cessation of these older species, others make their entrance. These, in turn, are found to die out and to be replaced by newer forms. After patient examination of the rocks, it is ascertained that every well-marked formation is characterized by its own species or genera (type-fossils, Leitfossilien) or by a general assemblage or *facies* of organic forms. This can only, of course, be determined by actual practical experience over an area of some size. The characteristic fossils are not always the most numerous; they are those which occur most constantly and have not been observed to extend their range above or below a definite geological horizon or platform. For the determination of geological chronology, as already pointed out, it may be affirmed as a general principle that the higher and more specialized the type of organism the more local is its area in space and the more limited its range in time. Hence mammalian remains have a special value in this respect.[20] But some invertebrate groups possess great importance as fixing stratigraphical horizons; as, for example, the ammonites in the Jurassic and the graptolites in the Silurian system.

As illustrations of type-fossils characteristic of some of the larger subdivisions of the Geological Record, the following may be given. Lepidodendra and Sigillaria are typical of Old Red Sandstone and Carboniferous deposits; Graptolites of the Silurian system; Trilobites of Palæozoic rocks from Cambrian to Carboniferous, Cystideans of the older Palæozoic rock-groups. Orthoceratites are Palæozoic, and Ammonites are Mesozoic; Ichthyosaurs and Plesiosaurs, Mesozoic; Nummulites, Palæotherium, Anoplotherium, Hyopotamus, and Anthracotherium belong to older Tertiary, and Mastodon, Elephas, Hyena, Cervus, and Equus to younger Tertiary and recent time. The occurrence of

[20] Consult the papers of Prof. Marsh quoted on p. 1083, and see especially the plate in the second paper in which the successive mammalian zones in the Geological Record of North America are given.