seen to pass directly across the tops of the two range stakes. Move slowly back and forth in the azimuth in which the station is known to lie until the call is acknowledged. Then adjust on the flash from the distant station and proceed with the message.

Section 110—Working at Short Ranges

At ranges up to about 10 miles, it will be found that the flash from the heliograph is extremely tiring to the eyes. For short ranges with 4-in. or larger mirrors, cover a part of the station mirror with a pasteboard disk having a hole in the centre 2-in. in diameter, or wear smoked glasses. Lookout men will generally be equipped with coloured glasses and should wear them when reading heliograph signals. The heliograph is more rapid and, at any but very short ranges, is more easily read than the flag, but it has various disadvantages that will not ordinarily cause it to be preferred to the flag at ranges under five miles unless it is necessary to signal through haze or smoke. For very short ranges, the flag described in chapter XXII will be found preferable to the heliograph and more generally available.

Section 111—Working through Haze and Smoke

A remarkable and extremely valuable property of the heliograph flash in forest protection is its ability to penetrate smoke. This increases with increase in size of the mirror. With the standard American Army 4½-in. mirror the author has read signals with the naked eye at a distance of 15 miles, when even the outlines of the mountain peak on which the sending heliograph was located could not be distinguished because of smoke from forest fires. At the same time this station was in continuous communication with another, 30 miles distant, although neither was for days able to see the mountain on which the other was located. This property, of course, has its limitations and very dense smoke will make heliograph communication impossible but probably not till long after location of fires by lookout men has become fully as impracticable.

Section 112—Heliograph Codes

Four different codes have been used for heliograph signalling. These are: (1) American Morse Code, (2) International Morse Code, (3) Myer Code, (4) Alphabetical Square Code.

1—American Morse Code

This code is only used for telegraphic communication in the United States and Canada. It is distinguished from the International Morse code by the "space" or "pause" used between the elements of certain letters. It is not now used for visual signalling although it may be so employed if desired, but has no advantages over other codes.

2—International Morse Code

This is the telegraph code used generally throughout the world except in the United States and Canadian telegraph services. It is also called the Continental code and is the code most commonly employed for heliograph signals. All letters consist of combinations of dots and dashes. With the heliograph these are made by short and long flashes.

The dash is represented by a flash of about two seconds' duration.
The dot is represented by a flash one-third as long.
The interval between flashes should be one-half second.
The interval between letters, one second.
The interval between words, two seconds.