of the formation; and the same is true of those of the Deep River and Dan River areas in North Carolina. The Connecticut valley area has some carbonaceous shale, but no coal.

On the Virginia belts and the Richmond coal areas, see Fontaine in *Am. Jour. Sc.*, 1879, and *U. S. G. S., Memoir*, 4to, 1883; on those of North Carolina, Emmons's *Geol. Rep.* of North Carolina, 1856, and Kerr's *Rep.*, 1875. Also, for a general review of the Triassic, the Correlation report of I. C. Russell, *Bull. U. S. G. S.*, No. 85, 1892, which contains colored maps of the areas.

Besides the sandstones and other rocks of *aqueous* origin, there are in the several areas rocks of *igneous* origin. These are described beyond (page 800).

The thickness of the Triassic formation in the several areas is determined with difficulty, not only on account of the want of continuous easily recognized strata to mark horizons, but also because of the many concealed faults and the upturned condition of the beds, as explained beyond. The maximum may be, in some of the areas, 8000 to 10,000 feet. In the Richmond area, Virginia, the thickness has been made 2000 to 2500 feet. In North Carolina, in the Deep River area, according to Emmons, it is 3000 feet. Much larger estimates have been made.

On the southern border of New York, in Rockland County, at Ramapo, near the northwestern limit of the Triassic beds, the thickness, down to the underlying gneiss, was found in a boring to be 120′ (J. C. Smock).

The large estimates are obtained by calculation from the dip, and the width at right angles to the dip. By this very unsatisfactory method a thickness of 12,000′ to 25,000′ has been obtained. Kerr thus arrived at a thickness of 10,000′ for the beds of the Dan River area, North Carolina, and 25,000′ for those of the Deep River area. In New Jersey and Pennsylvania, according to B. S. Lyman, there is a long longitudinal fault of 14,000′.

4. *Sources of the material and conditions of accumulation.* — So large a number of independent belts of sandstone ranging along for 1000 miles is an unusual feature for a Continental border. It is not possible that the sandstone formation was made during a general submergence, and in a great common body of water; for there is nothing marine about it in fossils or in structure; and fresh waters for the work could not have spread over the region of hills, ridges, and valleys, under any probable circumstances. Moreover, the Nova Scotia belt occupies the same Acadian trough which received deposits through Paleozoic time, even to the Carboniferous and Permian; and the Connecticut valley belt is in the same trough which had Silurian and Devonian beds laid down in its northern half, and possibly also in its southern half, for in this part the Triassic formation conceals what is below. Further, the parallelism of the belts to the mountain ranges of the Continental border is close, the Palisade trough taking faithfully their bends, from south by west on the Hudson River, to west-southwest in Pennsylvania (see map, page 731), and southwest in Virginia, as if occupying orographic valleys of the Appalachian Mountain chain. The facts show that the courses of the