isolation très-considérable. Il est aussi facile de voir que la quantité de l'électricité développée par cette excitation continuelle qui a lieu dans les circuits doit être d'autant plus grande que le circuit est plus parfait conducteur. Ainsi, le circuit thermo-électrique donnera une quantité d'électricité incomparablement plus grande que celle qu'on pouvait tirer d'aucun autre appareil qu'on ait inventé jusqu'à notre temps. Si à l'aide des anciens circuits on a décomposé successivement l'eau, les acides et les alcalis, il n'est pas hors des limites de la vraisemblance qu'on parviendra, par le nouveau, à décomposer les métaux mêmes, et à compléter ainsi le grand changement qu'a commencé dans la chimie la pile de Volta.

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# ON AN APPARENT PARADOXICAL GALVANIC EXPERIMENT

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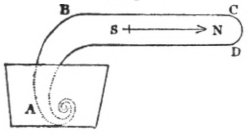
(THE EDINBURGH PHILOSOPHICAL JOURNAL. CONDUCTED BY DR. BREWSTER AND PROFESSOR JAMESON. VOL. X. P 205—207. EDINBURGH 1824)[1]

In a Memoir, published some months ago, by M. *Von Moll*,[2] at Utrecht,[3] this philosopher (already known from various experimental researches) describes an experiment, which, at first sight, appears to indicate a new class of galvanic phenomena.

I have submitted this experiment to an attentive examination. Fig. 1. is the apparatus of M. *Von Moll*. *ABCD* is a perpendicular section of a plate of zinc, bent in such a way that its extremities touch, and form a closed circuit. *NS* is a magnetic needle, properly suspended. The part *A* of the circuit is plunged in acidulated water.

*Fig. 1.*




If any point of this circuit under the water be touched by a piece of brass, the motion of the needle indicates an electric current. In order to be certain that the metallic continuity was not interrupted by the interposition of a part of the fluid, I

[1] [Among *H. C. Oersted's* papers a French rendering of the same essay has been found (parcel 23). No printed version has been discoverable.]

[2] [ɔ: Moll].

[3] Edinburgh Phil. Journal, vol. IX. p. 167.

substituted for that in Fig. 1., the circuit *A B C D E,* Fig. 2., cut out of a plate of zinc. The effect described by the Dutch philosopher was produced by this circuit likewise; but I soon discovered that it was owing to the ordinary galvanic circuits, like that formed by the copper *GH,* the zinc *GA*, and the fluid between *H* and *A*, or, as in that in Fig. 3. formed by the copper *JK,* the zinc *KC*, and the fluid.

The contact of the copper and zinc above the water, or at the surface of the water, produces no effect. In order to make myself

*Fig. 2.*

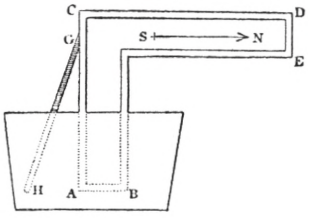



*Fig. 3.*

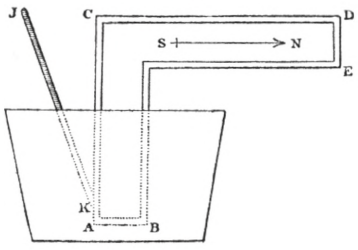



*Fig. 4*

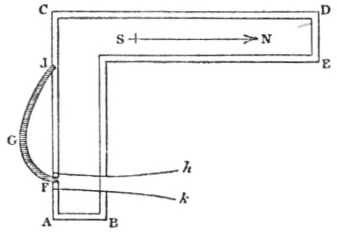
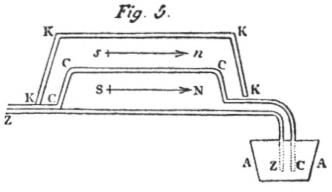



*Fig. 5.*




sure that a collateral galvanic circuit was capable of producing such an effect on a homogeneous metallic circuit, I made the construction shewn at Fig. 4., in which *A B C D E* is the same homogeneous circuit as before, but *JGF* is an arch of copper, in contact with the zinc at *J*, and separated from it at *F* by a fold *hk* of paper wetted in acidulated water. In alternately opening and closing this circuit, I found that the needle moved as in the preceding cases. This construction may therefore be considered as composed of a galvanic circuit *JGFJ,* and a conductor *JCDEBAF*, which transmits a current similar to that transmitted by *JGF.*

This explanation is confirmed by an experiment made with the construction represented in Fig. 5. in which *ZZ* is a plate of zinc, *CCCC* a plate of copper, and *AA* a vessel of acidulated water. When a magnetic needle is placed at *NS*, it is deflected according to the known laws; but, if to this circuit there be added the conductor *KKK*, a part of the electricity passes in it, and acts more

feebly on the needle, from being at a greater distance from it. The effect of the second conductor becomes more striking when the needle is placed at *ns*, and when (after having noted its deviation) the conductor *KKK* is added; because, in this case, the second conductor being above the needle, tends to give it a contrary deflexion to that given by the first conductor, which is below it. These experiments have the same result when *ZZ* is made of copper, and *CCC* of zinc.

On applying all this to the constructions in Figs. 2. and 3., we observe, that *CDEBA* is the same thing as the second conductor in Fig. 5. and that the current in the part *DE* (Figs. 2. and 3.) should have the same direction as in the part *CA* (to which it is parallel), in the same manner that the currents are similar in *CCC* and *KKK*, in Fig. 5. This being granted, we can determine the direction of the current in all the other parts of *CDEBA* (Figs. 2. and 3.), and experiments with the needle will confirm the predictions of the theory. In some experiments, M. *Von Moll* substituted a plate of zinc for the copper, with which he touched the zinc circuit, and produced electro-magnetic effects by these means also. This is likewise reducible to a collateral galvanic circuit; for I have proved, by experiments published two years ago, that a galvanic circuit may be made for a short space, by two plates of zinc and a liquid, provided that one of the plates be brought into contact with the liquid before the other.