

curate comparative anatomy, to throw light on the osteological branch of palæontology—the archæology of organic life; but the actual geognostic views of the doctrine of fossil remains, the felicitous combination of the zoological character with the order of succession, and the relative ages of strata, are due to the labors of George Cuvier and Alexander Brongniart.

The ancient sedimentary formations and those of transition rocks exhibit, in the organic remains contained within them, a mixture of structures very variously situated on the scale of progressively-developed organisms. These strata contain but few plants, as, for instance, some species of Fuci, Lycopodiaceæ which were probably arborescent, Equisetaceæ, and tropical ferns; they present, however, a singular association of animal forms, consisting of Crustacea (trilobites with reticulated eyes, and *Calymene*), Brachiopoda (*Spirifer*, *Orthis*), elegant Sphæronites, nearly allied to the Crinoidea,\* Orthoceratites, of the family of the Cephalopoda, corals, and, blended with these low organisms, fishes of the most singular forms, imbedded in the upper silurian formations. The family of the Cephalaspides, whose fragments of the species *Pterichtys* were long held to be trilobites, belongs exclusively to the devonian period (the old red), manifesting, according to Agassiz, as peculiar a type among fishes as do the Ichthyosaurs and Plesiosaurs among reptiles.† The Goniatites, of the tribe of Ammonites,‡ are manifested in the transition chalk, in the graywacke of the devonian periods, and even in the latest silurian formations.

The dependence of physiological gradation upon the age of the formations, which has not hitherto been shown with perfect certainty in the case of invertebrata,§ is most regularly manifested in vertebrated animals. The most ancient of these, as we have already seen, are fishes; next in the order of succession of formation, passing from the lower to the upper, come reptiles and mammalia. The first reptile (a Saurian, the Monitor of Cuvier), which excited the attention of Leibnitz,|| is found in cuperiferous schist of the Zechstein of

\* Leop. von Buch, *Gebirgsformationen von Russland*, 1840, s. 24–40.

† Agassiz, *Monographie des Poissons Fossiles du vieux Grès Rouge*, p. vi. and 4.

‡ Leop. von Buch, in the *Abhandl. der Berl. Akad.*, 1838, s. 149–168; Beyrich, *Beitr. zur Kenntniss des Rheinischen Uebergangsgebirges*, 1837, s. 45.

§ Agassiz, *Recherches sur les Poissons Fossiles*, t. i., *Introd.*, p. xviii.; Davy, *Consolation in Travel*, dial. iii.

|| A Protosaurus, according to Hermann von Meyer. The rib of a