marks and shrinkage cracks occur, even in some of the limestones. 2. The rocks are thickest near the borders of the continents. This is *certain* respecting the eastern side, and *probable* respecting the western. 3. The rocks of the east coast are mostly silicious—shales, sandstones, or their altered forms: those of the interior are mostly calcareous. 4. The outline of the future continent is strongly marked at the close of the Devonian periods. The Appalachian, and perhaps the Rocky Mountain ranges, form long sand reefs, hemming in more or less perfectly an interior sea, covering the area now occupied by the Mississippi and its branches. At the same time the two other smaller northern basins received their outline.

CARBONIFEROUS SYSTEM.

The best classification of the Carboniferous system is that adopted by the Professors Rogers. They divide into the Vespertine, Umbral, and Seral series, or the Lower Carboniferous, Middle Carboniferous, and Coal Measures. The lowest division consists of sandstones and conglomerates, with dark-colored slates sometimes containing beds of coal. This division is most abundantly developed upon the eastern side of the Appalachian basin, sometimes being entirely wanting elsewhere. In Ohio it constitutes the upper portion of the Waverly sandstone, and in Tennessee it is a buhrstone and limestone.

The Middle Carboniferous strata are quite variable in composition. In Nova Scotia, etc., they are red shales, sandstones, and various marls. In Pennsylvania they are red shales, associated farther south with a bed of limestone, which continues to increase in thickness southward. These strata are nearly all limestone in the Western States, where they are thicker than in the eastern coal fields.

In the true Coal Measures the rocks are sandstones, conglomerates, shales, limestones, and beds of coal. Some have traced resemblances between some of the conglomerates and the millstone grit of England. Upon the map the area covered by this division is represented as perfectly black. Coal fields are represented in the islands of the Arctic Ocean, in Newfoundland, New Brunswick, Nova Scotia, New England, the Appalachian Basin, in Michigan, Illinois, Iowa, Missouri, and Texas. The amount of coal is almost inexhaustible.

In Iowa the Carboniferous system is divided as follows: Burlington limestone, Keokuk limestone, St. Louis limestone, Kakaskia limestone, and Coal Measures. These members are remarkably prolific with beautiful remains of radiate animals.

Permian Series.—Until recently the existence of Permian strata in the United States was unknown. Professor Emmons first announced that the fossils of the red sandstones of North Carolina corresponded with known Permian types. These fossils were plants and Thecodont saurians. If this position can be settled, then at least the lower part of the Mesozoic conglomerates east of the Appalachian range are Permian.

Some geologists doubt the correctness of this view. But every one admits the discoveries of Messrs. Hawn, Swallow, Meek, and Hayden in Kansas, etc, to be genuine. These gentlemen have established the Permian character of many deposits in Kansas, Nebraska, and Illinois, which were at first confounded with the Coal Measures. There is an excellent development of these rocks at Leavenworth, in Kansas. They are 861 feet thick, and have been divided into Upper and Lower Permian. About 100 species of fossils have been collected and described from these strata.