

the soda to sodium; in the lime to calcium, and in the usual contaminating oxide, to iron. Supposing these to be the ultimate elements of the mineral, the proximate principles would be produced, first by their uniting, chemically, to form these binary compounds; which would still farther unite, but still chemically, to form the integrant particles of the mineral and these particles united mechanically by cohesion, would form the mineral itself.

The same reasoning may be applied to every variety of rocks and minerals. Limestone, consisting for its immediate principles, of lime carbonic acid and water, contains, for its ultimate elements, according to the present state of our knowledge, calcium, carbon, hydrogen and oxygen; the latter principle being united with each of the former ones, so as to produce the lime, (oxygen and calcium,) the carbonic acid, (carbon and oxygen,) and the water, (oxygen and hydrogen.) If the limestone were a magnesian one, then we must add oxygen and magnesium, and so of other earths, as silex or alumine, if they were present.

How far back, and how near to the isolated, independent state, we are to trace each element, we cannot determine. Whether the elements were created, in the first place, in a state of perfect freedom, and their earliest movement was, not so much, that of elemental war, as of elemental combination; or whether, they were combined in pairs, and those pairs again combined, to form more complex results we can never know with certainty; and all our suggestions on this subject being necessarily hypothetical, ought of course to be concisely stated.

But the discussion of these questions, which might easily be extended to the most complex rocks, and to all their imbedded minerals, however curious and even interesting, is in no way material to our proceeding to reason intelligibly—may we not say even conclusively, upon the act or process, which must, according to physical laws, have preceded the concretion of the materials of the primitive rocks.

Suppose the elements which are to form granite, to have already united, and a previous state of chemical mobility, to have rendered such a result possible, a simultaneous deposition of the different minerals must of course happen; the quartz particles must find their fellows, those of feldspar will do the same, and those of mica the same, and the three minerals, born at the same moment, will find repose in the same cradle. In the same manner, their ornamental companions, (not essential to the rock, but often studding it, like gems set in royal robes)—the emeralds, the topazes, the garnets, the tourma-