

instant submersion, by properly constructed vehicles for conveying the electric fluid over the sides into the water? What inconvenience could be felt, from a branched rod and a chain from the mast-head, hanging along the shrouds into the water! All the failures of conductors arise from their want of sufficient mass of metal. A zinc chain, or tube, would be far less liable to oxidation than iron; and, as I have before remarked in the case of a powder magazine, &c., the metal might easily be kept with a clear surface, by an occasional rubbing with a brick-bat. About London we see conductors not thicker than a quill, applied to shot towers, tall chimnies, &c., whereas they ought to be gas tubes of at least an inch in diameter. The top ought to be formed in the manner of a branch of a tree, with five or six points of copper gilt, the extreme points being of pure gold or silver, as are those at Rome.

In some volcanic districts, over which it would appear that the solidified crust of our globe, which covers the yet incandescent mass, is thinner or more porous, than at other points, the electrical exchange of compliments between the earth and atmosphere, are almost as frequently directed upwards from the earth to the clouds, as in the contrary direction. Even against such upward discharges, the conductors, inserted in the earth, and ascending to the summit of the building, will preserve them from injury. I have witnessed a great many instances of ascending streams of electricity, some of which I have remarked upon in your pages, particularly in Nos. 401 and 402; and I am induced to think that we should see many more exhibitions of the process, were it not for the trees which act as silent conductors, both upwards and downwards. Electricity is the real food of plants, which they absorb through the innumerable points of their leaves and branches. On the same principle should a lightning-conductor be constructed with as many points as convenient.

Lieutenant Green says, "seventy-nine churches in Great Britain have in a few years been struck; some of them destroyed; many, after being furnished with from one to four conductors. All of those struck had metal vanes." How "many," out of the seventy-nine churches, were furnished with conductors, this opponent to Benjamin Franklin, does not tell us. He only shows the danger of metal vanes inviting the lightning, without a conductor to take it away. A bit of wire attached to the walls by iron eye bolts, or staples, is certainly more likely to cause mischief than to give protection. A proper and elevated conductor will generally carry off the electricity silently, without any apparent discharge.*

Lond. Mech. Mag.

New Experiment on Galvanic or Chemical action.

The following experiment is communicated to "The Annals of Electricity, Magnetism and Chemistry, conducted by William Sturgeon," by a correspondent whose signature is L. B. W.

"I took a smooth and clean piece of zinc, about the size of a walnut, inserted it in a piece of bullock's gut, and having carefully squeezed out all the air from the gut, tied it tight at both ends. I then placed the zinc, so surrounded by the gut, (into which there could be no mechanical possibility of entrance to the fluid,) into a jar of dilute sulphuric acid, and left it so all night. In the morning I found the gut full of gas almost to bursting. To prove the nature of the gas I made a pin hole in the membrane,

* *Note.* The above article is inserted because the fact stated respecting St. Peter's Church is deemed important; it otherwise assumes as facts what requires to be verified.

and, squeezing the gas through the flame of a candle, found, as I expected, that it was hydrogen.*

Here there could have been no voltaic influence; for zinc *alone* can produce none. Chemical it could only have been by the transmission of the acid; but the gut contained none. The zinc bore the same clean appearance as when first inserted, and was nowise oxidated.

"I repeated the experiment again and again, with the same result, excepting only that I found the inside of the bladder, or gut, and the zinc slightly moistened with a tasteless vapid fluid." L. B. W.

To W. Sturgeon, Esq.

&c. &c. &c.

The interesting facts above stated, appear to admit of satisfactory explanation from experiments made by the Editor of the Journal, and published in the first number of his Annals. He ascertained that different points on the surface of the same piece of metal are evidently in different states of electric polarity, and act towards each other, where connected by imperfect conductors, like the poles of a voltaic battery, producing a decomposition of the interposed fluids. There can be little doubt, therefore, that the moisture supplied by the gut was decomposed by the voltaic action of the zinc itself, the oxygen of the moisture combining with the metal, while the hydrogen escaped and expanded the enclosing membrane.

G.

Progress of Civil Engineering.

Asphaltic Mastic.

The ancients were indebted for the preservation of their buildings to the choice of their materials, and particularly to the use of cements, which, perfectly uniting with metal, stone, or wood, rendered their structures firm and solid. Amongst others, the use of a bituminous cement appears to have been extensive from the earliest times. Historians inform us, and modern observation confirms their statements, that the bricks with which the walls of Babylon were constructed were cemented together with hot bitumen. And in the destruction of some ancient remains of fortifications, supposed to have been Roman, near Pyrimont, about forty years ago, the stones appear to have been similarly cemented; and so great was their tenacity, that the works were with great difficulty pulled down, and not without the use of gunpowder. This circumstance led to a singular and important discovery, for the fact of which, as follows, we are indebted to a gentleman named Perrigny, a native of that neighbourhood. During the removal of the above ancient

*That animal membrane (bladder gut) has not only a permeability to fluid, but a power, by capillary attraction, of raising it two or three feet above its level, I call to witness my friend Goldworthy Gurney, who lately related to me the following experiment. Fill a glass funnel with water, and tie a fresh bladder over the large opening so securely that no water can escape; place it, with the bladder downwards, in a vessel (large dish) also full of water. Into the nozzle, or small end, of the funnel, a tube of 3 feet in length is to be inserted and secured quite tight by luting; set the apparatus thus arranged aside, and watching it, it will be found, said my informer, that the water will soon begin to rise in the tube, and ultimately reach the height of two or three feet.