

Lower and Middle Triassic have rarely been *positively* identified; only those of the later part have been found on the Atlantic border; and none of either of the periods are yet known to exist on the Gulf border beneath its Cretaceous and Tertiary formations.

ROCKS—EQUIVALENCE, DISTRIBUTION, AND KINDS.

1. Triassic of the Atlantic Border, or the Newark Group.

1. *Equivalence*. — The Triassic beds of the Atlantic border, according to the most recent authorities, correspond with the upper part of the Trias, or the Keuper and Rhætic of Europe. The evidence is based on the characters of the fossil Plants and Vertebrates, marine Invertebrates being absent.

In 1819, A. Brongniart, on the basis of specimens of fossil fishes of the Connecticut valley (received from E. Hitchcock), which he referred to *Palæoniscus* (*Palæothrissum*) *Freieslebeni* of De Blainville (*Am. Jour. Sc.*, iii., 1821, and vi., 1823, with figures on a plate), made the age of the beds Middle Permian. In 1835, E. Hitchcock added to the evidence from the fossil fishes additional facts from the bones of a Saurian discovered at East Windsor, Conn., in 1820, and pronounced the age that of the New Red Sandstone, — a term that then covered both the Permian and Trias. In 1842, William B. Rogers, after a study of the coal-plants from Virginia beds, referred the fossils to the bottom of the Oölyte, and in 1854 to the base of the Jurassic. In 1855, E. Hitchcock, Jr., concluded, from the presence, in the beds in Massachusetts, of a Fern of the genus *Clathropteris*, that the age of the Connecticut River New Red Sandstone was that of the Upper Trias and Lower Lias. In 1856, William C. Redfield advocated the equivalency of the beds with the Lias and Oölyte on the basis of the fossil fishes; and at the same time he proposed the name *Newark Group* (from Newark, N.J.) for all the Triassic deposits of the Atlantic border. More recently the evidence from the fossil plants has been discussed, and the reference of the beds to the Upper Triassic sustained by Newberry, Fontaine, and Ward in this country, and by Stur and others abroad. The Vertebrate fossils lead to the same conclusion.

2. *Distribution*. — The Triassic beds of the Atlantic border occur in long, narrow independent areas, which are east of and closely parallel to the Appalachian protaxis, as shown on the map, page 412. They lie in troughs or basins over this border region of upturned Archæan, Cambrian, and some later Paleozoic rocks. Over the region southeast of New England these later rocks comprise only the Lower Silurian. But in Nova Scotia, the beds rest on the upturned Carboniferous, Subcarboniferous, and Devonian; and in New England, probably on Devonian or Upper Silurian. The areas are nearly parallel in direction to the mountain ranges to the west of them.

The most important of these areas are: the *Acadian*, of Nova Scotia, 120 miles long; that of the *Connecticut valley*, extending north and south along the Connecticut valley through Massachusetts and Connecticut, 110 miles long and mostly about 20 wide; the *Palisade belt*, extending from the Palisades on the west side of the Hudson through New Jersey, Maryland, and Pennsylvania to Orange County, Va., parallel with the Appalachians, 350 miles long and mostly 10 to 30 miles wide; the *Richmond belt*, west of Richmond,