

to it. But as for the seat of the forces which put and keep the Gulf-stream in motion, theorists may place them exclusively on one side of the ocean with as much philosophical propriety as on the other. Its waters find their way into the North Sea and Arctic Ocean by virtue of their specific gravity, while water thence, to take their place, is, by virtue of its specific gravity and by counter-currents, carried back into the gulf. The dynamical force which causes the Gulf-stream may therefore be said to reside both in the polar and in the intertropical waters of the Atlantic."

According to this view, the tropical water finds its way on account of its greater weight towards the poles, while the polar water, owing to its less weight, moves southwards to replace it. The general result would be of course a system of warm under- and cold surface-currents, and these we do not find. I merely quote the passage as a curious illustration of the adage that on most questions a good deal can be said on both sides.

We have already considered the doctrine of a general oceanic circulation, which has been so strongly advocated of late by Dr. Carpenter, and I have merely to advert in this place to the bearing which that doctrine has upon our views as to the origin of the Gulf-stream; its bearings on the extension and distribution of the current will be discussed hereafter. As already stated, Dr. Carpenter attributes all the great movements of ocean water to a general convective circulation, and of this general circulation he regards the Gulf-stream as a peculiarly modified case. In the passage already quoted (p. 370) of