For Survey Signal

Improvised Heliotrope

CDR Sidney C. Miller
Coast and Geodetic Survey Liaison Officer
USAFAS

With the advent of electronic distance measuring equipment (DME), field artillery gained the capability to measure lines in excess of 50 kilometers. Although it is not an everyday requirement to measure these long lines in artillery survey, the capability is extremely beneficial. In order to use a long line measurement, however, we must also visually extend the azimuth along the line with a theodolite.

There is no equipment presently available in the artillery survey inventory which can be used as a visual signal over long lines, and therefore, it is necessary to improvise. Several methods can be used to include flares and mirrors. Flares do not provide an ideal signal, are limited in range, and are visible all around the horizon. Single mirrors cannot be pointed such that a steady beam of sunlight is reflected without the aid of a device to stabilize the mirrors. A device, composed of one or more plain mirrors, mounted and arranged such that a beam of sunlight may be reflected by it in any desired direction, is known as a heliotrope. This word "heliotrope" is derived from two Greek words meaning "sun" and "turn." A satisfactory heliotrope can be quickly improvised in the field using available vehicle or ordinary mirrors and salvage materials (figure 1).

Directions for making a heliotrope are as follows:

Drive two nails vertically about 2 feet apart into a board; the heads of the nails are used as sighting points for the beam of reflected light. Place the forward nail as close to one end of the board as possible. Next, attach a strip of cardboard or coated plastic to the front edge of the board in line with the forward nail. The strip should be slightly wider than and project slightly above, the nail head. Attach this strip with a single small nail or thumb tack so that it can be conveniently rotated to allow for shadowing of the forward nail or clear alinement of the two nailheads. Firmly secure the board on a tripod or stand by any convenient method.

With the front strip rotated out of nails alinement position, aline the two nailheads as precisely as possible, both horizontally and vertically, toward the location of the observing party. Then rotate the strip attached to the front of the board until it directly shadows the forward nail. Place an ordinary adjustable mirror behind the rear nail; and, using the reflected sun rays, project the shadow of the **rear nailhead** until it is perfectly superimposed over the forward nailhead's shadow. The

strip attached in front of the board merely serves as an aid for this alinement, and does not appreciably reduce the reflected light. The sunrays are now being reflected exactly down the line of sight projected from the two nailheads. The mirror may be held in position by tape or a mud pack, or a more permanent framework can be fashioned from wood or a coathanger. Since the sun is moving at a rapid rate across the sky, it is necessary to reset the heliotrope mirror at intervals of about 1 minute. The apparent diameter of the sun is about 10 mils and the cone of light shown from the heliotrope will also be about 10 mils. On light overcast days the sky near the sun is often bright enough to be reflected.

If the direction of the observer is nearly opposite the direction of the hun, it may be necessary to use a second mirror to reflect the sun's rays into the mirror which is in line with the nails. A wider board should be used for this situation to permit off-set of the second mirror.

Recently, the improvised heliotrope shown in the illustration was used in measuring a line 44 kilometers long at Fort Sill under less than ideal conditions. A similar improvised heliotrope has been observed from a station 64 kilometers away. Voice communications provided with DME can be used to aid pointing the heliotrope, if no other communication means are available.

Commanders of those field artillery survey elements which do considerable long line work and experience frequent long line of sight angle turning problems might consider requesting the current U.S. Army inventory

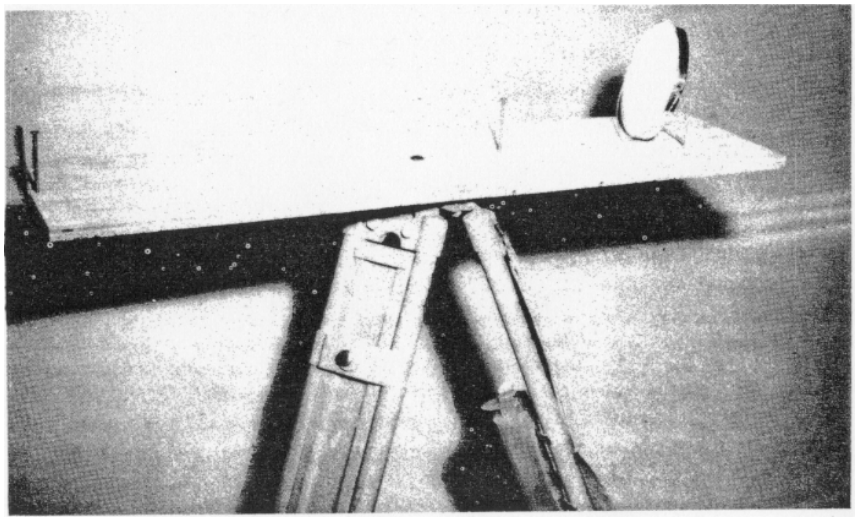

Figure 1. Improvised Heliotrope.

heliotrope through MTOE type action if felt necessary. The following Supply Bulletin 700-20 information is extracted for convenience:

Heliotrope, Line Item K33000, FSN 6675-240-1892

Current Authorization: 4 each per Survey Set Triangulation, Line Item U 71275, to Engineer Topographic Survey TOE.

Of course, heliotropes cannot be used without some sunlight. For long line observation in the daytime, which are out of range of available targets and other signals, this is about one's only resort. The heliotrope transmits a good light, and very accurate angle measurement can be obtained from these observations.

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ARMY INTEGRATING ALL ADP SYSTEMS INTO NEW COMMAND

A new command, the United States Army Computer Systems Command (USACSC), has been established at Fort Belvoir. It will be the responsible agency for the design, development, test, installation, programming and system support of the Army's multi-command automatic data processing (ADP) systems.

The new command, using the present Automatic Data Field Systems Command (ADFSC) as its nucleus, will report directly to the Army Assistant Vice Chief of Staff.

Under the Computer Systems Command's jurisdiction will be almost all the ADP systems that cross command lines in their operation, or which can be used in more than one command. Systems will serve the Army in the field and also fixed installations at all echelons. Under the project charter issued by the Secretary of the Army, the Computer Systems Command will be assisted by militarized ADP equipment and by the Army's Computer Systems Support and Evaluation Command in the selection of commercial general purpose computers.

The task of the new command, ranging from worldwide administrative systems to worldwide combat support systems, and embracing hardware and software and systems support, represents a broader scope of ADP systems responsibility than has ever before been brought together in a single Army agency.

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WALKING MACHINE

A Department of Defense-industrial joint development effort sustained over several years had produced a prototype Quadruped "walking machine." The 3,000 pound experimental unit uses an advanced system of levers, control linkage and servomechanisms to mimic and amplify movements of the machine's operator.

In an initial series of tests, the research prototype has walked across level ground, turned around, climbed obstacles, lifted a small military vehicle out of a mud hole, and hoisted a 500 pound load onto a truck with one of its mechanical feet.

Additional indoor tests of the Quadruped are scheduled before it is field tested.