three systems of recording fire time, the alphabetical, the numerical, and the crew system, are named according to the manner in which fire time reports are filed for use in fire camps. The method of filing determines the procedures in posting daily time for firefighters, and in processing men for transfer and release.

The crew system is recommended whenever it is possible to use it.

The primary deterrent to use of the crew system is lack of facilities in fire camps for filing and storing time reports. Small boxes, large envelopes, and large paper clips or clamps have been used. However, there is always danger of losing time reports or of getting them mixed. Lack of proper facilities for the crew system has encouraged the use of the less efficient alphabetical and numerical systems because time reports can be easily filed alphabetically or numerically in a standard 5- by 8-inch cardboard box.

The fire timekeeper's "Crew Organizer" (figs. 1, 2) is a portable unit that can be carried to a fire camp by plane or auto and can quickly be set up on the ground, or on a table, or can be attached to a tree, post, or wall. If it rains, the units can be folded to protect the time reports; if the camp is moved, the units can be folded and moved intact to the new location.

The time reports are filed by crews as men arrive at the fire camp, or as they are organized into crews. Crew names and the number of men in each crew are written on the plastic strips above the clamps to identify the crews.

Crews may be divided into four groups consisting of day and night Forest Service personnel and day and night non-Forest Service personnel. On a large fire, one crew organizer may be used for each of the four groups; on a smaller fire, two organizers can normally handle all four groups.

Unposted crew time reports can be placed on top of the fire time reports and when posted, they can be placed behind the time slips. Consequently, all data pertaining to each crew is in one place. Also, the following items can be quickly checked:

(1) The number of men, by day and night shifts, working on a fire
(2) Whether their time has been posted
(3) Names of crews
(4) Overhead

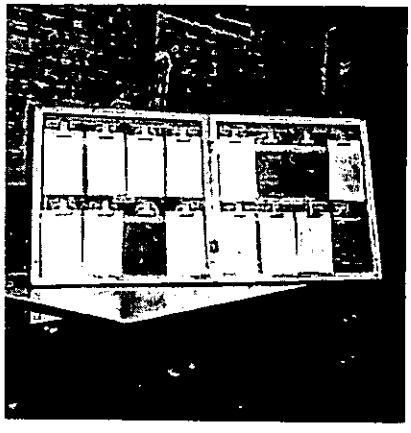

Figure 1.—The crew organizer shown fully extended, propped on legs, and locked into position.

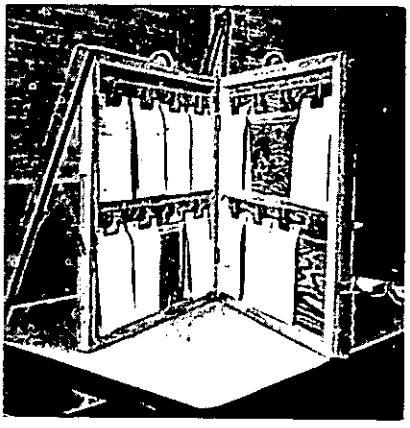

Figure 2.—The crew organizer, partially opened to show hinging and leg construction.

Used as described, the crew organizer becomes the nucleus of the timekeeper's organization and facilities.

If organizers are not available in a fire camp, the same results can be approximated if a building is available where nails can be driven into the wall, or where clips can be attached. If nails are used, they should be about 16d common nails, and the heads should be cut off after they are driven. The time reports can be hung on the nail by the center hole in the top of the time report. Names of crews and other pertinent data can be entered on masking tape placed above the time reports.

If no building is available, a unit can be built by setting two posts in the ground and nailing a few surfaced boards or a piece of plywood to the posts. Then nails or clips (Esterbrook ball bearing #20 or equal) can be mounted to this surface. If nails are used, a heavy weight must be placed on top of the time reports to keep them from blowing away.

These alternative methods describ-

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"QUICK" MOUNT FOR TOOLBOXES

JAMES R. CROUCH, *Management Analyst,*
Division of Administrative Management[1]

Have you ever wanted to mount or remove a ½-ton pickup toolbox in a few minutes? It can be done.

The folks on the Neches Ranger District in Texas and on the Yazoo-Little Tallahatchie Flood Prevention Project in Mississippi have a simple method—the "Quick" mount. Using this method, two men can quickly load or unload a box. This method saves man-hours and permits more flexibility in the use of pickups.

For example, one less vehicle may be required to do your work. When a crew is hauled to work, the box can be used as a seat and as a tool container. When the vehicle arrives at the job site, the box can be quickly and easily unloaded. The truck can then be used to haul bulky materials and supplies.

The components (fig. 1) of the "Quick" Mount follow:

Item	*Quantity*
Lumber, 2 × 4 × 96"[1]	2 pieces
Lumber, 2 × 4 × 48"[1]	2 pieces
Carriage bolts, ⅜ × 4"[1]	6 each
Carriage bolts, ⅜ × 2½"[1]	6 each

[1] The length will vary by truck.

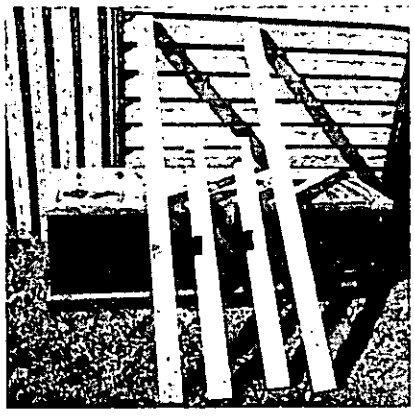

Figure 1.—Components of mount: Bolts, runners, and end pieces.

