ment in the shape of a powerful 1½-ton truck which carried his pump and about 5,000 feet of 1-inch fabric hose. Collecting a crew of several men, he drove rapidly to the fire, where he found he could drive his truck to a brook within 50 yards of one point of the fire. In the spring it is nearly always possible in Massachusetts to find water enough for operating a motor-driven pump. Four men unloaded the pump and set it down beside the brook. The other men coupled the hose to the engine, strung out and coupled together several 50-foot lengths, and everything was set to go. In the meantime the mechanic at the pump had coupled on one end of the intake hose and thrown the other end in the brook.

Half a Mile of Fire Line

At this time there was fully a half mile of blazing fire line, which a number of men from the neighborhood were attempting to extinguish with shovels, brooms, and pails of water carried from the brook. The chut, chut, chut, of the pump was a welcome sound, and the 25 or 30 gallon stream of water which soon came from the nozzle of the hose was an even more welcome sight. The man handling the nozzle knew his business. Coming up to the line of fire, he turned left and, walking rapidly, sprayed the edge of the fire as far as it was burning on that side and part way around its end. He then retraced his steps to his starting point and sprayed the right-hand edge of the fire. He again retraced his steps to the starting point and walked directly through the area already burned over until he reached the far edge of the fire. Here he repeated his tactics of first turning left and spraying the left wing of the fire, then coming back and going around the right wing. Thirty minutes after the fire truck arrived on the scene the running fire was stopped. A patrol was put on, but the fire did not break out again.

Let anyone who wishes compare this with the time it would have taken a crew of 10 to 20 men to build a fire line around and control a fire which was one-half mile in periphery when the crew arrived. Are these pumps effective? They certainly are where there is water and where they can be transported within a reasonable distance of the fire. That is generally possible in the Northeastern States. Further, they are fully as effective for direct attack on fires as they are for mopping-up purposes.

C. R. TILLOTSON.

FOREST-FIRE Patrol by Airplane Greatly Helps Ground Force

The first experiments with airplanes for forest-fire patrol in the United States were made in California in 1920. The work was conducted for the Forest Service by the Army Air Service and was sufficiently promising to warrant its continuation in the two succeeding seasons. It was then discontinued until 1925. In that year Congress appropriated $50,000 for renewed cooperation between the Forest Service and the Army Air Corps in aerial forest-fire control.

Beginning July 1, 1925, the Forest Service hired civilian pilots and mechanics. The pilots were Army reserve officers with pilot's training and operated its own patrol in the national forests and adjacent forest areas in California, Oregon, Washington, Idaho, and Montana. An Army officer was detailed for technical inspection of equipment. Liberty-motored Army DeHaviland planes were loaned by the Army

for the project. In some instances Forest Service officers experienced in fire-control work were detailed to direct the work and fly with the planes as observers. The patrol was maintained during the seasons of 1925, 1926, and 1927. Regular beats were not flown in any instance, but planes were sent out to scout rough and remote mountain areas immediately after such areas had been visited by the severe and often rainless electrical storms which start many forest fires in the mountain regions of the western United States. In areas not readily seen by the fire-control forces on the ground many small fires were promptly discovered and reported by the planes, with the result that the fire-suppression crews were able to reach the fires while they were still small and to control them with a minimum of expense and loss.

Used for Mapping Large Fires

Planes were also used for scouting and mapping large fires. The information so obtained was furnished to the ground forces for use in planning control work.

During the year 1927 forest-patrol planes made 247 flights and flew 547 hours on fire-control work. In competition with a highly organized fire-detection force on the ground they furnished first report on 35

FIGURE 94.—Scouting lightning fires in the Kaniksu National Forest, Idaho, by airplane

fires and made scouting trips and reports on 82 going fires. During the three years 1925 to 1927, inclusive, the forest-patrol flights over rough mountain areas remote from landing fields were made without injury to personnel and with only minor and repairable damage to equipment.

Some experiments were made in the use of airplanes in forest mapping, both by sketching and by photographic methods and in scouting for forest insect damage. The results obtained were encouraging and seem to warrant further work of this kind.

The use of the airplane in the United States Forest Service is still in a more or less experimental stage, but it promises to be a very valuable supplement to the ground forces in fire control and in some other lines of forest work. Its future depends largely on further perfection of the airplane, on cheaper operation, and on the skill, resourcefulness, and persistence with which foresters make use of it.

HOWARD R. FLINT.