

assume two or three molecules of hydrogen or water as typical forms, but even look on water as the derivative of hydrogen, which is itself the primal type.

As to the history of these ideas, Wurtz remarks that the proposition enunciated by Kolbe that all organic bodies are derived by substitution from mineral compounds is not new, but known in the science for about ten years. "Williamson was the first who said that alcohol, ether, and acetic acid were comparable to water—organic waters. Hoffman and myself had already compared the compound ammonias to ammonia itself." * * * "To Gerhardt belongs the merit of generalizing these ideas, of developing them, and supporting them with his beautiful discovery of anhydrous monobasic acids. Although he did not introduce into the science the idea of types, which belongs to M. Dumas, he gave it a new form which is expressed and essentially reproduced by the proposition of Kolbe. Gerhardt reduced all organic bodies to four types—hydrogen, hydrochloric acid, water and ammonia.—(*Ibid*, p. 355.)

The historical inaccuracies of the above quotation are the more surprising since in March, 1854, I published in the *American Journal of Science*, (xvii. 194) a concise account of the progress of these views. This paper was re-published in the *Chemical Gazette*, (1854, p. 181,) and copies of it were by myself placed in the hands of most of the distinguished chemists of England, France and Germany. In this paper I have shown that the germ of the idea of mineral types is to be found in an essay of Auguste Laurent, (*Sur les Combinaisons Azotées*, *Ann. de Chimie et Physique*, Nov., 1860,) where he showed that alcohol may be looked upon as water (H_2O_2) in which ethyle replaces one atom of hydrogen, and hydric ether as the result of a complete substitution of the hydrogen by a second atom of ethyle. Hence he observed that while ether is neutral, alcohol is monobasic and the type of the monobasic vinic acids, as water is the type of bibasic acids. In extending and developing this idea of Laurent's, I insisted in March, 1848, and again in January, 1850, upon the relation between the alcohols and water as one of homology, water being the first term in the series, and H_2 being in like manner the homologue of acetene and formene, while the bases of Wurtz were said to "sustain to their corresponding alcohols the same relation that ammonia does to water." (*Am. Jour. Sci.* v. 265; ix. 65; xiii. 206.)