

ordinary gill-bearing Gasteropods, is the one which has been traced farthest back, and includes the Paleozoic species. It is further remarkable that a very great gap exists in the geological history of this family. No species are known between the Carboniferous and the early Tertiary, though in the intervening formations there are many fresh-water and estuarine deposits in which such remains might be expected to occur. There is perhaps no reason to doubt the continuance of the Helicidæ through this long portion of geological time, though it is probable that during the interval the family did not increase much in the number of its species, more especially as it seems certain that it has its culmination in the modern period, when it is represented by very many and large species, which are dispersed over nearly all parts of our continents.

The mode of occurrence of the Paleozoic Pulmonifera in the few localities where they have been found is characteristic. The earliest known species, *Pupa vestuta*, was found by Sir Charles Lyell and the writer, in the material filling the once hollow stem of a *Sigillaria* at the South Joggins in Nova Scotia, and many additional specimens have subsequently been obtained from similar repositories in the same locality, where they are associated with bones of Batrachians and remains of Millipedes. Other specimens, and also the species *Zonites priscus*, have been found in a thin, shaly layer, containing debris of plants and crusts of Cyprids, and which was probably deposited at the outlet of a small stream flowing through the coal-formation forest. The two species found in Illinois occur, according to Bradley, in an underclay or fossil soil which may have been the bed of a pond or estuary, and subsequently became a forest sub-soil. The Erian species occurs in shales charged with remains of land plants and which must consequently have received abundant drainage from neighboring land. It is only in such deposits that remains of true land-snails can be expected to occur; though, had fresh-water or brackish water Pulmonates abounded in Carboniferous age, their remains should have occurred in those bituminous and calcareo-bituminous shales which contain such vast quantities of debris of cyprids, lamellibranchs and fishes of the period, mixed with fossil plants.

With reference to their affinities, the Paleozoic land snails present no very remarkable peculiarity except their close resemblance to some modern forms. Of the known species, four be-