

1. SUBCARBONIFEROUS PERIOD.

ROCKS—KINDS AND DISTRIBUTION.

The Subcarboniferous period, like several other periods of the Paleozoic, is noted for extensive limestone formations with thin shales and sandstone over the Central Continental Interior, or the area of the Mississippi basin; for sandstones and shales, with little limestone, along the Eastern Interior region, especially its northern bay-like portion; and, like all the preceding periods after the close of the Lower Silurian, for no deposits yet known over the Atlantic continental border south of the latitude of New York. The peculiarities of the Eastern Interior are attended by another distinctive feature: The limestones of the Mississippi basin abound in fossils, especially Crinoids, Brachiopods, and Corals; and, owing to the Crinoids, they are often called *Crinoidal* limestones; while the fragmental rocks to the eastward contain fewer fossils, and almost all of these are of different species from the western, except where limestone occurs in the series. Owing to the wide differences in the rocks and fossils, there is much difficulty in bringing the beds of the two distant regions into parallelism.

The rocks of the lower of the two groups in Pennsylvania, the *Pocono*, are mainly beds of hard gray sandstone and conglomerate; and those of the upper, the *Mauch Chunk*, reddish shales and shaly sandstones. In southwestern Pennsylvania a thin bed of siliceous limestone makes the top of the Pocono, and a similar layer occurs also in the upper shales.

The enduring Pocono sandstone is 800 feet thick near Pottsville, Pa. It extends northeastward, capping at many points the high northern plateau of the state; and it also stretches southwestward, making the summit, in Bedford County, of the Alleghanies, where it is 1400 feet thick—holding its place against denuding agencies. It is supposed, by Lesley, to constitute some hundreds of feet of the higher peaks of the Catskills. The overlying Mauch Chunk shale is a fragile rock and was easily swept off by denuding waters from the Pocono floor. Its thickness is stated to be 3000 feet at Pottsville. The two formations thin down to 600 feet, in southwestern, and 300 feet in northwestern, Pennsylvania.

The thickness of the limestone layers of the Eastern Interior increases in West Virginia; and in the southwest counties of Virginia becomes rather abruptly over 2000 feet thick. Farther south, in Tennessee and Alabama, siliceous beds and cherty limestones make the chief parts of the formation, and they once covered the Silurian limestone basin of central Tennessee. Some thin beds of coal occur in the upper formation, and one in southwest Virginia, near New River, is worked.

In Ohio, about 600 feet of shale and sandstone are overlaid in some parts by 15 to 20 feet of limestone. In Michigan, the beds are chiefly shales and limestones, with less than 70 feet of limestone in the upper part.

The limestones of the Mississippi basin, with the included shales and sand-