

in the same way will evolve its sulphur in the form of sulphurous acid mixed with oxygen. The presence of fossil plants in the melting strata would generate carburetted hydrogen gases, whose reducing action would convert the sulphurous acid into sulphuretted hydrogen; or the reducing agency of the carbonaceous matters might give rise to sulphuret of calcium which would be in its turn decomposed by carbonic acid or otherwise. The intervention of carbonaceous matters in volcanic phenomenon is indicated by the recent investigations of Deville, who has found carburetted hydrogen in the gaseous emanations of the region of Etna and the lagoons of Tuscany. The ammonia and the nitrogen of volcanos are also in many cases probably derived from organic matters in the strata decomposed by subterranean heat. The carburetted hydrogen and bitumen evolved from mud volcanos, like those of the Crimea and of Bakou, and the carbonized remains of plants in the *moya* of Quito, and in the volcanic matters of the Island of Ascension, not less than the infusorial remains found by Ehrenberg in the ejected matters of most volcanos, all go to show that fossiliferous sediments are very generally implicated in volcanic phenomena. It is to Sir John F. W. Herschel that we owe, so far as I am aware, the first suggestions of the theory of volcanic action which I have here brought forward. In a letter to Sir Charles Lyell, dated February 20, 1836, (Proceedings Geol. Soc. London, vol. 11, p. 548), he maintains that with the accumulation of sediment the isothermal lines in the earth's crust must rise, so that strata buried deep enough will be crystallized and metamorphosed, and eventually be raised, with their included water, to the melting point. This will give rise to evolutions of gases and vapours, earthquakes, volcanic explosions etc., all of which results must, according to known laws, follow from the fact of a high central temperature; while from the mechanical subversion of the equilibrium of pressure, following upon the transfer of sediments, while the yielding surface reposes upon a mass of matter partly liquid and partly solid, we may explain the phenomena of elevation and subsidence. Such is a summary of the views put forward more than twenty years since by this eminent philosopher, which, although they have passed almost unnoticed by geologists, seem to me to furnish a simple and comprehensive explanation of several of the most difficult problems of chemical and dynamical geology.

To sum up in a few words the views here advanced. We conceive that the earth's solid crust of anhydrous and primitive igneous rock is everywhere deeply concealed beneath its own ruins, which form a