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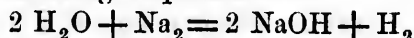
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letter, an additional distinctive letter is added when necessary, as Cl for Chlorine. The symbol stands for one atomic proportion, that is one volume or "atom," of the element; this is multiplied by placing a small figure on the right hand side of the symbol, thus,  $\text{Cl}_2$ .

A *Formula* is simply formed by placing two or more symbols together, to show the elements of which a compound consists. Thus  $\text{H}_2\text{O}$  is the formula for Water, showing that this compound consists of two volumes of Hydrogen and one volume of Oxygen; as the atomic weight, or weight of one volume, of Hydrogen is 1, the two atoms will weigh 2, and as the atomic weight of Oxygen is 16, its one volume will weigh 16;—the formula thus represents to us the exact proportions by volume and weight of the elements of which the compound consists. The use of a chemical formula is to show the precise composition of a compound body.

A *Chemical Equation* consists of two or more formulae, or of at least one formula and two or more symbols; its object is to represent what is called a "reaction," that is a change in the constitution, or arrangement of the components, of a compound, or the formation from free elements of a compound, or the resolution of a compound more or less completely into its elements. Thus, if we place a piece of the element Sodium in contact with the compound Water, a chemical change takes place: the sodium and water have combined to form an alkali, but not the whole of the water, for a gas,  $\text{H}$ , is set free. The change is explained by the following "equation:"—



Which we may read thus: two molecules of Hydrogen Oxide (water) and two atoms of Sodium, *yield* two molecules of Sodium Hydrate and two atoms of Hydrogen. In every case where the algebraic sign of equality  $=$  is used in a chemical equation it is to be