PRACTICAL HYDROLOGICAL WORK AT THE POLAR STATIONS.

Fixed Ice-Meter.

by

K. G.

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The measurement of the thickness of the ice under the conditions prevalent in the Far North of the USSR, where the thickness occasionally attains considerable dimensions, constitutes an extremely laborious operation, due to having to excavate a new well at each new place of observation.

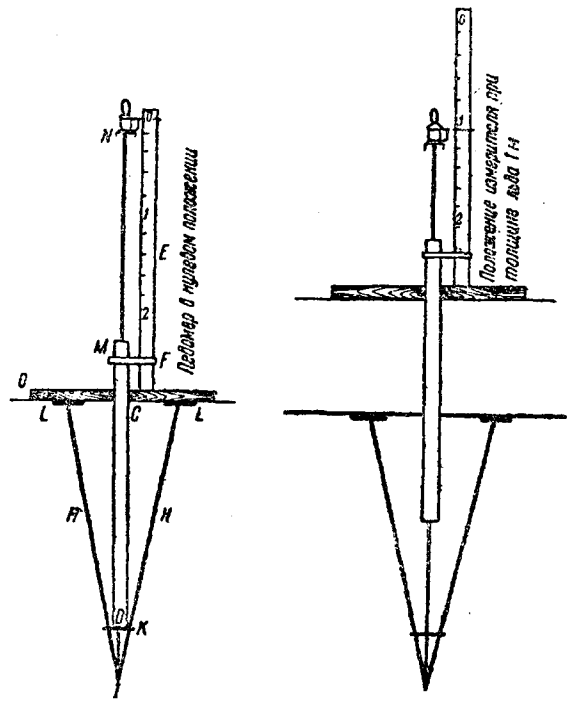

FIG. 1. — *Fixed device for the measurement of the thickness of the ice.*
Stationary part of the service : O — Beam; MD — Tube; E — Staff.
Movable part, the Meter : N1 — Shaft; H — Rods; L — Disc-Feelers;
N — Handle with rotatable Indicator.

For facilitating the work, many mechanical contrivances have been proposed. Some of these are instruments with drilling action, and are either hand or power driven; others act by percussion. The heat of steam from boiling water to melt a hole through the ice has also been quite successfully used.

The operator at Cape Schmidt polar station, M. KUSNETSOV, has solved in another manner the problem of facilitating the work when measuring the thickness of the ice. He utilised a special fixed staff which, once set up on the ice, remains in place during the entire period of the measurements.

This device, to which the name "Ice-Meter" has been given, is composed of two parts, one stationary, the other movable (Fig. 1).

The stationary part consists of a wooden beam in which a metal tube of such length is inserted that it somewhat exceeds the maximum thickness of the ice to be expected at the place of installation.

Alongside the tube, on the same beam, is affixed a wooden staff graduated in centimetres, of a length such that its dimensions also exceed the probable maximum thickness of the ice. For greater rigidity, the lower end of the stac and upper end of the tube are fastened together by a strong band F.

The movable part of the Ice-Meter consists of a metal shaft with metal rods welded to its lower end, terminating in disc-feelers; also a cap with indicator, fixed to the upper end of the shaft.

As soon as the ice strong enough to permit displacement on it to the site of the proposed measurements, and at sufficient a distance from shore to assure normal conditions for measuring its thickness, an oblong opening is cut through same. The device is brought to the site of measurement and is so installed that the beam lies flat on the ice, so that, on the staff, opposite the indicator, on lifting the shaft to its working position (the disc-feelers must then bear from underneath on the ice), the reading is the same as with the portable staff lowered in the ordinary manner through the opening. The tube is next filled with a mixture of kerosene and naphta.

The actual measurement is effected by pulling up the shaft until the discs come in contact with the under surface of the ice; the thickness of the ice is then read off directly on the staff.

When not in operation, the staff is lowered and the cap with indicator thereupon closes the tube.

The device is simple in construction and handling, and excludes the necessity of having to bore a well prior to each measurement.

The cooling effect of the tube should not be so great as to produce abnormal conditions for the growth of ice around it.

However, in view of this possibility, a distance of not less than 1 m. should be maintained between the discs of the metal rods.

It is very desirable that special experiments with the device be carried out alongside measurements by the ordinary methods recommended for the measurement of the thickness of the ice, in order to ascertain the extent of the thermic influence on the tube filled with kerosene and naphta.

ON THE WINTER INSTALLATION OF A TIDE-GAUGE ON THE ICE.

by

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For the continuous recording of the oscillations of sea level in winter in the Arctic, the installation of a tide-gauge on the ice is currently used. As a rule, the float of such tide-gauges is replaced by a weight, lowered to the bottom of the sea. The tide-gauge itself is set up on the ice and records the oscillations of the ice-cover which has followed the movements of the sea level. One of these devices, which later became the standard pattern, was still utilised in 1925 by I.L. RUSINOVA at the polar station Matotshkin Shar and is described in Vol. LIII of the *Zapiski po Ghidrografii*.