

the southward, and the temperature of the surface water was  $69^{\circ}$ . At 2 P.M. the trawl was hove up and the dredge put over, another sounding being obtained in 400 fathoms (Station 164c, see Sheet 26). The difference in position between this sounding and that of 410 fathoms is due partly to the drift of the ship whilst trawling, owing to the southerly current. At Station 164c there was very little current, and the temperature of the surface water fell to  $67^{\circ}$ . Serial observations showed that this temperature extended to the depth of 40 fathoms, after which a gradual decrease took place to the bottom. At 5 P.M. the dredge was hove up, and sail was made to the northward under double-reefed topsails and courses. At 6 P.M. the temperature of the surface water again rose to  $69^{\circ}\cdot7$ , and continued above  $69^{\circ}$  during the night.

On the 14th June, at 6.15 A.M., the ship's position was ascertained by observations of  $\alpha$  Andromedæ and  $\alpha$  Aquilæ, showing a current of 25 miles in a S.  $17^{\circ}$  E. direction (true) since 6 P.M. yesterday, or 2 miles per hour. After altering the course to get into a convenient position for sounding, the temperature of the surface water fell to  $67^{\circ}$  at 10 A.M. At 11 A.M. a sounding was obtained in 2100 fathoms at Station 164D (see Sheet 26), and here no current was experienced. At noon sail was made to triple-reefed topsails, and a course shaped to the eastward. A fresh southwesterly gale prevented temperatures being obtained.

The Challenger observations on the current off Sydney, New South Wales, showed that in June 1874 the surface temperature, which was  $62^{\circ}$  in Port Jackson, and  $66^{\circ}\cdot5$  just outside the heads, rose to  $69^{\circ}$  at a distance of 20 miles from the land, and continued at, or above, that temperature for 30 miles, when it again fell, at 50 miles from the shore, to  $67^{\circ}$ , and gradually decreased to  $63^{\circ}$ . When the temperature of the surface water was at, or above,  $69^{\circ}$ , it was found both by astronomical observations and from observations whilst sounding, that the current was running to the southward at an average rate of  $1\frac{1}{2}$  miles per hour; but directly the temperature of the surface fell to  $67^{\circ}$ , little, if any, current was experienced. The highest temperature registered in the heart of the stream was  $70^{\circ}\cdot7$ . The impossibility of mooring a boat by the dredge or trawl rope, in order to obtain a good observation of the speed of the current in the centre of the stream, was much regretted, but the weather was very unfavourable, there being strong breezes with a considerable swell, so that the rate could only be estimated whilst sounding, and calculated from the differences between the position of the ship by D.R. and observation. In April, when steaming along the land from Montague Island to Sydney, the stream was found close in shore (from Jervis Bay to Port Jackson); in June, after a continuance of westerly winds, its inner edge was 20 miles from the coast. This seems to indicate that the wind has much to do with the distance of this stream from the shore. The temperature of the stream in April was  $72^{\circ}$ , and in June  $69^{\circ}$ , showing a diminution of  $3^{\circ}$ . The mean temperature of the air at Sydney in April is  $65^{\circ}$ , and in June  $54^{\circ}\cdot6$ .