determined by heredity, but the relations of these elements in living matter itself are due to quite different forces in which heredity is a small factor or no factor at all. The acceptance or rejection of either hypothesis depends on the evidence which we can bring as to the composition of the ocean in the very earliest geological periods.

The conclusions which we can formulate on this point depend on what we accept as the composition of the original crust of the lithosphere, and in our knowledge of the character and composition of the sedimentary rocks, and they must also be based on the changes which are admitted to have taken place in the composition of the ocean during all the periods. These conclusions I propose to deal with here in a general way only, for a full consideration of all the facts which have a bearing on them would demand a detailed treatment which would far exceed the limits set for this paper.

IV.—THE COMPOSITION OF THE PRIMEVAL OCEAN.

The original condition of the earth was a molten mass in which the temperature was so high that many of the elements now in the rock crust were in a gaseous condition, and dissociated, just as they are at present, in the solar atmosphere. As the dissipation of heat went on some of these must have condensed at degrees of temperature which approximated their present respective volatilization points, while the remainder, oxygen, hydrogen, chlorine, sulphur and carbon would combine to form water, hydrochloric, sulphuric and carbonic acids. The elements, sodium, potassium, calcium, magnesium, and aluminum would also before condensation take out of the original atmosphere chlorine, sulphuric acid, oxygen, and perhaps, carbonic acid, to form the chlorides, sulphates, oxides, and carbonates of these elements, but whether these compounds obtained after condensation depended on whether the temperature of the heated rock surface was still as high as their respective dissociation points. When the molten magma had cooled down to a degree below the lowest dissociation point, all the compounds referred to would be either deposited on the hot rock surface or in the form of vapour in the then atmosphere. When the temperature of the latter had fallen to about 1000°C, all these compounds were removed by condensation, for although, under the atmospheric pressure which now obtains, the temperature of condensation is for nearly all these compounds about 200° lower, the very great atmospheric pressure of the pre-oceanic period must have rendered the