

and excellent letter addressed to Dr. Carpenter—a letter which there is no impropriety in my quoting in full as it is already in print, and which has a special interest as being probably one of the last written by Sir John Herschel on scientific subjects:—

“COLLINGWOOD, *April 9th*, 1871.

“MY DEAR SIR,—Many thanks for your paper on the Gibraltar current and the Gulf-stream. Assuredly, after well considering all you say, as well as the common sense of the matter, and the experience of our hot-water circulation pipes in our greenhouses, &c., there is no refusing to admit that an oceanic circulation of some sort must arise from mere heat, cold, and evaporation, as *veræ causæ*, and you have brought forward with singular emphasis the more powerful action of the polar cold, or rather the more intense action, as its maximum effect is limited to a much smaller area than that of the maximum of equatorial heat.

“The action of the trade and counter-trade winds, in like manner, cannot be ignored; and henceforward the question of ocean currents will have to be studied under a twofold point of view. The wind-currents, however, are of easier investigation: all the causes lie on the surface; none of the agencies escape our notice; the configuration of coasts, which mainly determines their direction, is patent to sight. It is otherwise with the other class of movements. They take place in the depths of the ocean; and their movements and directions and channels of concentration are limited to the configuration of the sea-bottom, which has to be studied over its entire surface by the very imperfect method of sounding.

“I am glad you succeeded in getting specimens of Mediterranean water near the place of the presumed salt spring of Smyth and Wollaston, making it clear that the whole affair must have arisen from some accidental substitution of one bottle for another, or from evaporation. I never put any hearty faith in it.