

as the Shenandoah (upper part), Martinsburg, Juniata, Tuscarora, Rockwood and Lewistown formations.

THE SHENANDOAH FORMATION (upper part).—The Shenandoah formation, which has already been described in the previous chapter as in part of Silurian age, contains an abundant fauna of fossil brachiopods, gasteropods, corals and crinoids in its upper beds. These forms are in the main identical with those found in the Trenton limestone of New York. As already stated, the line of separation between the Cambrian and Silurian portions of this formation cannot be definitely determined, since no physical break occurs. The upper portion of the formation does not differ materially from the lower, so that the description which has been given will serve for present needs.

THE MARTINSBURG FORMATION (Hudson river shales).—The Martinsburg formation, so called from its typical development in the vicinity of Martinsburg, West Virginia, occurs in several areas along the western border of the Hagerstown valley and in the region immediately adjacent to it upon the west. This formation consists of black and gray calcareous and argillaceous shales, which are fine-grained and show but slight variations within the limits of the state of Maryland. The shales bear from five to twenty per cent of carbonate of lime. The deposits were formed in shallow seas which abounded in graptolites, corals, brachiopods and trilobites which have left abundant fossil remains. The fauna is essentially that of the Hudson river shales of New York. The thickness of the formation varies from 700 to 1000 feet.

There has been but slight alteration in the shale, which is usually not sufficient to obscure the bedding which, however, was never sharply marked. The rocks of this formation have suffered considerable decay as the result of the solution of the carbonate of lime contained in them.

THE JUNIATA FORMATION (red Medina sandstone).—The Juniata formation, so called from its typical occurrence upon the Juniata river in Pennsylvania, is limited to the western portion of the central division of the Appalachian Region in western Alleghany county. It