The essential circumstances of the electric shock were gradually unravelled. Watson found that it did not increase in proportion either to the contents of the phial or the size of the globe by which the electricity was excited; that the outside coating of the glass (which, in the first form of the experiment, was only a film of water), and its contents, might be varied in different ways. To Franklin is due the merit of clearly pointing out most of the circumstances on which the efficacy of the Leyden phial depends. He showed, in 1747,[11] that the inside of the bottle is electrized positively, the outside negatively; and that the shock is produced by the restoration of the equilibrium, when the outside and inside are brought into communication suddenly. But in order to complete this discovery, it remained to be shown that the electric matter was collected entirely at the surface of the glass, and that the opposite electricities on the two opposite sides of the glass were accumulated by their mutual attraction. Monnier the younger discovered that the electricity which bodies can receive, depends upon their surface rather than their mass, and Franklin[12] soon found that "the whole force of the bottle, and power of giving a shock, is in the glass itself." This they proved by decanting the water out of an electrized into another bottle, when it appeared that the second bottle did not become electric, but the first remained so. Thus it was found "that the non-electrics, in contact with the glass, served only to unite the force of the several parts."

So far as the effect of the coating of the Leyden phial is concerned, this was satisfactory and complete: but Franklin was not equally successful in tracing the action of the electric matter upon itself, in virtue of which it is accumulated in the phial; indeed, he appears to have ascribed the effect to some property of the glass. The mode of describing this action varied, accordingly as two electric *fluids* were supposed (with Dufay,) or one, which was the view taken by Franklin. On this latter supposition the parts of the electric fluid repel each other, and the excess in one surface of the glass expels the fluid from the other surface. This kind of action, however, came into much clearer view in the experiments of Canton, Wilcke, and Æpinus. It was principally manifested in the attractions and repulsions which objects exert when they are in the neighborhood of electrized bodies; or in the *electrical atmosphere*, using the phraseology of the time. At present we say that bodies are electrized *by induction*, when they are

[11] *Letters*, p. 13.

[12] *Letters*, iv. Sect. 16.