

ON THE NATURE OF THE VOLTA EFFECT; A REPLY.

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IN the July number of this journal Mr. Albert E. Hennings¹ undertakes to show that the results of an experiment as published by the present writer were spurious. Mr. Hennings bases this charge upon the results of some experiments which he claims "reproduce the essential elements of the experiment described by Sanford." In this claim Mr. Hennings is seriously mistaken, as his experiments reproduce none of the essential elements of the experiment described by me.² The experiment which Mr. Hennings undertook to reproduce in a more satisfactory manner was performed by lowering an insulated zinc ball into a hollow conductor until it touched the bottom, then withdrawing it and measuring the contact charge taken by the ball from the inside of the hollow conductor or from a disc of another metal resting upon its bottom. The conclusions drawn from the experiment were based upon the assumption that the metal disc inside the hollow conductor was effectually screened from all outside induction. Mr. Hennings criticized the validity of my conclusions because he thought the metal disc and ball were not screened from the inductive effects of a hypothetical charge on the silk thread by which the ball was insulated.

Mr. Hennings's reproduction of the essential elements of this experiment consists in insulating a metal beaker, then lowering an uninsulated steel ball into it by means of a long conductor connected to earth, withdrawing the long conductor and ball and measuring the contact charge left upon the then insulated beaker.

This arrangement of a metallic beaker connected to earth by a long, uninsulated conductor standing up inside it can be called a hollow conductor only by courtesy, and seems to be especially adapted to eliminating all the properties for which hollow conductors have heretofore been used. The outside of a hollow conductor has been defined as the surface most exposed to the induction of surrounding charges. If this definition be adopted, Mr. Hennings has succeeded in introducing the outside of his hollow conductor into the inside of his beaker. It is at least certain that

¹ "Nature of the Volta Effect," *PHYS. REV.*, Ser. II., Vol. I., p. 1.

² "On The Nature of the Volta Effect," *PHYS. REV.*, XXXV., 484 (1912).

no experiments in which the shielding properties of a hollow conductor were involved could be performed with such a device as the one invented by Mr. Hennings.

The remainder of Mr. Hennings's paper contains nothing touching in any way upon the validity of the conclusions drawn from my experiment. In fact, he finally comes to the same conclusion as to the nature of the Volta effect that is stated at the end of my paper. I state as a result of what I conceive to be the teachings of my experiment that "Apparently the Volta effect is not due to any electrolytic action between the opposed metals, but different metals when in contact with the earth or with the inside of the same hollow conductor may be at different potentials relative to each other." Mr. Hennings says, "The surfaces of conductors which have been discharged to earth act just as though they were definitely and characteristically charged."

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