

our oysters and clams, and after further periods of time there appeared the Articulates from which have been evolved our shrimps, lobsters and crabs, and finally there appeared upon the scene the Vertebrates, which are represented by fishes, reptiles, birds, animals, anything in fact which has a backbone, and we remark that in each period of time there was a higher order of being.

But it must be understood that in this process of evolution the changes from a lower to a higher order of being did not occur in a regular sequence by the lower disappearing upon the advent of the higher order—on the contrary, there appears to have been a radiation of evolution starting from the protoplasm as a common centre, and some of the organisms after considerable development fail and die out, some remain stationary, while others are developed into higher and still higher orders of being. This may possibly be accounted for by the change which has taken place in the atmosphere and in the waters of the ocean which have become inimical to some organisms and favourable to others.

Turning then to the palaeozoic period we find life commencing in the Lower Silurian formation—it may have existed in the laurentian in the form of algae or seaweed, and indeed some scientists, Sir William Dawson among the number, think they have discovered what are called rhizopods, a form of protozoa, in the Laurentian limestone, but as far as our purpose goes we may say that life commences in the Lower Silurian formation with the protozoa, radiates, mollusks and articulates, all of which were of marine origin; there was no life upon the land at that period.

When we ascend into the Upper Silurian formation we still find the same forms of life continuing, but a very important event now occurs in the history of evolution by the appearance upon the scene of the first vertebrate in the form of a low order of fish, something like a dog fish of the present day, and I want you to realize the enormous length of time which it took from the commencement of life to arrive at even this primitive vertebrate. According to Lord Kelvin, whom you may perhaps recognize better under his former name of Sir William Thompson—and we could not have a better authority—it must have taken about 50,000,000 of years from the commencement of life to the development of even this primitive vertebrate. Think of that? This is on the supposition that it has taken about 96,000,000 of years from the creation of life up to the present time, which has been divided into 72,000,000 of years for the palaeozoic, 18,000,000 of years for the mesozoic, and 6,000,000 of years for the cenozoic periods. It is a long, long time, and it has been computed by measuring the thicknesses of the different strata and then calculating the length of time necessary for their deposition. Of course the computation can only be approximate even to some millions of years, but it affords a basis to reason upon.

As we ascend into the formation above the Upper Silurian, namely, the Devonian, we find it characterized by the great abundance of fishes—it was altogether a very fishy period, but even these fishes assumed a higher order of being by some of them becoming ganoid or covered by great shining scales, and we have only to place a salmon alongside a dog-fish to become aware of how large a field there is for the development of even fishes. There was still no life upon the land at this period, except perhaps a few mosses, and here and there a very scanty vegetation.

But when we ascend into the Carboniferous formation then a most important change occurs. We find a large portion of the land covered by a dense vegetation, in the form of great forests of pines, trees, ferns and a thick undergrowth,