"energy" has become a commercial commodity as it had before become a scientific measure.

That chemical reactions are connected with mechanical, gravitational, optical, caloric, and electric phenomena has been known for a long time. Each of these manifestations has therefore been studied as affording a measure of the energy of chemical reactions, and these have in turn been looked upon as results of attractions, or of mass actions, or of thermal conditions, or of electrical polarities. We have thus mechanical, thermo-chemical, electro-chemical theories of affinity. Valuable discoveries and important suggestions have also been arrived at by these special researches: we have the laws of mass-action suggested by Berthollet and revived in modern times by Guldberg and Waage; the all-important electrolytic law of Faraday and the so-called third law of Berthelot in thermo-chemistry; further, the important researches of Kopp and Hess. None of these discoveries, however, seemed really to grasp the whole subject of chemical reaction, and accordingly they remained for a long time unknown, or fell, after a short life, into oblivion and disrepute. It has been one of the greatest performances of the last twenty years of the century to have approached the all-important question, "What is chemical affinity, and how is it to be measured?" in a comprehensive spirit, and to have brought it to the verge of solution. The merit of having done this belongs the more incontestably to Prof. Wilhelm Ostwald,[1] because no one

37. Berthelot and Ostwald.

[1] Prof. Ostwald's principal work is the 'Lehrbuch der allgemeinen Chemie,' of which the first edition appeared in two volumes (Leipzig,