

finger, it is indispensable that the contact be direct. The fish may with impunity be touched with a key, or any other metallic instrument; no shock is felt when a conducting or non-conducting body is interposed between the finger and the electrical organ of the torpedo. This circumstance proves a great difference between the torpedo and the gymnotus, the latter giving his strokes through an iron rod several feet long.

When the torpedo is placed on a metallic plate of very little thickness, so that the plate touches the inferior surface of the organs, the hand that supports the plate never feels any shock, though another insulated person may excite the animal, and the convulsive movement of the pectoral fins may denote the strongest and most reiterated discharges.

If, on the contrary, a person support the torpedo placed upon a metallic plate, with the left hand, as in the foregoing experiment, and the same person touch the superior surface of the electrical organ with the right hand, a strong shock is then felt in both arms. The sensation is the same when the fish is placed between two metallic plates, the edges of which do not touch, and the person applies both hands at once to these plates. The interposition of one metallic plate prevents the communication if that plate be touched with one hand only, while the interposition of two metallic plates does not prevent the shock when both hands are applied. In the latter case it cannot be doubted that the circulation of the fluid is established by the two arms.

If, in this situation of the fish between two plates, there exist any immediate communication between the edges of these two plates, no shock takes place. The chain between the two surfaces of the electric organ is then formed by the plates, and the new communication, established by the contact of the two hands with the two plates, remains without effect. We carried the torpedo with impunity between two plates of metal, and felt the strokes it gave only at the instant when they ceased to touch each other at the edges.

Nothing in the torpedo or in the gymnotus indicates that the animal modifies the electrical state of the bodies by which it is surrounded. The most delicate electrometer is no way affected in whatever manner it is employed, whether