

interior waters. Besides, the surface rocks of the continent are to a large extent Permian, Triassic, or Jurassic. Marsupials and Monotremes formerly had a wide range over the globe. A large Echidna, or Monotreme Porcupine, was among the species of England in the Middle Quaternary; and Marsupials, among the Mammals of Europe and America in the Tertiary; but at the present time the few of South and North America are all that exist out of Australia. It cannot be affirmed that Triassic Australia was the source of all the Marsupials of the world; but there is little doubt that its only Triassic Mammals were Marsupials and Monotremes.

It has already been explained that New Guinea and New Zealand show by their faunas that they were once parts of a great Australasian continent, New Guinea having its Marsupials, and New Zealand the only surviving species of the Permian and Triassic tribe of Rhynchocephalians, in a species of the genus *Hatteria*. The possible extension of the continent southward, and its union for a time with an Antarctic continent, are considered on page 737.

DISTURBANCES AND UPTURNINGS DURING, OR AT THE CLOSE OF, THE TRIASSIC AND JURASSIC PERIODS.

Triassic of the Atlantic border.

The Triassic areas of the Atlantic border bear evidence of a general upturning, in which the beds were, with small exceptions, raised not into flexures, but into monoclines. The effects of the movements have been briefly stated on page 357, under the subject of mountain-making. Additional facts and illustrations, respecting the disturbed areas, and the orographic results and methods, are here presented.

The close parallelism between the Triassic areas and the Appalachian chain is one of the great facts to be here noted. It is well seen on the map, page 412, and for Pennsylvania on that of page 730. The general parallelism between the strike of the upturned beds and the same course—that is, the trend of the areas—is another important fact. The two are satisfactory evidence that the agency concerned over the Atlantic border was the same for Jurassic time, as for the epoch when the Appalachians were made; and, it may be added, for all epochs of Eastern Border mountain-making.

In the Connecticut valley area there was an eastward dip also in the fracture planes, and a westward upthrust along these planes; and this also was a feature of the Appalachian upturning. These facts imply the action of lateral pressure from the eastward, or the direction of the ocean.

In the Palisade area passing from New York through New Jersey and Pennsylvania into Virginia, and in the *western* areas of Virginia and North Carolina, the results of the upturning are in general the reverse of those in the Connecticut valley and in *eastern* North Carolina. The beds of sandstone and the great fracture-planes, for the most part, dip westward or northwestward, and the upthrust along the fracture-planes was southeastward.