

in order to get good results, the instrument must be kept perfectly clean, being always wiped dry with a clean cloth after use. Repeated experiments with the same liquid give results always agreeing within one scale division. In taking specific gravities at sea, the operation is performed on a swinging table; the motion of the ship gives the hydrometer just so much oscillation as to overcome all effect of sticking, and to make the reading as much more satisfactory than on shore as that of a balance is, when it is allowed to oscillate, in preference to being brought to rest with the tongue on the zero. As it is very difficult to place the cylinder perfectly vertically on the swinging table, the hydrometer generally has a certain list to one side or another, which also favors its freedom of motion.

The space on the port side of the main-deck between the chart-room and the laboratory is occupied by such of our gear as would not pack into the work-rooms, including the apparatus devised by Mr. Siemens, F.R.S., for telegraphing the temperature from all depths, and his photometric apparatus for determining, by the exposure of sensitive paper for a certain length of time, the depth to which the chemical rays of the sun penetrate into the water of the sea. Fig. 13 represents a hydraulic pump for reproducing the pressure to which thermometers and other instruments are subjected at great depths, and thus affording us a means of determining their error under certain measured pressures before sending them down. The pump A is of the ordinary construction, only with a very narrow cylinder, the diameter of the cylinder and piston being $\frac{1}{4}$ inch. The water is pumped into the reservoir B, a cast-iron tube of 3 inches internal and 9 inches external diameter, closed above by the plug C, which is held in its place by the bolt D. The instruments to be tested are placed in B; the plug C is inserted and made fast by the bolt, and water is pumped in until the desired pressure has been obtained. This is indicated by water issuing from the safety-valve E, which is of the ordinary construction. The ma-