come highly negative, while the other end of the same conductor must be highly positive; also, the first end of the second conductor will be negative, and the other end positive, and so on. The lightning therefore will enter the metal with much greater intensity than that with which it will pass along the conductor; and hence a hole may be melted at the point of entrance; for the same reason another hole might be expected at the point of exit, and in this way the perforations of the pans might be explained. The electricity did not pass through the space from side to side of the pan, as a bullet would have done, but took the circuit around the inverted bottom of the vessel.

He stated that in all cases when an electrical discharge passes through a conductor, the point at which the fluid enters, and that at which it passes out, are both marked with evidence of more intense action.

When a disruptive discharge takes place through the air between two conductors, in many cases a part of the matter of each conductor is transferred to the other. Professor Henry said that he had received accounts from different sources of a remarkable phenomenon connected with this action. In the case of a person killed many years ago by lightning, while standing near to the whitewashed wall of a room, the discharge took place between his body and the wall, and on the latter was depicted, in dark color, an image of his person. Other cases of the same kind had been observed.

ON THE PHENOMENA OF THE LEYDEN JAR.

(Proceedings American Association, Adv. of Science, vol. IV, pp. 377, 378.)

August 24, 1850.

Professor Henry gave an account of his investigation of the discharge of a Leyden jar. This was a part of a series of experiments he had made a few years ago on the general subject of the dynamic phenomena of ordinary or frictional electricity. On this subject he had made several thousand experiments. He had never published these in full, but had given brief notices of some of them in the Proceedings of

the American Philosophical Society. All the complex phenomena he had observed could be referred to a series of oscillations in the discharge of the jar. If we adopt the hypothesis of a single fluid, then we shall be obliged to admit that the equilibrium of the fluid after a discharge takes place by a series of oscillations, gradually diminishing in intensity and magnitude. He had been enabled to show effects from five of these waves in succession. The means used for determining the existence of these waves was that of the magnetization of steel needles, introduced into the axis of a spiral. A needle of this kind it is well known is susceptible of receiving a definite amount of magnetism, which is called its saturation. Now if the needle be of such a size as to be magnetized to saturation by the principal discharge, it will come out of the spiral magnetized to a less degree than that of saturation, by the amount of the adverse influence of the oscillations in the opposite direction to that of the principal discharge. If the quantity of electricity be increased, the power of the second wave may be so exalted that the needle will exhibit no magnetism; the whole effect of the first or principal wave will be neutralized by the action of the second. If the quantity of electricity be greater than this, then the needle will be magnetized in an opposite direction. If the electricity be still more increased, the needle will again exhibit a change in its polarity, and so on in succession, as the power of the successive waves is increased.

These experiments had been made several years ago, but he had not given them in detail to the public, because he had wished to render them more perfect. For the last three and a half years all his time and all his thought had been given to the details of the business of the Smithsonian Institution. He had been obliged to withdraw himself entirely from scientific research; but he hoped—now the Institution had got under way, and the Regents had allowed him some able assistants,—that he would be enabled, in part at least, to return to his first love—the investigation of the phenomena of nature.