

sound wave, the author develops, by making certain assumptions, a formula showing that the velocity of a permanent explosion is a function of the density of the exploded gas. It is also shown how the specific heat at constant volume may be calculated from the velocity of explosion. The pressure of explosion is also obtained by the aid of two formulas, and for an explosion of equal volumes of cyanogen and oxygen it is found to be 57 atmospheres. *H. T. B.*

Electromotive Forces

On the controversy concerning Volta's contact force. *O. Lodge. Phil. Mag. [5] 49, 351-454 (1900).* — The first part of the paper is devoted to an argument that the Peltier effect is a measure of the potential difference between two metals. This is followed by an approving statement of the osmotic pressure theory of the cell, and then comes a discussion of the electron theory. It is much to be regretted that Professor Lodge and Lord Kelvin do not come together and decide on the points on which they disagree and the reasons for such disagreement. This firing away at long range is profitless, especially while each assumes that the other is ignorant of the elementary principles of physics. *W. D. B.*

Contact electricity. *F. S. Spiers. Phil. Mag. [5] 49, 70 (1900).* — The object of the work is to determine the cause of the Volta effect. The difficulties to be overcome are treated at some length and as a result an apparatus is devised, which combines the Ayrton and Perry method with the Kelvin compensation method. The measurements were made of the contact E. M. F. with the metals in vacuum and air, and when hot or cold. It was found that air was retained by the metals in vacuum to such an extent as to render it necessary to devise some special means to obviate it. A method of burning the oxygen in hydrogen and at the same time heating the metals was adopted, but even this was found insufficient, and at a high vacuum of pure dry hydrogen there was still sufficient oxygen left to oxidize the surface of an aluminum plate.

The paper concludes by stating "that it is utterly futile to draw any positive conclusions whatever concerning the seat of the E. M. F. in Volta's phenomenon based on experiments made in what usually passes for vacuum."

H. T. B.

Cadmium standard cells. *J. Henderson. Phil. Mag. [5] 48, 152 (1899).* — A brief description of tests made on a type of cadmium cell, where the cadmium sulphate solution was replaced by cadmium sulphate crystals. The temperature coefficient was found to vary between 0.009 percent and 0.002 percent, which is to be expected in spite of the utmost care in construction and purification of materials. The author's conclusions that "the cadmium cell is distinctly superior to any modification of the Clark cell" is not indicated by his own results.

H. T. B.

The reversibility of voltaic cells. *T. S. Moore. Phil. Mag. [5] 49, 491 (1900).* — The author has studied zinc-copper and cadmium-copper cells, using the corresponding sulphate and chloride solutions; also the Clark cell. The internal resistances were determined from two observations on the potential difference between the electrodes, and also from an observation on closed circuit