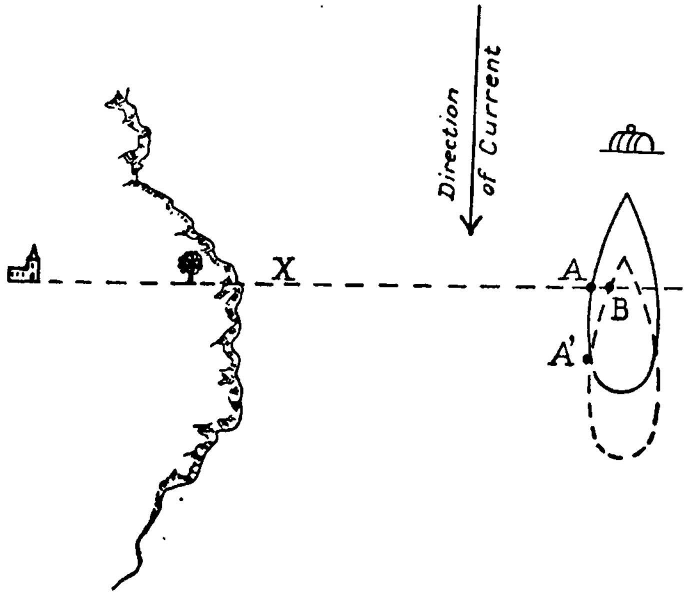


Thus, in the annexed figure, at the commencement of the observations the ship was in the position shown by the firm line and the transit line AX was observed from the point A.

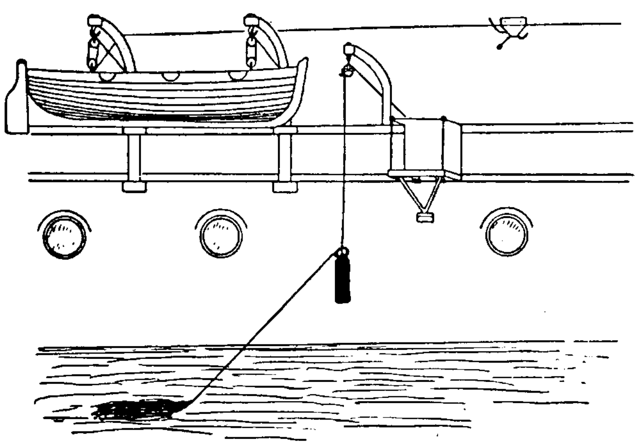
At the end of the observation the ship had dropped astern to the position shown by the dotted line and the point A had therefore moved to A^1; it was necessary to move to point B to bring the transit marks in line again and the distance A^1B had therefore to be added to the total distance recorded by the current meter. (Any movements of the ship ahead or astern during the course of the observations would counteract one another and so would not have to be taken into consideration).

After a little experience it was found that the ship could be kept fairly steady both as regards her distance from the buoy and the direction of her head; the distance A^1B was consequently small and it is claimed that the final results of the observations were much more accurate than if they had been obtained from the ship at anchor.

A SIMPLE DEVICE TO PROVIDE AGAINST POSSIBLE SWINGING OF THE LEAD IN SHIP SOUNDING.

By means of the device shown on the annexed figure, the damage which sometimes occurs at the moment of hauling in the lead during ship sounding operations may be avoided.

After each sounding, owing to the considerable speed at which the electric winch hauls in the lead, it happens that the latter, diverted towards the stern by the headway of the ship, leaves the surface of the water more or less abruptly. And if the sounding chains are in even a slightly raised position, the lead at the moment of leaving the



water may begin a series of swinging movements, each successive movement increasing in range in proportion with the shortening of the distance between lead and block.

French hydrographic parties frequently use the damping device shown in the accompanying figure.

It consists in passing the end of the sounding line through a ring, which will rest on top of the lead, before securing the latter to the line. Attached to the ring is a hemp lanyard the length of which is about equal to the height of the sounding chains above the water; if desired, a mop may be attached to the other end of this lanyard.

While the lead is being hauled forward along the jackstay, and also during the actul sounding, the ring is secured near the block used for heaving in or held in the leadsman's hand; as soon as the vertical sounding has been taken and the sounding line is travelling upwards under the action of the winch, the leadsman drops the lanyard into the sea, the ring meanwhile sliding along the sounding line.

When the lead leaves the water, the mop or lanyard which has been trailing in the sea behind the sounding line while the lead is coming up, acts as a damper to prevent the lead from swinging while being hauled on board.

H. B.

WATER SIGNALS FOR TRIANGULATION AND HYDROGRAPHY

(Extract from U. S. Coast and Geodetic Survey Special Publication No. 93 "*Reconnaissance and Signal Building*" by JASPER S. BILBY, Washington, 1923, pp. 69-72).

Along certain sections of the coast it is sometimes desirable to locate a station in the water some distance from the shore. In some cases the position of this station is determined by observations from land stations. In other cases it becomes necessary to occupy the water station itself with a theodolite. The signal must be built in such a way that it will not be shifted in position by wave action or wind pressure, and if it is to be occupied with an instrument it must be steady enough to permit accurate angle measurements.

The type of water signal described below is one that has been used successfully in depths as great as 13 feet. The elevation and plan of the tripod instrument support of this signal are shown in Fig. 1 and the different steps in its construction are shown in Fig. 2. The tripod has a large spread at the base to minimize the amount and effects of any unequal settling in soft bottom and has an extensive system of bracing for rigidity. A vertical stake attached to the foot of each leg of the tripod and weights in the form of bags of sand placed on platforms attached to each foot help to prevent any shift of position of the signal. The tripod is designed so that the center of bracing is well below the surface of the water where the greatest rigidity is required and to offer the least possible resistance to the waves at the surface of the water. The twisting motion caused by the waves acting unequally on different parts of the structure is by far the greatest factor to be considered in obtaining a rigid structure.

The tripod is built on shore, carried into the water and launched, towed to the desired location, and finally placed in position and weighted down. The scaffold for supporting the observer is then built independently of the tripod. The size of the structure depends, of course, upon the depth of water in which it is used.

Construction.

For building the tripod a level place on the beach is selected as near as possible to deep water and not too far from where the station is to be located. The bottom section of the center pole, consisting of two 2 by 4 inch pieces 8 and 16 feet long respectively, is placed in a vertical position and held by temporary supports. The three bottom members *B* are then placed on the ground in a level position at angles of about 120° with each other and nailed to the bottom of the center pole. Temporary braces are then nailed from each bottom member *B* to the center pole and the center pole extended by lapping on another 2 by 4 inch piece 16 feet long. The lower diagonal braces *C* (see *B*, Fig. 2.) are next nailed in place, and after the center pole has again been extended the upper diagonals or legs *D* are put on. The horizontal braces *E* are then