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ON THE TIDAL WATERS IN THE NORDÅSVATN

A home-made, self-recording Tide-gauge

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On the Tidal Waters in the Nordåsvatn.

A home-made, self- recording tide-gauge.

Stimulated by Mr. G. Rollefsen, The Directorate of Fisheries, Bergen, I made in the autumn of 1942 a rather primitive self-recording tide-gauge and mounted it at Kråkenes in the Nordåsvatn in order to have it tried. In spite of its simple construction it was found to give quite distinct records of the daily and weekly periods, besides showing some typical traits of the tide disturbances.

Fig. 1 shows the registrator. The floater *F* is an ordinary bottle, half filled with water and floating inside a tube. A narrow opening in the bottom of the tube reduces the disturbing effects of surface wawes on the record. By means of a piano string the movements of the bottle are transmitted to the larger wheel *H* on the gauge. A smal-

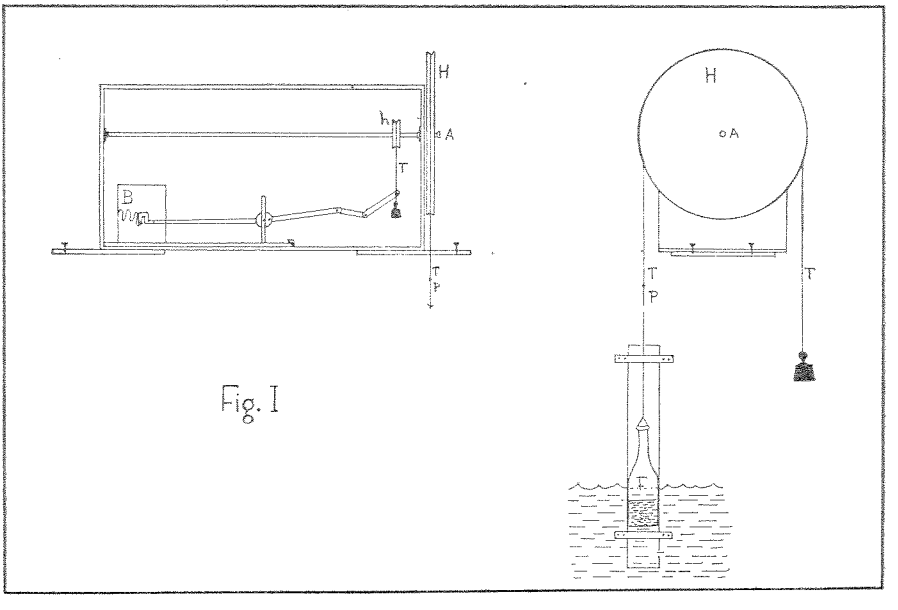

Fig. 1

ler wheel *h*, mounted on the same axis, serves to reduce the scale to 1 : 10. In order to increase friction rope is used round both wheels instead of string. The motion of the wheel *h* is finally transferred to a lever arrangement, one arm of which is used for adjusting the scale by regulating its length. The other arm is provided with a pen that records on an old barograph-drum, making one revolution a week. Ordinary barograph paper is used, and the movements of the floater with the tide can be read with an accuracy of about $\pm$ 0,1 cm ($\pm$ 0,1 mm on the record.)

Fig. 2 represents the records obtained from October 12. to November 17. 1942. During that period the daily amplitude is about 10 cm and the greatest difference is 65 cm, from 78 cm (neap) to 143 cm (spring).

Fig. 3 illustrates the average height of water, the curve being obtained from the 2-hourly readings of the original records by forming consecutive means of 12 values.

Fig. 5 shows the delay of high and low water at Kråkenes compared with high and low water at Vatlestraumen (outer fjord). The average delay is about 2 hours and it seems to decrease with increasing average height of water. This is no doubt due to the narrow and shallow entrance to the Nordåsvatn at Straume, where the transport of water pr. unit of time is relatively very much increased with an increasing average height of water.

The weekly period of the tide is distinct, but several times disturbances can be seen to have occurred. The wind seems to be the cause of these irregularities as southerly and westerly winds have the effect of piling up the water in the Nordåsvatn, and easterly and northerly winds of brushing it out towards the sea. Trying to justify this point of view I have plotted in fig. 6, after Beaufort scale, the southerly and westerly winds upwards from a zeroline and the easterly and northerly winds downwards in the same way, and a comparison between fig. 6 and fig. 2 seems to confirm the theory. This elevation of the water must partly be seen as a local stowing of the water in the Nordåsvatn itself, and partly as due to a general stowing of the coastal water.

