

ART. XLVIII.—*Note on the Alleged Change in the Resistance of Carbon due to Change of Pressure*; by SILVANUS P. THOMPSON, Professor of Experimental Physics in University College, Bristol.

IN the July number of this Journal, Professor T. C. Mendenhall has described some experiments upon the change of resistance in a disk of prepared lamp-black, such as is used in Edison's tasimeter. At the close of his communication Professor Mendenhall ventures, "without knowing anything about the nature of these experiments," to call in question the researches made by Professor W. F. Barrett, by Mr. Herbert Tomlinson,

and by the present writer, in which they had each independently arrived at the conclusion that this alleged effect was due not to any change in the specific resistance of carbon, but to better external contact between the piece or pieces of carbon and the conductors in contact with them. It may be added that an identical conclusion was arrived at in 1879 by Professors Naccari and Pagliani; and that a similar result was found a little later by Mr. Conrad W. Cooke. In short, with the exception of Professor Mendenhall, all who have investigated the point are agreed in their verdict.

As Professor Mendenhall expressly disclaims all acquaintance with the experiments upon which previous observers founded their conclusions, it is not extraordinary that he fails to appreciate the vital point in experimenting. His carbon disk lay in its usual place in the tasimeter, of which, however, the upper works had been removed for the purpose of his experiments, in which pressure was applied through a slender brass rod placed in a vertical position upon the center of "the upper contact piece." What this upper contact-piece was he does not say. No information is given of the nature of the contacts above and below. No attempt to distinguish between the resistance at the contacts and the resistance of the carbon disk was made; nor does the memoir show that any care was taken to ensure either perfection or constancy of contact. Under these circumstances it is difficult to see what grounds these experiments afford Professor Mendenhall for expressing opinions upon the question at issue. In the crucial experiment of Professor Barrett, which was made with one of Edison's own buttons of prepared lamp-black, there was a perfect contact maintained during the variations of pressure by covering both surfaces of the button with mercury; and in some of the other cases amalgamated copper contacts, and electroplated contacts have been employed. I venture to predict that if Professor Mendenhall will repeat his experiment, ensuring at the outset by one or other of these precautions that the disk of carbon shall have uniform and constant contacts during the experiment, he will find a very different result from that which he has announced. The very interesting observation which he has made that the influence of *time* makes itself felt when pressure is applied but not when pressure is removed, furnishes another argument in favor of the views held by the majority of experimenters on this question.

Another point worthy of note is this. Observers have more than once suspected that in carbon there is the peculiarity that the resistance—the true resistance of carbon itself—varies under different electromotive forces. The point is certainly worth investigating. Professor Mendenhall does not state what electromotive force was employed in his investigations.