

the observed latitude being $36^{\circ} 23' 30''$ N. At 10.20 A.M. a set of sights was obtained, and as the bearing of the sun at that time made it a matter of importance to know exactly the latitude (an error of one mile of latitude causing an error of one mile in longitude), the result given by the observations then taken furnishes a very good test of the accuracy of the deductions. The interval from noon being 1.7 hour, it follows that the position of the ship at the moment, calculated by the known rate of the current from the noon results, will be lat. $36^{\circ} 20' 48''$ N., long. $71^{\circ} 51' 44''$ W., and the longitude, calculated from the observations, was $71^{\circ} 53' 45''$ W. Again, at 8.40 A.M. the position calculated from the noon observation was lat. $36^{\circ} 18' 15''$ N., long. $71^{\circ} 57' 6''$ W., and longitude calculated from the observations at the time was $71^{\circ} 57' 30''$ W. Such an accordance between the calculated positions and those obtained by observation will, in all probability, be deemed a sufficient proof, together with the fact of the rate at which it was necessary to steam to keep the sounding line perpendicular, that this estimate of the strength and direction of the Gulf Stream whilst the vessel was in it is a very close approximation to the truth.

At 5 P.M., these observations being completed, the ship proceeded N.N.W. (N. 30° W. true) at right angles to the direction of the stream. At 9.30 P.M. the surface temperature had fallen from $75^{\circ} 0$ to $69^{\circ} 0$, and the patent log showed that the vessel had gone 10 miles through the water. At 11 P.M. the surface temperature was $67^{\circ} 5$, but at midnight it had fallen to $56^{\circ} 5$, and continued nearly the same the whole of the next day.

On the 2nd and 3rd May the weather was so thick with rain and fog that no observations of any of the heavenly bodies could be obtained. On the 4th May the clouds cleared off, and it was possible to ascertain the position of the ship at 6 A.M., which proved to be lat. $39^{\circ} 5'$ N., long. $71^{\circ} 55'$ W., the position by D.R. at this time being $38^{\circ} 57'$ N., $71^{\circ} 57'$ W., that is allowing for a current of $3\frac{1}{4}$ miles per hour up to 9.30 P.M. on the 1st, at which time the temperature decreased 6° . It will, therefore, be seen that the position by D.R. was 8 miles south of that by observation—a difference due, in all probability, to an error in the leeway allowed from 2 P.M. on the 3rd to 6 A.M. on the 4th, during which time the ship was close hauled; previously the course had been off the wind.

Recapitulating, then, it appears that on May 1st, at 6 A.M., the temperature of the surface water rose to $75^{\circ} 0$, and that at 6.40 A.M., when soundings, &c., were taken, and when the ship had run 5 miles to N.N.W. from 6 A.M., her position by D.R. and observation showed a difference of but 4 miles in longitude; that by astronomical observation the ship drifted between 6.40 A.M. and 4.30 P.M. $3\frac{1}{4}$ miles per hour in a N. 60° E. direction (true), the temperature of the surface water remaining at 75° ; that from 5 P.M. to 9.30 P.M. the ship proceeded in a N. 30° W. direction (true) for 10 miles, the surface temperature still remaining at $75^{\circ} 0$, but that immediately afterwards it fell to $69^{\circ} 0$, and was at midnight $56^{\circ} 5$; and that allowing a current of $3\frac{1}{4}$ miles per hour N. 60° E. (true) during the time the surface temperature remained at $75^{\circ} 0$, the longitude by D.R. agrees