

is a propeller which is moved by the current, the velocity determining the number of revolutions in a certain period. The propeller works some small cog-wheels connected with hands showing on a dial the number of revolutions. The mechanism for indicating the direction of the current is very ingenious. Some small shot are inserted into a tube leading to one of the cog-wheels, which is provided with notches each holding one little ball. The balls are carried round by the wheel, and after half a revolution are discharged through another tube into the centre of a metal box, in which is poised a magnetic needle with a groove along the top of one branch. As the shot fall, they roll along the needle and drop off its point into the box. Their path may be traced in the figure. The bottom of the box is divided into thirty-six small partitions, and the balls fall into one or other of these according to the position of the needle. The position of a ball in the box thus indicates the angle between the axis of the apparatus and the magnetic meridian, that is, the direction of the current. When the apparatus is lowered into the water, the propeller is set and fixed, and is subsequently released by a small messenger so as to spin with the current; when desired, a larger messenger is sent down to arrest the propeller before hauling up. With this current-meter a great number of observations have now been made, many of which have given very important results.

In order to obtain good results it is necessary that the apparatus should hang practically still, without being carried along by the ship or the water, or—if this be unavoidable—that the drift should be perfectly well known. The boat from which the work is done must be very firmly anchored. In the Norwegian investigations we have, as a rule, worked from a small boat with anchors fore and aft, and it was possible in this way to hold the boat, even when more than 500 metres over the bottom, the most exact bearings showing that the boat did not drift sufficiently to influence the current-meter; one anchor alone is usually not sufficient, for the boat may swing, thus affecting the apparatus. When measuring the currents in the Straits of Gibraltar, we tried double staying with the life-boat, using a strong hemp line about one inch in circumference, but the current was so strong that the line broke again and again, and we had to give it up. When the current (or the wind) is very strong, good results may be obtained by means of a single anchor forward, so we dropped one of the large anchors of the "Michael Sars," and the steamer lay so