Corals also with few exceptions; Nautiloids lose nearly all their Orthoceras-like forms; while the coiled Nautilus-like species culminate in the Carboniferous, and have few species and genera afterward. So the Insects had Paleozoic features which were dropped at the same time, and one division passed its time of culmination. The Placoderm, Dipnoan, and Ganoid Fishes, which were eminently Paleozoic types, culminated in the Devonian and Carbonic eras, and only inferior Dipnoans and Ganoids existed later. Cryptogamous Plants culminated in the Carboniferous era, and only the Calamites and some related genera, and a few genera of Ferns survived into the Mesozoic.

Should discovery open to view earlier species than those now known in the Cambrian, they would be only earlier representatives of Paleozoic types, or their precursor embryonic kinds. And if some of these latter existed in preceding Archæan time, this fact would be parallel with the appearance of many Mesozoic types in the course of Paleozoic time.

The disappearance of species at the close of Paleozoic time was not due chiefly to physical catastrophe, for the Trilobites had dwindled greatly by the close of the Devonian; and similar expansions to culmination in many other tribes, with subsequently a commencing decline, have been mentioned in the preceding pages, both among plants and animals.

How far such culminations were a consequence primarily of laws of growth it is not possible to say. There is no doubt as to their connection with physical changes in progress. One of these physical changes was the slow removal of carbonic acid from the atmosphere. The making of shells, corals, and Crinoid skeletons, and thereby the making of limestones, was, through Paleozoic time, dependent mainly on carbon abstracted from the carbonic acid of the air and waters; and vegetation, so far as its products became stored in the rocks, in the form of coal, oil, gas, and other carbonaceous products, involved a further abstraction, as explained on page 485. The purification of the air which was thus carried on was the means of fitting it for Spiders, Insects, and other *terrestrial* life, and afterwards for Amphibians, and finally for Reptiles. Change in animal as well as vegetable types must have been involved in this using up of the deleterious carbonic acid. But the extent of its influence can only be conjectured. An examination into the amount of carbonic acid which air can contain without being injurious to different kinds of Insects, and to Amphibians, Reptiles, and other species, would have much geological interest. Decline in the temperature of the sea and air through Paleozoic time also had its influence. But it is not safe at present to attribute special facts to this cause.

SECTION OF THE PALEOZOIC ROCKS OF PENNSYLVANIA.

The following section of the Paleozoic rocks of Pennsylvania, published by H. D. Rogers, after the first survey of the state, is here added because of its geological and historical value.