to oxygen is more often determined than the ratio to hydrogen, and if the number assigned to the element is to be compared with hydrogen as unity it is evident that the ratio to oxygen must be multiplied by 15.88. If there is any error in the ratio of oxygen to hydrogen this error would appear in the other elements, being greater as the standard number is greater, so that in the case of uranium the oxygen error would be multiplied by 15. Hence it is now usual to make oxygen the standard, but instead of 100, as selected by Berzelius, the standard quantity is taken as 16. This gives the standard quantity of hydrogen as 1.0075 instead of unity. This small difference does not usually need to be considered. One advantage of taking the standard quantity of oxygen as 16 is that the standard quantities of most of the other elements are sufficiently near whole numbers that these whole numbers may for most purposes be taken as exact. It is to be clearly understood that making the standard quantity of oxygen 16, arose from making the standard quantity of hydrogen unity. No one would naturally have chosen 16 as the standard quantity of oxygen in the first instance.

It may be asked whether the law of Dulong and Petit does not give our present atomic weights — does not decide, for instance, whether the standard quantity for iron shall not be 56 instead of 28 or 7, as was suggested early in this article. Would not Dulong and Petit's law preclude oxygen being taken as 100 and the standard of iron 350? The reply is, not at all! Dulong and Petit's law is often given in the form that the product of the atomic weight multiplied by the specific heat of an element is approximately 6.4. This, however, is not really the law. With the set of standard weights that we have adopted for the different elements the product of these standard weights and the specific heats is approximately 6.4, and if any new element were discovered and its specific heat determined the number which would be chosen for the standard weight would be that which multiplied by the specific heat would most nearly approach 6.4. But this is because we have already fixed upon the standard weights for the other elements. If all the other standard weights were half their present value, the product would be 3.2; if they were double, the product would be 12.8. All that Dulong and Petit's law asserts is, that the standard weights of all the elements shall be so chosen that the product of the standard weight into the specific heat will be approximately constant. All the standard weights must conform; the product in all cases may (so far as *this* law is concerned) be 3.2 or 6.4 or 17 or 100, or any other number, but it is not allowable for the product to be in one case 3.2, in another 6.4, in another 17 or 19 or 100.

The Periodic law would also be unaffected by the value assigned to the primary standard, provided the *ratio* between the standard weights is kept the same as now. The Periodic law would be interfered with if calcium were given a value of 20 while potassium was kept at 39, but if the value of potassium were halved or doubled, the Periodic law would be undisturbed, provided the present numbers for all the other elements were correspondingly halved or doubled.

The line of argument presented above is not difficult to follow if the student's mind is not prejudiced by wrong impressions already received or misconceptions already formed. This treatment of the subject should be introduced before the atomic theory, but not till some familiarity is obtained with simple experimental phenomena. Water, hydrogen, oxygen, hydrogen peroxide, ozone, air, nitrogen, ammonia, nitrous oxide, nitric oxide, carbon dioxide, and carbon monoxide may well be experimented with and their properties discussed as a beginning in the study of chemistry. Incidentally, the difference between a mixture and a compound will be noticed, and facts may be learned which may be used to lead up to the laws of chemical combination and hence to formulae. In order to change the symbol weight of an element to atomic it is only necessary to introduce the atomic theory, and Avogadro's law will allow the standard formulae for gases to be translated into molecular formulae. The student should be made to thoroughly realize that Avogadro's law is not a law in the same sense as the laws of constant, multiple and reciprocal proportions, but that they are statements of fact, while it is merely the statement of a theory; a theory indeed, in accordance with all the facts so far known, but nevertheless a theory.

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While reviewing some of his soldiers in France, King George was seriously hurt by a fall from his horse. He returned to England, but is still unable to walk.