

amount of this gas is made equal to that of the oxygen in the present atmosphere, plants will still thrive. How far this principle worked in early times is among the uncertainties.

The idea has been thrown out by T. Sterry Hunt that carbonic acid has been received by the earth, from time to time, through the fall or near contact of meteorites, since carbon exists sparingly in some of these bodies. But it has not found favor with astronomers.

BIOLOGICAL PROGRESS.

Display of the system of life in the Cambrian.—The system of life, as exemplified by Lower Cambrian species, was essentially the existing system. Seven of the grander divisions of animal life above the grade of Rhizopods were represented: Sponges, Corals, Echinoderms, Worms, Brachiopods, Mollusks, and Crustaceans. And under Mollusks there were species of Lamelibranchs, Pteropods or related forms, and Gastropods; under Crustaceans, Entomostracans of two sections, — the Ostracoids or Bivalve Crustaceans, and Caridoids or shrimp-shaped species, — and Trilobites. It is true that species are represented only by their hard parts — their shells or skeletons. But the several subdivisions have species living in the existing world, so that the nature of the life and the laws of structure and physiology of the Cambrian species are, with few exceptions, all within man's range of study.

The multiply structure a common, low-grade feature of the Cambrian fauna.—The multiply structure exists among living species. But in the early Paleozoic it was a prevalent feature under all the tribes that admitted of it. The structure is a fundamental one in the Worms of all ages, the body consisting of an indefinite number of body-segments; and, since successional lines of development led off from their precursors to Trilobites and other Crustaceans, it is natural that Cambrian species of these classes should be multiply in number of segments. The Protocarids (page 474) are an example among the Crustaceans, as shown by the number of segments in the abdomen; the modern *Apus* is a representative of the Protocarid structure. The Ostracoids (Fig. 562) have their limbs and segments concealed by the shell; but there is reason to believe that these were multiply, and prototypes of the modern *Limnadia*. The large Trilobites on pages 473, 476 exemplify the feature. Only the small *Agnostus* family (page 476) fails of it, and these species probably fail because the form represents an embryonic condition.

Other low-grade features of Lower Cambrian species.—The Cystoids are the lowest of Echinoderms, inferior to Crinoids.

Brachiopods are (1) mostly the hingeless or inarticulate species; (2) small in size; and (3), to a great extent, if the number of individuals of the prevailing kinds is considered, species having a chitinous shell: and all these characters are embryonic features. Further, as remarked by Schuchert, no species having spines or loops within the shell are yet known. The special embryonic features of *Kutorgina*, *Obolella*, and *Paterina* have been well illustrated by Beecher; and, according to this author, the genus *Kutorgina* is probably the earliest representative of articulate Brachiopods.

The chitinous shells of the Brachiopods, that make up so large a part of the individuals, contain much calcium phosphate, as shown by the analyses