

## CHAPTER VI.

### CHEMICAL FORMULÆ. THE INTERNATIONAL ATOMIC WEIGHTS.

1. Because of the law of combination in reciprocal proportions, the composition of chemical compounds can be represented by cards.

On page 21 the reaction between red oxide of mercury and hydrochloric acid was represented by tickets<sup>1</sup> as follows :—

Merc	Ox	and	Hy	Chl	give	Merc	Chl	and	Hy	Ox
92.59	7.41		0.933	32.82		92.59	32.82		0.933	7.41

The reaction between red oxide of mercury and sulphuretted hydrogen can be similarly represented if one more card be added to the pack.<sup>2</sup> As before, 100 g of the oxide react with just as much sulphuretted hydrogen as is necessary to form water, in addition to which there is formed mercuric sulphide, and nothing more; the 14.85 g of sulphur that was formerly combined with the 0.933 g of hydrogen is now "contained" in the mercuric sulphide. "Sulphur 14.85" is evidently the inscription for the new ticket.

As corrosive sublimate and sulphuretted hydrogen give mercuric sulphide, hydrochloric acid, and nothing else, the reaction between them can evidently be represented by the same cards; and so can the reaction between chlorine and sulphuretted hydrogen, giving hydrochloric acid and sulphur.

2. For this purpose the actual numbers on the cards are immaterial, only their ratios are of importance.

The numbers on the cards were chosen because of the chance use of 100 g of red oxide of mercury in the first experiment. If fifty grammes had been taken, all the numbers would have been divided by two; and it is thus obvious that only the ratios between the numbers, not their actual values, are of importance. The number on the hydrogen card is less than any other of the four; if it be replaced by 1, and the others be reduced in like proportion (by dividing by 0.933) the numbers so obtained are called the "equivalent weights" or "equivalents" of mercury, oxygen, etc. A set of five "equivalent" cards<sup>3</sup> should be prepared, preferably of a different colour to those first used.

<sup>1</sup> For economy in printing, the outlines of the cards are omitted and the names abbreviated.

<sup>2</sup> First pack.

<sup>3</sup> Second pack.