THE CENTURY SCIENCE SERIES. JOHN DALTON AND THE RISE OF MODERN CHEMISTRY

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SIR HENRY E. ROSCOE

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INTRODUCTION.

In the vestibule of the Manchester Town Hall are placed two life-sized marble statues facing each other. One of these is that of John Dalton, by Chantrey; the other that of James Prescott Joule, by Gilbert. Thus honour is done to Manchester's two greatest sons — to Dalton, the founder of modern Chemistry and of the Atomic Theory, and the discoverer of the laws of chemical-combining proportions; to Joule, the founder of modern Physics and the discoverer of the law of the Conservation of Energy. The one gave to the world the final and satisfactory proof of the great principle, long surmised and often dwelt upon, that in every kind of chemical change no loss of matter occurs; the other proved that in all the varied modes of physical change no loss of energy takes place. Dalton, by determining the relative weights of the atoms which

take part in chemical change, proved that every such change — whether from visible to invisible, from solid to liquid, or from liquid to gas — can be represented quantitatively by a chemical equation; and he created the Atomic Theory of Chemistry by which these changes are explained. Joule, by exact experiment, proved the truth of the same statement for the different forms of energy.

As we can neither create nor destroy matter, so also we can neither create nor destroy energy. As when the candle burns and the wax disappears, its constituent parts are not lost, but escape in the form of steam and carbonic acid gas formed by the union of the hydrogen and carbon of the wax with atmospheric oxygen; so the energy of the chemical forces locked up, or potential, in the wax and oxygen becomes evident, or kinetic, in the heat of the flame. In other words, the molecular motion of the particles becomes motion of the mass. And just as there is a definite and unalterable relation of weight between the carbon and the hydrogen of the wax and the products of their combustion — carbonic acid and water — so there is a definite and unalterable relation between the amount of the chemical