

Section 103—Heliographs on Patrol Routes

The use of heliographs by patrolmen or other moving units of a forest-protection force brings up the question of light weight and ready portability, as previously mentioned. Such use is only practicable on a forest equipped with a permanent lookout system for fire detection, and then only under topographic conditions which make it readily possible for patrolmen to find points easily and quickly from which they can open communication with lookout stations. This is not often practicable in a heavily timbered region of little relief, but is easily accomplished in any rolling, hilly or mountainous country.

For patrol purposes, the Godwin or Forest Service heliograph is the only practical type. Its weight and size make it an entirely practicable equipment for any kind of patrol and its range is sufficient for most forests where it might be employed. A use for this instrument will exist wherever the standards of protection employed make it impossible to secure rapid enough communication by message carried to the nearest telephone station. Of course, the degree of development of the telephone system will exercise a very considerable influence on this time interval, but as long as it remains necessary to establish a physical connection with a telephone wire in order to use the line and as long as maintenance charges remain as they are, very large areas in all forest regions must necessarily remain without immediate telephone service. Conditions may vary all the way from a protection staff which depends entirely on the heliograph for intercommunication between all units to a staff which uses the heliograph merely as an emergency auxiliary, placing its dependence primarily on a telephone system. The difference will result from the protection standards employed, that is the maximum of average annual damage to which the protection system is designed to restrict the forest fire loss.

CHAPTER XIX

USE OF THE GODWIN HELIOGRAPH

Section 104—Parts of the Instrument

LIST OF PARTS

The complete instrument consists of a sole-leather case with shoulder-strap containing: (a) One sun mirror, (b) one station mirror, (c) one screen, (d) one sighting rod, (e) two mirror bars; the above in two padded wooden packing blocks; and (f) one tripod with leather cup for points.

The heliograph and case is $10\frac{1}{2}$ by $5\frac{1}{2}$ by $2\frac{1}{2}$ in. outside dimensions and weighs 4 pounds 9 ounces. The tripod folded is 2 in. in diameter by 23 $\frac{1}{2}$ in. long and weighs 7 pounds 3 ounces.

(a and b) *Mirrors.*—Two plane mirrors, each $2\frac{1}{2}$ in. square are employed. These are very carefully constructed so as to have both surfaces parallel, are backed with pure silver, and varnished. Each is mounted in a black metal frame and swings in a yoke on pivots at the sides. A slow-motion adjusting screw is provided by means of which the mirrors when set up may be rotated on the line between these pivots as an axis. This axis passes through the centre of the mirror. In the centre of each mirror there is an unsilvered spot $\frac{1}{8}$ in. in diameter. On the lower side of the yoke there is a tapered stud which fits into a hole at the end of the mirror bar when the instrument is set up. Both mirrors are exactly alike and may be used interchangeably, except that when both are employed at one time it is necessary to paste a small white paper disk in the centre of one of the mirrors on which to hold the "shadow spot." The