

Barrande, in his review of the Trilobite Fauna of the Paleozoic, which he published in 1871, made the total number of Cambrian and Silurian species then known 1500; and those subsequently introduced, in the Devonian and Carboniferous eras, about 200. He states that in the Cambrian period the number of species known was 252 in 28 genera; in the Lower Silurian, 886 species in 52 genera, eight of these genera being of Cambrian origin; then in the Upper Silurian—his *third* Fauna—there were 482 species in 20 genera, but only *three* of these 20 genera were of Upper Silurian origin, the rest already existing in the Lower Silurian.

The number of known Cambrian species of Trilobites has been increased since 1871 by more than 200; and besides, a larger number of the genera are now known to date from the Cambrian. But still Barrande's conclusion remains right—that the Lower Silurian was the era of maximum development of Trilobites. In North America, the Lower Silurian beds add 215 species and 30 genera of Trilobites; the Upper Silurian only 81 species and three genera; and of these three, two occur in Europe. The type for awhile was the highest of the seas; but that of Cephalopods, of later introduction, had passed it in size, grade, and power before the Lower Silurian era closed. Such facts give strong characteristics to the Lower Silurian, and exhibit its contrast to the Upper.

The Hydrozoans, Actinozoans, and Bryozoans, which usually produce, by multiplication, compound groups of branching and other forms, and show thereby their low grade among species, are rare fossils in the Cambrian as simple individuals, and are wholly unknown in compound groups, although such groups are indicative of low grade, and the Bryozoans are the lowest of the Molluscoids. But in the Lower Silurian era the compound forms after the commencement of the Chazy period were common, and were eminently so during the Trenton period. Ulrich states, after an investigation of the Bryozoans of Minnesota (a few of his figures are reproduced on page 506), that the contributions from them of calcareous material for the Lower Silurian limestones of that state were twice as great as those from the Brachiopods (*Rep. L. Sil. Bry. Minnesota, 1893*).

## UPTURNINGS AT THE CLOSE OF THE LOWER SILURIAN.

### AMERICAN.

**General quiet of the Lower Silurian era.**—The strata of the Lower Silurian in eastern North America appear to have been laid down, one over the other, without intervening dislocations. Through the era there were extensive oscillations in the water level, for this is indicated by the varying limits of the formations, as well as by changes in the kinds of rocks; and the exposed beds of one period probably suffered much by denudation before the next were deposited. But these oscillations resulted in no great upturnings of the rocks. The era was one of quiet progress in sedimentary