

Stream. The South American continent is shaped somewhat in the form of a triangle, with one of its angular corners, called Cape St. Roque, pointing eastward. The equatorial current of the Atlantic impinges against this corner; but as the greater portion of the current lies a little to the north of the corner, it flows westward into the Gulf of Mexico and forms the Gulf Stream. A considerable portion of the water, however, strikes the land to the south of the cape, and is deflected along the shore of Brazil into the Southern Ocean, forming what is known as the Brazilian current. Now, it is obvious that the shifting of the equatorial current of the Atlantic only a few degrees to the south of its present position—a thing which would certainly take place under the conditions which we have been detailing—would turn the entire current into the Brazilian branch, and instead of flowing chiefly into the Gulf of Mexico, as at present, it would all flow into the Southern Ocean, and the Gulf Stream would consequently be stopped. The stoppage of the Gulf Stream, combined with all those causes which we have just been considering, would place Europe under a glacial condition, while at the same time the temperature of the Southern Ocean would, in consequence of the enormous quantity of warm water received, have its temperature (already high from other causes) raised enormously. And what holds true in regard to the currents of the Atlantic holds also true, though perhaps not to the same extent, of the currents of the Pacific.

“If the breadth of the Gulf Stream be taken at 50 miles, its depth at 1000 feet, its mean velocity at 2 statute miles an hour, the temperature of the water when it leaves the gulf at 65° , and the return current at 40° F.,⁴³ then, the quantity of heat conveyed into the Atlantic by this stream is equal to one-fourth of all the heat received from the sun by that ocean from the Tropic of Cancer to the Arctic Circle.”⁴⁴ From principles discussed at considerable length

⁴³ Sir Wyville Thomson states that in May, 1873, the “Challenger” expedition found the Gulf Stream, at the point where it was crossed, to be about sixty miles in width, 100 fathoms deep, and flowing at the rate of three knots per hour. This makes the volume of the stream one-fifth greater than the above estimate.

⁴⁴ The quantity of heat conveyed by the Gulf Stream for distribution is equal to 77,479,650,000,000,000,000 foot-pounds per day. The quantity received from the sun by the North Atlantic is 310,923,000,000,000,000,000 foot-pounds. “Climate and Time,” chap. ii.