

exactness than is attainable in modern natural history. Certain shells, fishes, &c., are recognised by the geologist, but he may not find them of all ages; cannot know correctly what were the limits of variation, of their magnitude, forms, habits, &c. In some important cases, he can hardly know whether particular mollusca and fishes lived in lakes, rivers, or the sea; whether certain plants grew on land or in water. Now, as it is only on a correct knowledge of the affinities which the fossil remains of life bear to existing races, that any just inference can be founded concerning the contemporaneous physical conditions, we see how fertile are the sources of error, and with what justice men of philosophic minds have endeavoured to restrain that propensity to speculation which imperceptibly gets possession of the human mind, and has particularly luxuriated among the enthusiastic votaries of geology. There is less difficulty with respect to inorganic bodies, because the laws of their aggregation are such as, in many instances, can be tested by experiments which apply with equal exactness to the ancient and modern mineral kingdoms.

Scale of Geological Time.

It is further to be observed, that the very foundation of all history of geological phenomena is difficult to fix; for if it be embarrassing, even in civil history, to ascertain the relative dates of many, most important occurrences, how careful should we be in marking even the order of succession of geological phenomena of the same kind; how diffident of our power of determining at all the lines of contemporaneity among occurrences of different nature, which happened in different regions of the globe, and under at least some difference of physical conditions! The very first inquiry to be answered, then, is, what are the limits within which it is possible to determine the relative dates of geological phenomena? For if no scale of geological time be