First, the surface of the sea—that is to say, the upper surface of the Gulf-stream layer—is losing heat rapidly by radiation, by contact with a layer of air which is in constant motion and being perpetually cooled by convection, and by the conversion of water into vapour.[1] As this cooling of the Gulf-stream layer takes place principally at the surface, the temperature of the mass is kept pretty uniform by convection. Secondly, the band of contact of the lower surface of the Gulf-stream water with the upper surface of the cold indraught. Here the interchange of temperature must be very slow, though that it does take place is shown by the slight depression of the surface isotherms over the principal paths of the indraught. But there is a good deal of intermixture extending through a considerable layer. The cold water being beneath, convection in the ordinary sense cannot occur, and interchange of temperature must depend mainly upon conduction and diffusion, causes which in the case of masses of water must be almost secular in their action, and probably to a much greater extent upon mixture produced by local currents and by the tides. The third surface is that of contact between the cold indraught and the bottom of the sea. The temperature of the crust of the earth has been variously calculated at from 4° to 11° C., but it must be completely cooled down by anything like a movement and constant renewal of cold water.

[1] On Deep-sea Climates. The Substance of a Lecture delivered to the Natural Science Class in Queen's College, Belfast, at the close of the Summer Session 1870, by Professor Wyville Thomson. (*Nature*, July 28th, 1870.)