A DESCRIPTION OF A FORM VACUUM TIDE GAUGE

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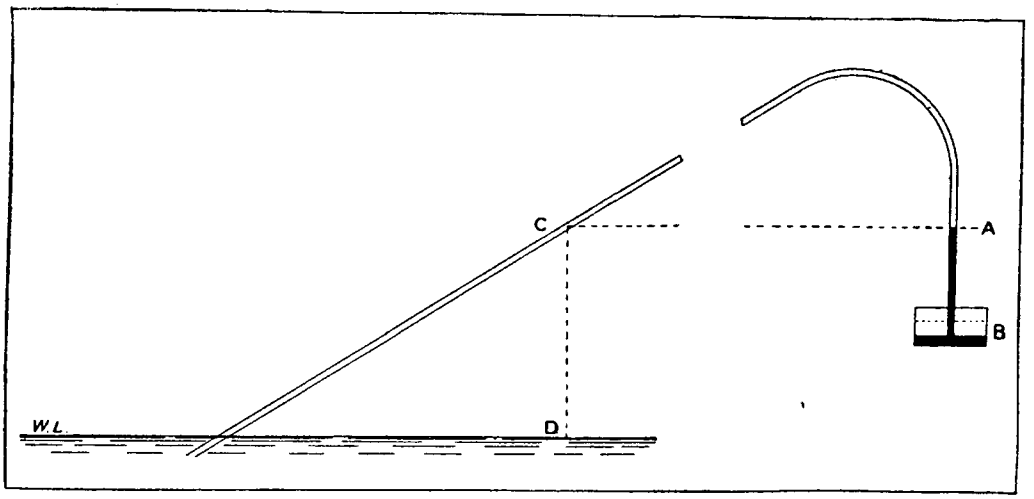
(Hydrographer of the British Navy from 1909 to 1914.)

Attach a glass barometer tube to one end of a length of rubber tubing, place the latter vertically in a vessel of water above High Water mark, and lead the tubing down the beach to the sea. The water may be made to syphon from the vessel to the sea with very little difficulty, pro-



vided the highest portion of the tubing is not more than about 30 feet (9 m.) above the level of the sea.

While the water is syphoning, pour some mercury into the vessel (a jam pot makes a convenient vessel), and then raise the latter until the end of the barometer tube dips under the mercury; the mercury will at once rise in the tube to a height *AB* shown on the plate, equivalent to the height of a corresponding column of water *CD*. If *CD* varies owing to the surface of the water at *D* varying, then *AB* must likewise vary in the same proportion. Consequently, if *D* represent the surface of the tide, then as the tide rises and falls so will the column of mercury *AB* fall and

rise in the proportion of about one inch of mercury to one foot of water, and therefore, if a suitable scale be provided, *AB* may be read off like a tide pole.

The end of the tubing must always be below the surface of the water, but the amount is immaterial; it should, however, be kept clear of the bottom, if of mud or sand, and may with advantage be attached to the under surface of a small buoy moored in a convenient spot.

As a very small amount of air leaking into the tubing will largely affect the vacuum, and consequently the height of the mercury column, precaution is necessary to prevent leakage as much as possible by painting over all connections with several coats of " Shellac varnish ", which is made by breaking up sealing wax into small pieces, placing in a bottle and covering with methylated spirits, and then standing for two or three days before use.

This gauge is not intended to supersede the ordinary tide pole, but only to provide an alternative means of readily recording the tide when, for instance, at night, it is inconvenient or impossible to obtain the direct readings of the pole. It is most useful of course on a shelving beach, as the mercury gauge, *etc.*, can be fixed up, inside the tide watcher's hut or tent, or as convenient, at some distance from the water, the limit being the amount of tubing available. The less height, however, the mercury gauge is above high-water, the less practical difficulties there are likely down to be with the gauge.

Similar gauges have been used with perfect success by several British Surveying vessels, as much as 400 feet (122 m.) of tubing between sea and gauge being used; on one occasion when the tide pole was knocked in a gale of wind, the gauge remained working satisfactorily.

No difficulties were experienced in keeping the vacuum, even when, as a severe test, it was left without attendance for an entire month. In practice, however, it is advisable to thoroughly wash through the whole apparatus once a week or oftener if there is much sediment in the water, as it is surprising what an amount of small particles of shell and other substances find their way in; the washing through is easily performed by causing the water to syphon.