

water on the outer shell, and thus protecting the bulb within.

Mr. Casella was directed to construct some thermometers on this plan, only instead of being filled with air, the outer shell was nearly filled with alcohol warmed to expel a portion of the remaining air, and the chamber was then hermetically sealed, leaving a bell of air and vapour of alcohol to yield to the pressure and relieve the bulb within. The 'Miller-Casella' thermometer proved so nearly perfection that it was decided to adopt it in future, and to use it as a standard in a series of experiments which were undertaken to test the ordinary Six's thermometers of the Hydrographic Office pattern. We depended upon this thermometer alone in our subsequent cruises in the 'Porcupine,' and we found it most satisfactory. During the summer of 1869 temperature observations were taken at upwards of ninety stations, at depths varying from 10 to 2,435 fathoms. Two thermometers, numbered 100 and 103 respectively were sent down at every station, and in no instance did they give the least reason to doubt their accuracy. Every observation was taken by Captain Calver himself, the lead with the thermometers attached being in every single instance let down by his own hand,

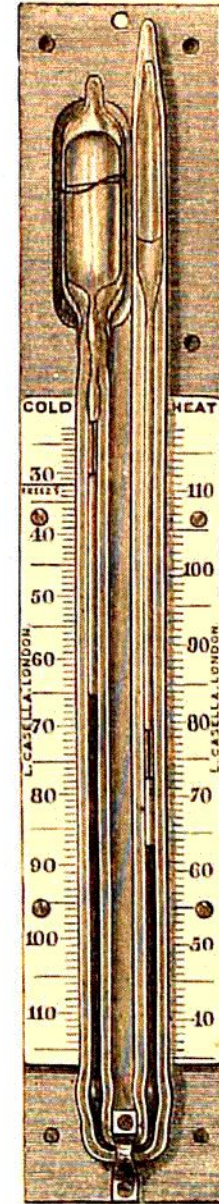


FIG. 53.—The Miller-Casella modification of Six's self-registering thermometer. The large bulb is double, with a layer of liquid and a bell of vapour between the shells, to relieve pressure.