

## REMARKS ON TIDE-GAUGES

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I. — There has been recently greatly increased activity in taking observations of tides but many difficulties have had to be overcome because of the cost of new gauges. It has been customary to use very large gauges which could only be operated by large floats in wide wells. I have long held that these are quite unnecessary and I advised Légé and Co., London, regarding the design of a new gauge which would have the following advantages :

(1) The chart should have an open time scale, about 1 cm. per hour as I strongly disapprove of contracted time scales ;

(2) it should normally operate on a height scale of 1 cm. per foot of tide, or on a larger scale if the tidal range is small ;

(3) the gear-wheels for the height scales should be readily interchanged to permit the instrument to be used for more than one range of tide ;

(4) it should use a pen to give the record, and the pen should be so mounted as to have minimum friction ;

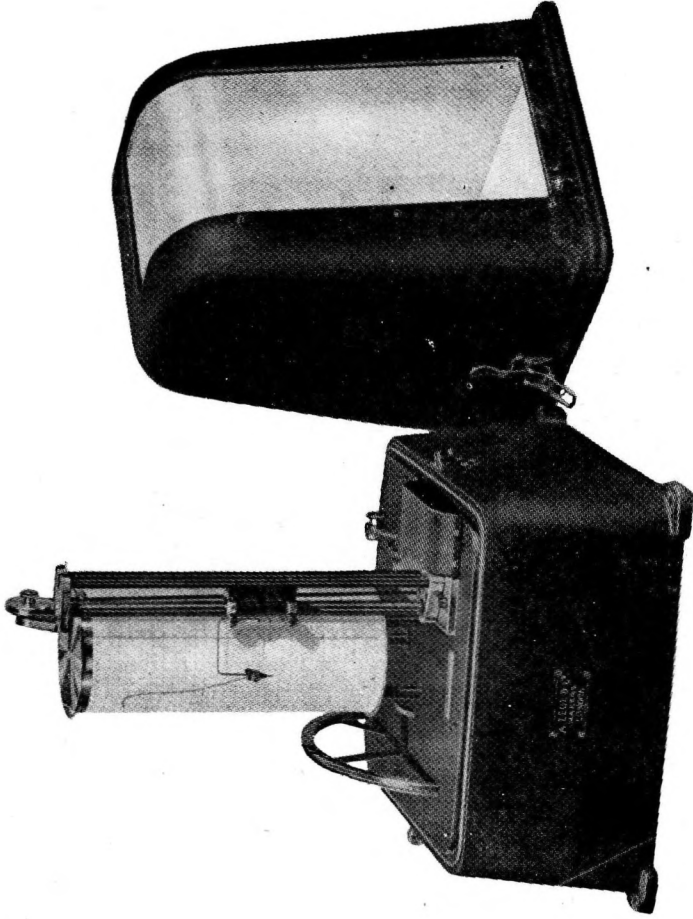
(5) the float should be small enough to permit the use of a standard-size stainless-steel tube for the well, as this would not require costly wells and it could be readily supported by simple structures alongside wharfs, or piers, or even on open coasts ;

(6) the case for the instrument should exclude all damp air or spray from the sea ;

(7) the clock should be of high quality.

An example of the gauge made to this specification is shown on the stand. It costs less than one-quarter of the older and larger gauges and it is very sensitive. Being made of stainless steel, it is not subject to corrosion ; and the clock is one of the very best obtainable for such purposes. The gauge has been well tested in harbours and the records have been analysed by the Tidal Institute.

II. A further development has been the design of a gauge which can record a considerable distance from the sea. There are many designs for remote-recording, the transmitting element in many cases being that of the pressure. My personal preference is for a gauge which is electrically operated, and I myself have designed a gauge which records 3 miles away from the sea, but it is not perfect and there



The L'égé Tide or Water Level Recorder, Universal and Automatic.

are many difficulties to be overcome in order to obtain efficient registration. My experience showed that the best type of *transmitter* must conform to the following specification :

(1) It must operate in a very narrow tube which may be easily set up either on wharfs or piers or on open coasts ;

(2) it must not just give impulses every centimetre of tide, say, for the summation of these impulses may not be perfect ;

(3) the transmitting element should be drawn upwards as soon as the sea covers two electrodes, or it should fall when one of those electrodes is uncovered ;

(4) the operation of the motor effecting the movement of the transmitting element should be effected by a motor requiring not more than 24 volts ;

(5) the transmission from the element to the recorder should be of the highest possible electrical quality ;

(6) the recorder should have the same qualities as that of the float-operated gauge.

These conditions have been satisfied with very great success by L  g   and Co. I have inspected the instrument which has been constructed for the British Hydrographic Department. It has been tested under very stringent conditions near a weir at Richmond on the Thames, and this position is one of very high turbulence together with rapid changes of elevation when the weir is operated. The record from it has been placed upon the gauge-recorder and it may be seen how sensitive the instrument is. I have no doubt whatever that this instrument will be of very great service to hydrographic surveyors and to port authorities who require recorders to be in their offices.

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