with the top of the reflection of the disk and the top of the unsilvered spot of the sun mirror; after this the station mirror must not be touched. Now step behind the sun mirror and adjust it by means of the tangent screws so that the shadow spot falls on the centre of the paper disk on the station mirror. The flash will then be visible at the distant station.

An alternate method of alignment is as follows: Stoop down behind the sun mirror and while looking through the small hole in this mirror turn the station mirror on its vertical and horizontal axes until the paper disk on the station mirror accurately covers the distant station. Standing behind the sun mirror, turn it on its vertical and horizontal axes by means of the tangent adjusting screws until the shadow spot falls on the centre of the paper disk on the station mirror.

In operating the heliograph from a position behind the sun mirror the operator is not as favourably placed for watching the distant station as when standing behind the station mirror, but he is able to maintain his adjustment more perfectly and conveniently and on this account will generally secure more satisfactory results.

CHAPTER XX

SIGNALLING WITH THE HELIOGRAPH

Section 106—Selecting a Station

Permanent stations will nearly always be selected with objects in view that take precedence over the requirements of the signalling apparatus. Such stations may, however, be improved artificially, if not entirely suitable.

Semi-permanent and temporary stations are occupied for signalling purposes primarily and should be selected with this end in view. Stations should be selected so that they are in full view of the station or stations it is desired to communicate with. They should be located at as great an altitude as possible, especially when there is difficulty about haze, smoke, dust, or undulations of the atmosphere noticeable on hot summer days. A dark background is preferable for heliograph stations, so that it is not always desirable to locate on the top of a conical peak which would probably ensure a sky background. Select a station on the slope. Heliograph stations should be protected from the wind. This may be accomplished by setting up in the lee of a clump of trees, a rock, or a building, but care must be taken to ensure that by so doing the shadow will not fall on the instrument at any period during the day.

Section 107—Position of Operator

In operating the Godwin heliograph the operator stands directly behind the sun mirror with the right hand holding the string by which the screen is opened and the left on the tangent screws of the mirror. Both screws must be manipulated with one hand and the rate and direction of movement depends upon the locality and the time of day. By means of them the mirror must be made to follow the sun continuously; this being accomplished by keeping the shadow spot on the centre of the target of the sighting-rod or disk of the station mirror, as previously explained

In using the British Army type of heliograph the position of the operator is the same, but with these instruments the key held in the right hand is also one of the adjusting screws. The left hand holds the other. The operator is thus able to use both hands for adjusting while signalling. The shadow spot, however, falls on the centre of the target only momentarily while a flash is directed at the distant station, and not continuously as in the Godwin type.

In using the American Army type, the screen must sometimes be placed so far from the mirror that it is difficult to reach both screen and adjusting screws at the