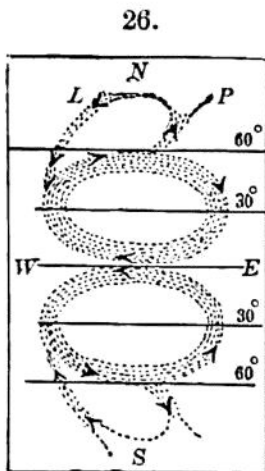


The rate of flow of the tropical current is increased somewhat after striking the borders of a continent, because of the diminished depth. As it passes on beyond the parallel of 30° and 35° , the flow becomes more and more easterly in course, in consequence of loss of motion by friction. In the tropical region, the movement *westward* indicates a less rapid rate of movement than the earth's surface, in its daily eastward rotation. But beyond 30° the rate of flow is faster than the rotation there; and hence the result is an eastward movement. As the waters continue on to the Arctic, friction further diminishes the flow, and while part goes on northeastward north of Asia, the rest lags and goes northward and northwestward. From the full polar seas the waters must of necessity escape southward; the lagging part takes a course along the Greenland border and down Baffin Bay, making the *Labrador current*; and also a submarine course along the western half of the ocean's bottom, while the rest returns along the ocean's bottom,—especially along its eastern half,—and thus the Atlantic circuit is completed.

In the accompanying sketch, WE is the equator with 30° and 60° parallels of latitude north and south of it. North, the ellipse represents the general movement in the north Atlantic; the branch at P, the flow poleward, and the current at L, the returning Labrador current.



The trends of the continental coasts, and their larger bays, gulfs, or seas, and bordering island groups, have much influence on the course and character of the current. Owing to the position of the north coast of South America with reference to the opposite coast of Africa, the circuit-stream of the south Atlantic as it flows westward contributes a considerable branch to the north Atlantic circuit; and because of the outlet among the East India Islands, the circuits of the north and south Pacific lose part of their waters by their

passing off into the Indian Ocean; and still they are plainly distinguishable off Japan, and off Australia, in the currents and their temperature.

The most remarkable example of the effect of gulfs or seas and islands is that afforded by the West India seas and islands. The West India sea faces part of the slowly advancing ocean-stream. It has an area of nearly 2,000,000 square miles. Though rudely fenced in by the Windward Islands, there are spaces over 3000 feet deep between the most of them, and less than twice this at the chief entrance. From the Caribbean Sea the waters, after a circuit, escape partly between the islands northwestward; but part pass the narrow Yucatan channel with an hourly movement of one fourth of a mile, and raise the level of the Gulf of Mexico three feet above its natural level, and, at the same time, act as a hydrostatic reservoir to make of the escaping waters the Gulf Stream, which flows through the Florida straits (according to Commander Bartlett) at a mean rate of three miles an hour, and at a maximum, for 15 miles in the axis of the stream, as high as 5½