

examined, the effect of this aneurism, and his Report concludes with a table of the results. From these it appears that, even with the aneurisms, there is none of the instruments examined in which the requisite correction for pressure amounts to more than $0^{\circ}\cdot14$ F. per mile of depth in the sea, while the average value is considerably lower.

Under the circumstances in which the thermometers are usually hauled on board, and considering also the difficulty of reading to small fractions of a degree, it is clear that it is scarcely necessary to apply any correction for pressure, though it would certainly have been much more satisfactory to have had the aneurisms protected as well as the main bulb.

Professor Tait's experiments with the new apparatus have led to several curious results which, though not directly bearing on the pressure errors of the thermometers, may be found of importance in other departments of the Challenger work. He has, for instance, investigated the compressibility of fresh and salt water at different temperatures under great pressures, and has shown that the maximum density point of fresh water is lowered by pressure. Various additional questions of this kind, directly connected with the great problem of ocean circulation, are now being investigated by means of the new pressure apparatus—and a verification of the unit of his gauge was obtained in the autumn of 1882, by sinking a number of his gauges, whose behaviour in the pressure apparatus had been previously ascertained, to depths of 800 and 1300 fathoms from H.M.S. "Triton," which made a special cruise for this and other connected purposes.

Piezometers.—In the Mediterranean, the Red Sea, and many of the seas of the Eastern Archipelago, besides, possibly, large tracts both of the Atlantic and Pacific Oceans, the temperature decreases regularly down to a certain depth, which varies in different seas, and at all greater depths the protected Six thermometer gives identical readings, indicating that the water is either at the same temperature or some higher one. In the neighbourhood of ice, layers of water are frequently met with at various depths whose temperature, being higher than that of the surface, is indicated by the maximum index of the protected Six thermometer. Besides these layers there may be, and there probably are, others whose temperature is higher than that of the water immediately above them without reaching that of the surface, and their temperature would remain unrecorded.

This fact was brought prominently under the notice of the members of the Expedition during the cruise in Antarctic waters, where a large stratum of water was found at depths exceeding 300 and 500 fathoms from the surface, the temperature of which could not be ascertained by any instrument on board, and had to be reported as uncertain.

In order to prevent the recurrence of such an experience, the matter was carefully investigated by the chemist of the Expedition, who devised and constructed an instrument suitable for determining the temperature of water arranged as it was in the Antarctic Ocean. Before leaving home he had had constructed several piezometers filled with water or saline solutions, with a view of determining the compressibility of these liquids