

is a remarkable feature of the era. Even in the Laramide Range of southern British America, McConnell found the Upper Silurian series only 1500 feet thick; and in the Wasatch Range, according to King, the thickness of the whole Silurian is but 1000 feet. The era began, as the Medina rocks show, with shallow waters over central New York, and probably large, emerged areas east of the Mississippi as well as west. In its progress through the Clinton epoch there were still shallow waters and emerging lands; for the extensive beds of iron ore, ranging far south and west to Wisconsin, are evidence of great seashore flats through long intervals over much of the eastern half of the continent. In the Niagara epoch there were somewhat deeper and purer waters over the Interior Continental Seas, but the areas were not of very wide extent, and the epoch closed through the coming on of another period, the Onondaga, in which again great seashore flats prevailed, with feeble submergences or emergences where any occurred.

The length of this period of great briny flats and salt deposits — which were 100 miles or more long in the state of New York, and twice this to Goderich, on Lake Huron — cannot be estimated; for thinness of rocks means nothing as regards elapsed time where a region is undergoing no oscillations of level, or only those of extreme slowness.

The prevailing characteristic of the continent during the early and middle Upper Silurian, that of shallow seas and emerging seashore flats, continued on, with little change, through the closing Lower Helderberg period; for the formations are unknown over the Mississippi basin and farther west, and have their greatest extent along the region of the progressing Appalachian geosyncline, and its temporary prolongation northward through the Hudson and Champlain depressions to Montreal.

*The period of briny flats unfavorable to aquatic life.* — Only two species of the Niagara fauna, the widely ranging *Leptaena rhomboidalis* and *Atrypa reticularis*, are known to occur in the Lower Helderberg beds, although the epoch which intervened was only one of muddy, briny flats. But the remark applies only to eastern North America, for nothing has been ascertained with regard to the Onondaga and Lower Helderberg faunas for the larger part of the continent.

*No upturnings at the close of the Upper Silurian.* — The era appears to have passed and ended quietly. It had slow and gentle oscillations in level, like other geological eras, but it was marked with no great upturning in its progress, and with none at its close. The Lower Helderberg formation graduates into that of the opening Devonian, and if transferred to the Devonian, the statement would still hold true.

*The eastern continental border related in life to the European.* — In Canada and New England the formations of the Upper Silurian have not yet been so fully distinguished and described that the succession of events for this part of the continental border can be deduced. But the fact that the region was distinct from the Interior Continental region has been well made out from the Upper Silurian fossils, by Salter and Billings, who state the following facts: —