local accidents as those which produce the Gulf-stream proper, and which gives movement to a much larger and deeper body of water than the latter can affect. The evidence of such an interchange is two-fold—that of physical theory, and that of actual observation. Such a movement *must* take place, as was long since pointed out by Professor Buff, whenever an extended body of water is heated at one part and cooled at another; it is made use of in the warming of buildings by the hot-water apparatus, and it was admirably displayed at the Royal Institution a few months since in the following experiment kindly prepared for me by Dr. Odling." Dr. Carpenter then repeats Professor Buff's convection experiment, the heat being applied by a steam jet introduced vertically at one end of a narrow glass trough while a block of ice was wedged into the other end. "Thus a circulation was shown to be maintained in the trough by the application of heat at one of its extremities and of cold at the other, the *heated* water flowing along the *surface* from the warm to the cold end, and the *cooled* water flowing along the *bottom* from the cold to the warm end; just as it has been maintained that equatorial water streams on the surface towards the poles, and that polar water returns along the bottom towards the equator, if the movement be not interfered with by interposed obstacles, or prevented by antagonistic currents arising from local peculiarities."[1]

That such a movement *cannot* take place on this hypothesis has been already shown; and Dr. Car-

[1] The Gulf-stream. A letter from Dr. Carpenter to the Editor of *Nature*, dated Gibraltar, August 11th, 1870. (*Nature*, vol. ii. p. 334.)