

must have seen Lyell's map of Europe, as Europe existed in the Eocene period, — a map constructed mainly on the geologic data of M. A. Boué. The land which it exhibits exists as

from the west. The west coast of England and Ireland also exhibits deep indentations in high rocky land. We find the same appearances in a less marked degree on the coast of Normandy and Brittany in France, and on a still smaller scale upon the west coasts of Spain and Portugal. The west coast of Norway is one long line of islands, promontories, and deep fiords, — showing that the primary rocks, in spite of their hardness, have been breached in a thousand places by powerful currents. The western coasts of Denmark, Holland and Belgium, having the British Isles before them as a breakwater, have few indentations, except where laid open by the rivers. An effect so general should have a general cause, and perhaps physical geography may afford a clue to it. If the land rose in detached portions, and by successive lifts, from the sea, we may suppose that there was a time when the surface of the globe consisted of a great expanse of ocean studded with islands. Such Adolphe Brongniart supposes its condition to have been, at least in Europe, when the Coal Measures were deposited. In this state of things there would be three great and constant currents, — one within the tropics, running westward ; and two running eastward between the tropics and the poles. The trade-winds in the torrid zone, and the prevailing westerly winds in the extra-tropical regions, would alone account for these currents. But to these causes must be added the southward course of an under-current, from the pole, of *cold water*, with a low velocity of revolution, and the northward course of an upper current, from the equator, of *warm water*, with a high velocity of revolution. The first would become a westerly current when it reached the tropics, and the second an easterly current when it reached the temperate zone. Such would be the state of an open ocean from the equator to the north pole ; and, *mutatis mutandis*, the same description applies to the southern hemisphere. All the three currents, in truth, exist at this day, but enfeebled and metamorphosed by the transverse position of the two great continents. Now, if these currents were acting permanently, and with the force which they would have if little obstructed, their operation, when tracts of land rose above the sea, would be thus : — They would form deep indentations on the *east side* of intertropical, and on the *west side* of extratropical lands ; and, when acting in very favorable circumstances, would form islands, by making breaches through continents, or separating their prominent parts. The