

zoic until now, and modern species seem scarcely at all to differ from specimens procured from rocks at least half-way back to the beginning of our geological record. If we suppose that the present sponges and foraminifera are the descendants of those of the Silurian period, we can affirm that in all that vast lapse of time they have, on the whole, made little greater change than that which may be observed in variable forms at present. The same remark applies to other low animal forms. In types somewhat higher and less variable, this is almost equally noteworthy. The pattern of the venation of the wings of cockroaches, and the structure and form of land snails, gally-worms and decapod crustaceans were all settled in the Carboniferous age, in a way that still remains. So were the foliage and the fructification of club-mosses and ferns. If, at any time, members of these groups branched off, so as to lay the foundation of new species, this must have been a very rare and exceptional occurrence, and one demanding even some suspension of the ordinary laws of nature.

We may perhaps be content on this question to say with Gaudry,¹ that it is not yet possible to "pierce the mystery that surrounds the development of the great classes of animals," or with Prof. Williamson,² that in reference to fossil plants "the time has not yet arrived for the appointment of a botanical King-at-arms and Constructor of pedigrees." We shall, however, find that by abandoning mere hypothetical causes and carefully noting the order of the development and the causes in operation, so far as known, we may reach to ideas as to cause and mode, and the laws of succession, even if unable to penetrate the mystery of origins.

Another caution which a palæontologist has occasion to give with regard to theories of life, has reference to the tendency of biologists to infer that animals and plants were introduced

¹ "Enchainements du Monde Animal," Paris, 1883.

² Address before Royal Institution, Feb., 1883.