The weights and formulæ thus arrived at constitute a "natural" system, in the sense in which one speaks of natural systems in Zoology or Botany, as distinguished from an artificial system like the Linnean. Formulæ primarily invented to record compositions, specific heat determinations, or experiments with gases, shew analogies in many other respects; the Periodic Law is a striking illustration of relationships which were totally unsuspected by the original founders of the system. Up to the present, however, no explanation of these regularities has been advanced; and the place which the theory of evolution holds in Biology, is, in Chemistry, still unfilled.

6. *Chemical Symbols.*

The Committee further adopted[1] a letter or letters as the symbol for each element, which take the place of both name and number (international weight) on the "standard tickets". O, for instance, stands for 16.000 g of oxygen, H_2 for 2 × 1.008 g of hydrogen, $2H_2O$ for 36.032 g of water, that is for two groups of three cards each.

By adding up the weights corresponding to the various symbols in the chemical formula, the "formula weight," "gramme molecular weight," or weight of one "mole" of the compound is obtained. In the case of gases or vapours this weight occupies (approximately, see page 23) the same volume as 32 g of oxygen at the same temperature and pressure—at 0°*C* and 760*mm* for instance, 22.4 litres.

7. Why was O=16.000 made the basis of the International Atomic Weights ?

Two points only remain to be cleared up. Why was 16.000 taken for the International Weight of oxygen ? and why is the volume of 32.000 g of the same gas adopted as the standard volume in writing chemical formulæ ?

The decisions of the Committee were based on eminently practical grounds. Most of the equivalent weights have been determined, directly or indirectly, by comparison with oxygen, and in many cases the quantity of an element that combines with one gramme of oxygen can be determined with greater accuracy than the weight of oxygen that combines with one gramme of hydrogen; so that, if hydrogen were taken as the standard, the combining weights of these latter would be affected not only by the error or uncertainty in the analysis of the oxide, but also by the greater error in the determination of the ratio H/O. Oxygen, therefore, has been selected as the standard of comparison; but instead of assigning it the weight 1, or 100, (as was commonly done between 1820 and 1850) the number 16.000 was chosen in order to make

1 Adopted, not originated; the Committee was formed to secure uniformity, and introduced as little change in the prevalent customs as possible.