

CHAPTER V.

CHEMICAL COMPOUNDS. LAWS OF CHEMICAL COMBINATION

1. *Law of combination in definite proportions.*

Chemical compounds and elements combine in definite proportions to form new chemical compounds.—

Proust, 1799.

They combine in "indefinite" proportions also; the product being then called a "Physical Compound" or solution; the "law" of combination in definite proportions is thus only the definition of the group of "Chemical Compounds." The word "definite" as used above has a special meaning; by act of parliament, proof spirit has the definite composition 97.23 grammes of alcohol to 100 grammes of water, it is none the less but one of an infinite series of solutions containing alcohol and water; and although the composition of Dover's powder is fixed by the British Pharmacopœa, that does not prevent its being a "mechanical mixture." Many cases are known of substances which combine in two or more proportions, mercury and oxygen for instance; in the absence of a continuous series of other compounds approaching them closely in composition they must be regarded as chemical compounds.

The question whether chemical compounds as defined above actually exist or not, was the subject of a long discussion in the beginning of the nineteenth century; the French Chemist Proust, who took the affirmative, being in the end successful. The same question was subsequently taken up by Stas (1867) who devoted to it some of the most careful experimental work ever carried out by a Chemist; he shewed for instance, that silver chloride prepared by three different methods and under the most diverse conditions does not differ in composition by as much as one part in ten thousand. It is, no doubt, this constancy of composition, which early attracted attention, that caused these substances to be regarded as peculiarly "pure," and earned them the title of "chemical" compounds *par excellence*.

2. *Law of combination in reciprocal proportions.*

The ratios between the weights of A, B, C, etc., which unite with a given weight of W are equal to or some simple multiple of the ratios in which they unite with fixed weights of X, Y, Z, etc. (A, B, C, W, X, Y, Z, and the products of their union must all be either chemical compounds or elements).....Richter, 1791.