Liebig, in his work of 1851, attempts no solution of it. But our author has advanced the following ingenious and plausible explanation, which we shall attempt to compress into a few words. He supposes that heat is combined in definite proportions with bodies—that is, that it is as really and essentially a constituent of them as their ponderable elements—and that any change in the amount of their combined heat is attended with a change of properties—in obedience to the great physical law "that no change of properties can occur without change of composition." The only objection to this hypothesis that occurs to us, is its regarding heat as a material substance in opposition to the more generally received undulatory theory of heat; but this is not a sufficient reason for its rejection, as many of the properties of heat are as explicable, if not, more so, on the molecular as on the undulatory theory.

In the section on the constitution of salts, we find a very lucid statement of a theory, which, conceived long ago in the comprehensive mind of Davy, has, under the fostering care of Dulong, Liebig, Dumas, Clark, Frémy and others, passed scathlessly through the period of infancy, and now almost claims the authority amongst modern philosophers of an established opinicn. We allude to the theory which regards all salts as being compounds, analogous in their constitution to chloride of sodium; thus sulphate of soda, which, upon the old view, consists of soda (NaO) and sulphuric acid (SO<sub>3</sub>), is composed agreeably to the new, of sodium (Na) and the salt radical sulphion (SO<sub>4</sub>) and is called the sulphionide of sodium; so the sulphate of water (oil of vitriel) formerly stated to consist of water (HO) and sulphuric acid (SO<sub>3</sub>), by the binary hypothesis is composed of hydrogen (H) and sulphion (SO<sub>4</sub>) and called the sulphionide of hydrogen :—

Old view. Sulphate of Soda.....NaO,SO<sub>3</sub> Sulphate of Water.....HO,SO<sub>3</sub> New view. Chloride of Sodium.....Na,SO<sub>4</sub> Sulphionide of Sodium......Na,SO<sub>4</sub>

Now though our author, in common with most authorities, evidently inclines to this beautiful and simple view of the constitution of salts and hydracids, he candidly states the arguments *pro* and *con* which affect it, and admits that this theory, like the older one rests on no demonstrative evidence, "that they are both hypotheses, and are both capable of explaining all the phenomena of the salts." However, the American editor, Dr. Bridges, assigns several additional and very sensible objections to the salt-radical theory, which must be met before it can be substituted for its older rival.

Before concluding this glance at some of the peculiarities of this edition of Graham's Chemistry, which is indeed worthy of the numer-

358