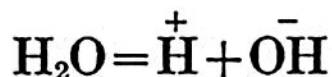


constituent is probably a necessary adjuvant in the most far-reaching geological phenomena. Indeed, it is the united action of water and carbonic acid, aided in lesser degree by nitric acid, which has been formed in the atmosphere by electrical action, and by acid products of vegetation, which sets free the inorganic constituents of the earth's crust and turns them into the stream of metabolism.

But apart from the solvent action of carbonic acid, there is another group of phenomena which depend upon its acid character. These must now be explained. They are the neutrality or faint alkalinity of the ocean, and of protoplasm.

According to the modern theory of solution, water itself, like the dissolved electrolytes, is dissociated into ions, though only to a very slight degree.¹ The reaction is expressed as follows: —



and the deposit of the material so removed in stalactites and stalagmites, likewise the rapid effacement of marble epitaphs in our church yards, are instances of this solution. . . . Among the sulphates, gypsum is the most important example of solution. It is dissolved in the proportion of about 1 part in 400 parts of water. Even silica is abstracted from rocks by natural waters." — GEIKIE, "Geology," pp. 451-452.

¹ For a discussion of this subject the textbook of Mellor, "Chemical Statics and Dynamics," p. 205, may be consulted.