The steps in installing the mount follow:

1. Cut runners to correct length and bolt to bottom of box, using ⅜ × 4-inch bolts.
2. Cut end pieces to correct length and notch to match runners on box. Bolt one piece to front of vehicle bed (fig. 2) and the other to tailgate (fig. 3), using ⅜ × 2½-inch bolts.
3. Place box in vehicle. Insert runners into notches at front of vehicle bed and then close tailgate (fig. 3). This locks box into place.

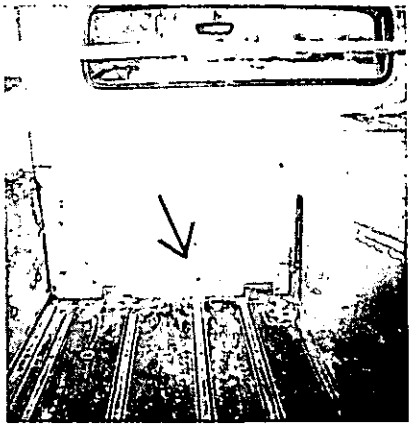

Figure 2.—End piece in place.

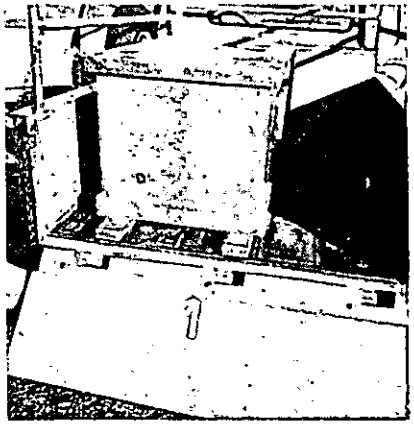

Figure 3.—End piece in place on tailgate; runners under box. (Note: Raise tailgate and box automatically locks into place).

[1] The information in this report was obtained when the author was Assistant District Ranger, Neches Ranger District, Crockett, Tex.

Crew Organizer —

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ed have been used by the writer, and their use has led to the design of the crew organizer. While these methods do not provide the flexibility of the crew organizer, the basic advantages of organization and visual control still exist. It is believed to be several times as efficient as the alphabetical or numerical system.

Savings resulting from use of the crew organizer and the system described are difficult to calculate. It is estimated that in situations where the crew method is employed, use of the crew organizer and the system of visual organization reduces by 25 percent time spent by time officers and recorders.

TOPOGRAPHIC RELIEF MAPS

DONALD H. THOMAS, *Fire Control Officer,*
Mendocino National Forest

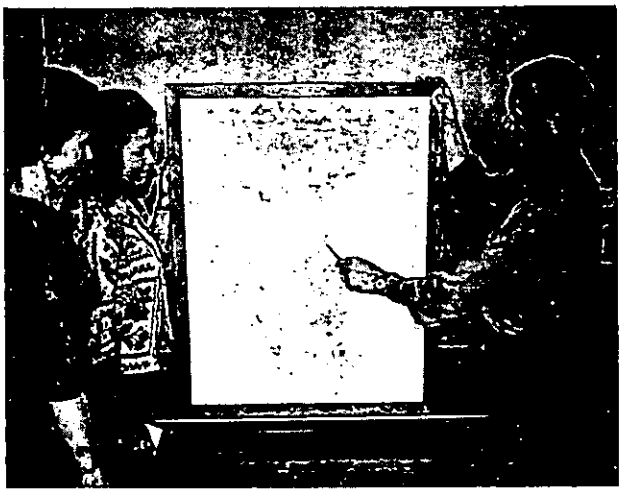

Figure 1.—A fire control officer indicates contour lines on a topographic relief map.

Fire control officers find that it takes more than talk to teach a new employee what a contour line is. Sand tables and other devices have been used to aid the telling by showing. The Corning Ranger District of the Mendocino National Forest purchased a set of three topographic relief maps for use in demonstrating contour lines (fig. 1).

The maps were obtained from the U.S. Army Corps of Engineers, Army Map Service, 2100 North New Braunfels Ave., San Antonio, Tex., for $2.50 each. The size of each map is 18 by 27 inches. They are printed on a rigid, heavy-duty plastic. Normal temperature ranges do not cause the relief pattern to distort. Horizontal and vertical scale is 1:250,000. Contour interval is 100 feet and is based on photo-planimetric methods. Horizontal and vertical control was field checked in 1957. The relief pattern is very accurate.

The map sections are constructed to allow sufficient overlap for joining sections together. The maps have proved to be a valuable training aid in our fire control work.

Helicopter Cargo Net —
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pickup areas, and in engineering projects such as the transportation of bridge building equipment and lookout tower components.

In August 1964, on the Lewis and Clark Forest, the cargo nets were satisfactorily used to transport 60,000 pounds of hardware and lumber for bridge construction. The net saved time and labor, and was highly recommended by the men in charge of the project.

Specifications

The cost of materials and labor follows:

Nylon net

Webbing, type VI nylon	124 yards	@ $0.14 =	$17.36
"V" rings, steel	4 each	@ $ .05 =	.20
Labor	5 hrs.	@ $2.98 =	14.90
Total		=	$32.46

Cotton net

Webbing, type VIII cotton	124 yards	@ $0.30 =	$37.20
"V" rings, steel	4 each	@ $ .05 =	.20
Labor	6 hrs.	@ $2.98 =	17.88
Total		=	$55.28

"Spider" suspension system

Webbing, tubular 1-inch nylon	24 yards	@ $0.17½ =	$ 4.20
Snaps, steel	3 each	@ $ .05 =	.15
Labor	2 hrs.	@ $2.98 =	5.96
Total		=	$10.31