

of its cylinder. As the instrument runs down the water passes freely through the tube and valves, and pours out by the holes in the wall of the cylinder. When it touches the ground the piston is pulled down by the weight, but its progress is somewhat arrested by the water in the lower part of the cylinder, which can only escape slowly, thus giving the weight time to force the terminal chamber with the butterfly valves into the ground. The weights then rest upon the bottom and relieve the spring which throws the sling off the tooth. The tube comes up free with all the valves closed, and the last chamber filled with the substance of the bottom, and the other chamber with bottom water.

In the skilful hands of Captain Calver the 'Hydra' never once failed, and from the great weight used it is admirably suited for accurate soundings in deep water; but it is somewhat complicated, and it brings up very small samples of the bottom. In the case of the cruise of the 'Porcupine,' where the large dredge was sent down at almost every sounding-station, this was of little consequence; but where dredging is impracticable, and all information as to the condition of the bottom must be got from soundings, some simple adaptation of the 'Bull-dog' scoops or the Fitzgerald apparatus would certainly have a great advantage.

During the cruise of the 'Porcupine' in 1869 soundings were taken with the utmost care at ninety stations, and in 1870 at sixty-seven stations, and on every occasion the operation was conducted by Capt. Calver himself, whose great experience on the surveying service was in itself a guarantee of the greatest possible accuracy. Captain Calver told me that on