Fig. 7 shows the rainfall. When not occurring in greater quantities the precipitation does not seem to have any notable influence on the height of water. However a decrease of amplitude and the great elevation of water on November 14. and 15. seems to be caused by the rainfall. (The observations on wind and rainfall are from Fredriksberg, Bergen).

It must be borne in mind that this was no scientific research, but

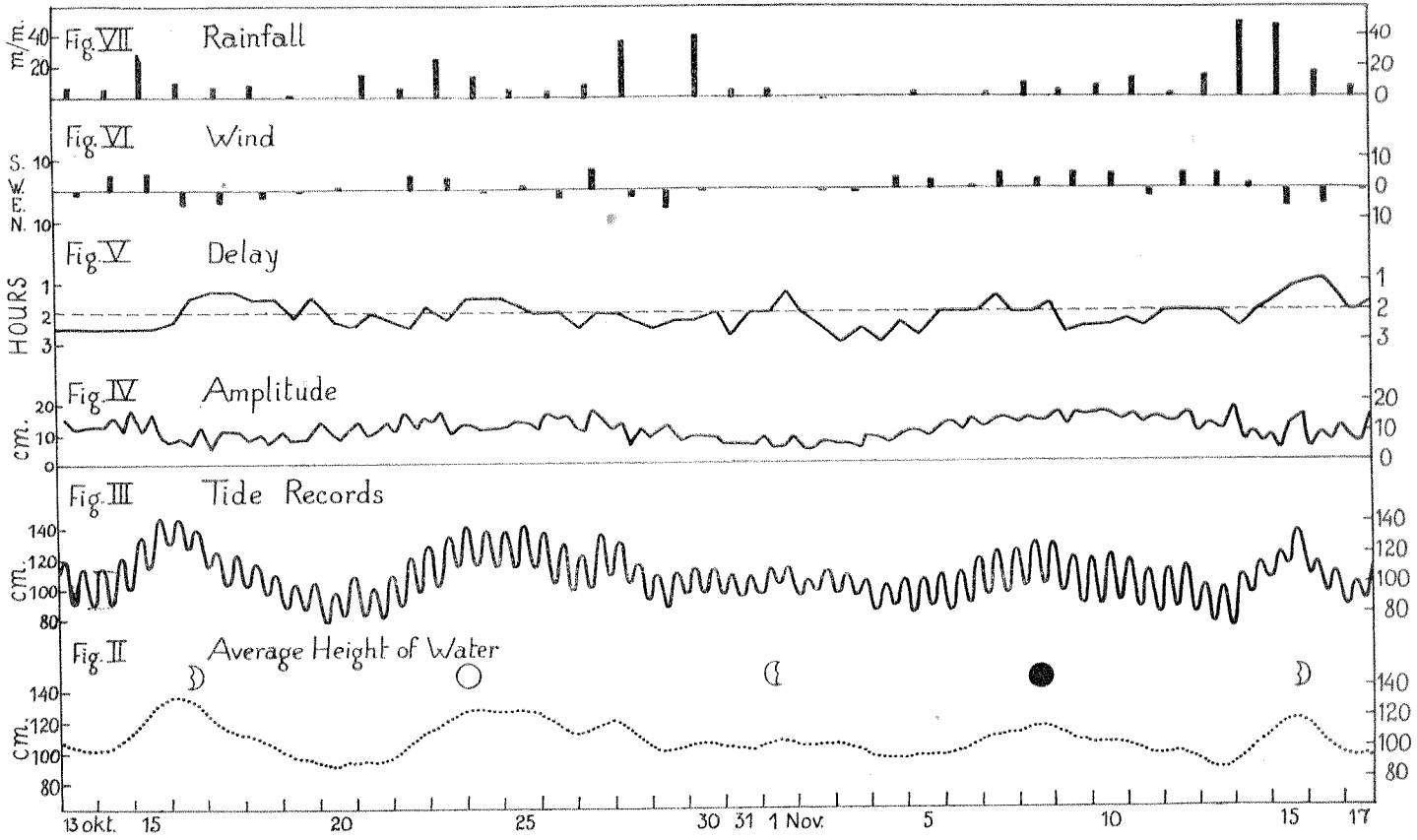
Fig. VII Rainfall
m/m.
40
20
0
Fig. VI Wind
S.
N.
10
0
10
Fig. V Delay
HOURS
1
2
3
Fig. IV Amplitude
cm.
20
10
0
Fig. III Tide Records
cm.
140
120
100
80
Fig. II Average Height of Water
13 okt.
15
20
25
30
31
1 Nov.
5
10
15
17

only an experiment in order to find out the working possibilities of the home-made tide-gauge.

As mentioned above, however, some interesting and probably good results were obtained through the experiment, and it is very likely that an instrument of a similar construction, when scientifically mounted and served, might be used for scientific investigations.