the survey was carried on under the direction of Sir John Murray and Mr Laurence Pullar, and temperature observations were made in practically all the lochs surveyed. In Loch Ness observations were made in the years 1903, 1904, and 1905, which in their completeness are, I believe, unique in the history of limnology, though in the light of after experience the observations leave much to be desired. I have subsequently endeavoured to examine the temperature changes occurring in fresh-water lakes experimentally, and during the first half of the year 1908 I was able to make numerous observations in Loch Garry, Inverness-shire, which are of great value as confirming deductions based on the observations in Loch Ness. An attempt has also been made (the first of its kind) to observe directly currents in lakes, with a view to a better understanding of the temperature changes which have been observed.

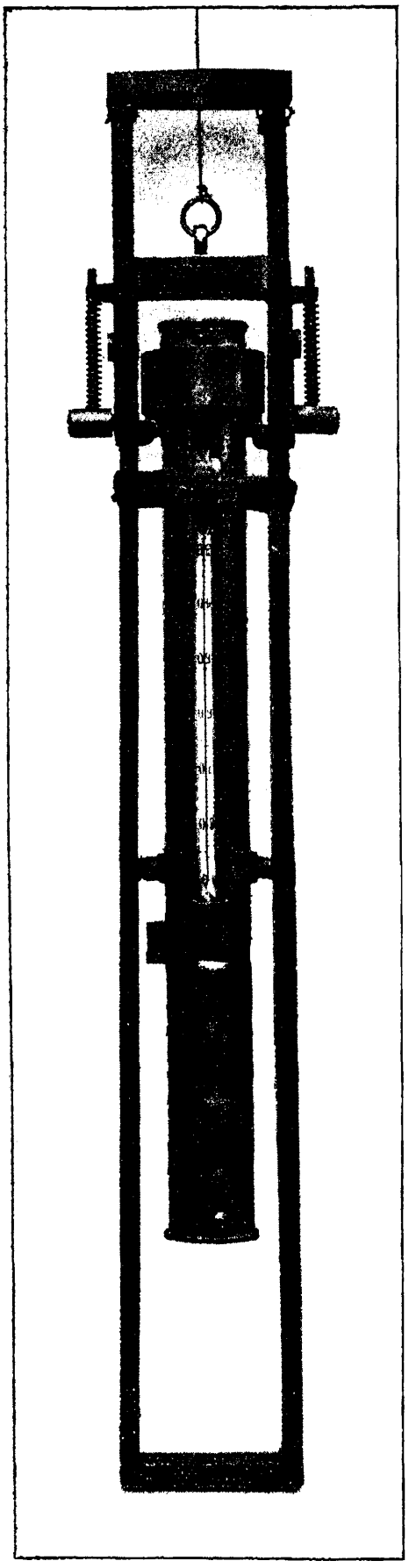

Fig. 35.

Reference may be made in passing to the different kinds of thermometers which have been used from time to time in making temperature observations in lakes. The instrument which is chiefly used now is the Negretti & Zambra reversing thermometer. It consists of a mercury thermometer with a constriction in the bore of the stem about an inch above the bulb. As long as the thermometer is upright the mercury is continuous from bulb to stem, but if the thermometer be turned upside down, the mercury breaks at the constriction, and the portion in the stem falls down. The stem is graduated from the point to the bulb, so that the temperature at the moment of inversion is read off on the stem. This thermometer is enclosed in a strong glass case to protect it against the pressure to which it is subjected when immersed in water, and the whole is fitted in a metal frame which can be attached to the sounding-line.