

them shut by the weight of the beam. They can be adjusted to any degree of stiffness by means of the screws in the keys of the stop-cocks and those attaching the levers to the beam. When the instrument has been set and fixed to the sounding-line, it should be lowered as nearly as possible to the surface of the water and then let go, care being taken that the line is not checked till the desired depth is attained. If the vessel from which the soundings are being taken is not very high out of the water, it is better, as soon as the water-bottle is fixed, to let it go without previous lowering, avoiding thereby the danger of the stop-cocks being shut by the line being lowered by jerks.

That the instrument really collects the water at the depth to which it is sunk, or, in other words, that the water really passes through it without sticking, was proved by some experiment in Linlithgow Loch. The bottle was filled with water containing ferrocyanide of potassium in solution, and sunk to various depths, the water brought up being tested with perchloride of iron. Water brought up from any depth over $1\frac{1}{2}$ fathoms showed no trace of Prussian blue.

For determining the specific gravity of the sea in different parts of the ocean, Mr. Buchanan uses a hydrometer of the following construction and dimensions: It is a glass instrument of the ordinary shape, loaded with mercury, and carrying an arbitrary scale. It is made to float at the lowest mark on the stem at about 15° C. To the top of the stem is fitted a small table of thin sheet-brass of such a weight that it depresses the instrument, in distilled water of 15° C., to the highest division on the stem. This table is destined to carry such weights as shall sink the instrument within the limits of the scale in the liquid whose specific gravity is to be determined. The instrument ceases to be useful when the weight becomes so great as to render it top-heavy. By use of a series of six weights, specific gravities between 1 and 1.034 can be determined with one hydrometer, and the results be accurate to 5 in the fifth decimal place.