

from physiologists; but his total merit has never yet been recognised as it assuredly would have been had he chosen a happier mode of publication. I do not think a greater disservice could be done to a man of science, than to overstate his claims; such overstatement is sure to recoil to the disadvantage of him in whose interest it is made. But when Mayer's opportunities, achievements, and fate are taken into account, I do not think that I shall be deeply blamed for attempting to place him in that honourable position which I believe to be his due.

Here, however, are the titles of Mayer's papers, the perusal of which will correct any error of judgment into which I may have fallen regarding their author. "Bemerkungen über die Kräfte der unbelebten Natur," Liebig's Annalen, 1842, vol. 42, p. 231; "Die Organische Bewegung in ihrem Zusammenhange mit dem Stoffwechsel;" Heilbronn, 1845; "Beiträge zur Dynamik des Himmels," Heilbronn, 1848; "Bemerkungen über das Mechanische Equivalent der Wärme," Heilbronn, 1851.

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ARTICLE XXIII.—*On the Utilisation of the Power involved in the Rise and Fall of the tides.\**

The tendency of modern scientific discovery has been to show that all the various forms of force with which we are acquainted are mutually convertible into one another. Thus, of the six forces known to us in connection with the universe—gravitation, motion, light, heat, electricity, and chemical affinity—it is well known that any one of the five latter is capable, by appropriate means, of generating the other four, the force of gravitation being capable, through the medium of motion, of giving rise to the other five forces, whilst it cannot itself be generated. Gravitation may therefore be assumed to be the elemental force, since it is the only one of the six which will generate all the others. So accurately have these correlations been studied, that the quantitative value of gravitation has even been ascertained, it having been found that the mechanical force required to lift 772 pounds to the height of one foot, is capable, when converted into the force of heat, of raising the temperature of one pound of water 1° F. In other words, this amount of heat may be generated by an appropriate utilisation of the gravitating pull, exerted by a weight of 772 pounds during its downward movement through the space of one

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\* From the "Chemical News," 12th July, 1862.