

and then uninterruptedly on through all formations to the strata of the tertiary period, while Saurians begin with the zechstone. In like manner, we find the first mammalia (*Thylacotherium Prevostii*, and *T. Bucklandii*, which are nearly allied, according to Valenciennes,* with marsupial animals) in the oolitic formations (Stonesfield schist), and the first birds in the most ancient cretaceous strata.† Such are, according to the present state of our knowledge, the lowest‡ limits of fishes, Saurians, mammalia, and birds.

Although corals and Serpulidæ occur in the most ancient formations simultaneously with highly-developed Cephalopodes and Crustaceans, thus exhibiting the most various orders grouped together, we yet discover very determinate laws in the case of many individual groups of one and the same orders. A single species of fossil, as *Goniatites*, *Trilobites*, or *Nummulites*, sometimes constitutes whole mountains. Where different families are blended together, a determinate succession of organisms has not only been observed with reference to the superposition of the formations, but the association of certain families and species has also been noticed in the lower strata of the same formation. By his acute discovery of the arrangement of the lobes of their chamber-sutures, Leopold von Buch has been enabled to divide the innumerable quantity of *Ammonites* into well-characterized families, and to show that *Ceratites* appertain to the muschelkalk, *Arietes* to the lias, and *Goniatites* to transition limestone and graywacke.§ The lower limits of *Belemnites* are, in the keuper, covered by Jura limestone, and their upper limits in the chalk formations.|| It appears, from what we now know of this subject, that the waters must have been inhabited at the same epoch, and in the most widely-remote districts of the world, by shellfish, which were, at any rate, in part, identical with the fossil remains found in England. Leopold von Buch has discovered *exogyra* and *trigonia* in the southern hemisphere (volcano of

* Valenciennes, in the *Comptes Rendus de l'Académie des Sciences*, t. vii., 1838, Part ii., p. 580.

† In the Weald clay; Beudant, *Géologie*, p. 173. The ornitholites increase in number in the gypsum of the tertiary formations. Cuvier, *Ossemens Fossiles*, t. ii., p. 302-328.

‡ [Recent collections from the southern hemisphere show that this distribution was not so universal during the earlier epochs as has generally been supposed. See papers by Darwin, Sharpe, Morris, and M'Coy, in the *Geological Journal*.]—Tr.

§ Leop. von Buch, in the *Abhandl. der Berl. Akad.*, 1830, s. 135-187

|| Quenstedt, *Flötzgebirge Würtembergs*, 1843. s. 135.