

## INVERTEBRATE AIR-BREATHERS.

The coal formation rocks have afforded Land Snails, Millipedes, Spiders, Scorpions and Insects, so that all the great types of invertebrate life which up to this day can live on land already had representatives in this ancient period. Some of them, indeed, we can trace further back, the land snails probably to the Devonian, the Millipedes to the same period, and the Scorpions and insects as far as the Silurian. No land vertebrate is yet known, older than the Lower Carboniferous, but there is nothing known to us in physical condition, to preclude the existence of such creatures at least in the Devonian.

It would take us too far afield to attempt to notice the invertebrate land life of the Palæozoic in general. This has been done in great detail by Dr. Scudder. I shall here limit myself to the animals found in our erect trees, and merely touch incidentally on such others as may be connected with them.

I have already mentioned the occurrence of a land snail, a true pulmonate mollusk, in the first find by Lyell and myself at Coal Mine Point, and this was the first animal of this kind known in any rocks older than the Purbeck formation of England. It is one of the groups of so-called Chrysalis-shells, scarcely distinguishable at first sight from some modern West Indian species, and distinctly referable to the modern genus *Pupa*. It was named *Pupa vetusta*, and a second and smaller species subsequently found was named *P. Bigsbyi*, and a third of different form, and resembling the modern snails, bears the name *Zonites priscus*. The only other Palæozoic land mollusks known at present are a few species found in the coal formation of Ohio, and a fragment supposed to indicate another species from the Devonian plant beds of St. John's, New Brunswick. This last is the oldest known evidence of pulmonate snails. If we ask the precise relations of these creatures to modern snails, it may be answered that of the two leading sub-