more than one oxygen equivalent, but these are connected by the law of multiple proportions.

The weights of the "standard volume" of as many gaseous compounds as possible of each element were collected; and that multiple or "simple" fraction—$\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{3}{2}$—of the oxygen equivalent was chosen as "international weight" which came nearest the G.C.M. of the weights of the element in the standard volumes of its gaseous compounds. For instance, the oxygen equivalents of mercury are 200.0 and 400.0, the standard volume of mercuric chloride (a gas at high temperatures) contains 210 g mercury, and that of mercuric bromide 196 g mercury, 200.0 was chosen as international weight; the oxygen equivalents of bismuth are 83.4 and 139.0, the standard volume of the vapour of bismuth chloride contains 217 g bismuth, 208.5 was adopted as the international weight.

This method of selection has made it possible to write formulæ for these gaseous compounds which besides giving their compositions accurately, furnish a close approximation to the weights of the standard volume.

In the case of elements whose gaseous compounds—where they have any—had not been studied from this point of view, it was necessary to adopt other principles of selection. Nearly half of the known elements fall into this class, which includes seven of those prescribed for study in the Ontario High Schools, viz.: sodium, potassium, magnesium, calcium, strontium, barium, and manganese. The specific heats of five of these were known, and that "simple fraction" of the oxygen equivalent was chosen as international weight which, when multiplied by the specific heat gave a number between 6 and 7 as product.[1] The oxygen equivalent of sodium, for instance, is 11.525, its specific heat 0.293, and 23.05 was chosen as international weight.

For the other two, barium and strontium, the weight was selected so that the formulæ of their compounds might resemble those of calcium :—CaO, SrO, BaO; $CaCl_2$, $SrCl_2$, $BaCl_2$. Chemical similarity was thus paralleled by similarity in formulæ.

The case of copper perhaps deserves a word to itself. The only compound of that element that has been gasified and measured is cuprous chloride, its standard volume contains 131 g of copper. The oxygen equivalents are 63.6 and 127.2. Instead of taking 127.2 as international weight, however, 63.6 has been selected, partly because of the specific heat (0.094), and partly in order that the formulæ of the copper compounds migh resemble those of the compounds of zinc, etc., with which they are isomorphous.

1 The product sp. ht. × int. wt. for 41 of the solid elements lies between 6 and 7, for 9 between 5 and 6, and for 1 below 5.