

I have since seen a solution of the latter problem by Professor Hare, who attributes the effect to a different cause. He supposes that the blast coming out in various currents from the common centre of the tube and disks, causes an afflux of the surrounding air towards them, and as Mr. Perkins expresses it, (who explained the problem of the valve in the same way that Dr. Hare has that of the cards,) "impinges" on the whole outer surface of the disk, and counteracts the power of the blast, which acts only on a small part of the inner surface. To satisfy myself of the fallacy of this, I used means which I thought effectual to cut off all afflux of air towards the disk, which could have a tendency to keep them together, when I found the effect as prompt as before; which made me conclude, they were not kept together by any *flow* of air, but by the constant and steady *pressure* of the atmosphere which rested on them at the time the blast commenced, and continues unabated, while that on the inner surfaces is lessened by being met and opposed by the force of the blast, running out between the two inner surfaces of the cards.

I attempted to illustrate this by a tube six inches in length, and about the diameter of a large quill, at the end of which I fixed two strips of paper $\frac{3}{4}$ of an inch wide, and extending about three inches from the end of the tube; on blowing with force through the tube, the strips of paper were brought together by a very prompt and rapid movement. I observed the same effect, when this tube, with the strips of paper, was placed within another tube of $1\frac{1}{2}$ inch diameter and 10 or 12 inches long.

Account of the accident from lightning, which happened to the packet ship the New York. By T. TRAIL STEWART, M. D., of Liverpool. Read before the Royal Society, February 21st, 1828.

WE have already published an account of the accident narrated in the following paper, in our 4th vol. p. 197; but as this contains some particulars not mentioned in the former, we have determined to present it also. Some of the English Journals state the fact, that the elderly gentleman who "forgot his debility," walked home from the vessel upon her arrival in Liverpool, and has ever since retained the use of his limbs. Is it not more probable that this was the effect of electricity, than of terror from the crash? EDITOR.

"The ship which met with the accident of which the effects are the subject of this communication, was the American packet the New York, of 526 tons, commanded by captain Bennet. She sailed from New York for Liverpool, on the 16th of April, 1827; and on the morning of the 19th was struck by lightning, which shattered the main royal mast, and gliding down the iron chain main-top-sail tie, burst the iron bands on the main mast head. It was thence conducted

by the iron main-top-sail sheets, to the iron work of the pumps. It then entered between decks, demolishing the bulkheads that form the store-room, in its way to a small leaden cistern: whence it was conducted, by a leaden pipe, through the starboard side of the ship, where it started three five-inch planks, ten feet in length, at the lower part of the bends. Many other parts of the ship, not in the direct line of its passage, were also shattered, apparently from the effects of a lateral explosion, several doors and partitions were thrown down, a large mirror in the cabin was shattered into small fragments, and a piano-forte was thrown down, its top torn off and broken in pieces. The loudness of the explosion was appalling, and spread universal consternation. A sulphurous smoke, which had issued with a bluish flame from the hatches, filled the cabins; and at first inspired alarm, lest the cargo in the hold, consisting chiefly of cotton and turpentine, had taken fire; but on clearing the main hatch, it was soon ascertained that no danger from fire existed. The ship however had sprung a leak, which made four inches of water every hour, but which on washing the pumps was found to be under command, and would not prevent her proceeding on her voyage to England.

“When the first terror created by the accident had somewhat subsided, it was found that none of the passengers or crew had sustained any injury. The chief mate was sleeping in the birth opposite to the main-hatch, near the spot where the lightning entered the store-room, the lock of which was forcibly driven into his cabin: but he was not himself affected by the shock; and a quantity of gunpowder which was kept under his bed, was fortunately not ignited by the lightning. An ewer and a basin placed on a stand over a child's bed, were thrown down by the explosion, but the child had escaped unhurt. A remarkable effect was however produced on an elderly gentleman, who for the last five years had not been able to walk half-a-mile at a time: terrified by the crash, he forgot his debility, and springing from his bed, rushed on deck with singular quickness and agility. He has retained, ever since the event, the power over the muscles of his limbs, derived from this sudden emotion.

“The threatening aspect of the heavens, the appearance of numerous water-spouts on the surface of the sea, and other electrical indications, gave rise to apprehensions of further danger, and induced the captain to put up the conductor with which he was provided, but which had not been previously applied. It was made of iron links eighteen inches long, connected by iron rings an inch in diameter; and was furnished at the top with an iron rod four feet long, and half an inch in diameter, tapering to a fine point. This rod was fixed so as to rise three feet above the main royal mast head; and the chain was made to descend along the back-stay, and below was kept at a distance of ten feet from the starboard bulwarks by a light wooden outrigger, or spar. Its whole length was 145 feet, of which about nine feet of its lower part descended into the sea. The wisdom of adopting this precaution was soon apparent, for in the course of the same morning, the ship was struck by a second explosion, which is

stated by the unanimous testimony of all on board, to have far exceeded the first in violence. It melted a great part of the conductor, producing a vivid combustion of many of the links, which burnt like so many tapers; and descending into the sea, darted off to a considerable distance along the surface of the waves. The resistance to its passage was so great as to cause the ship to recoil with a sudden and violent shock, so as to throw down several of the crew. The melted iron of the conductor fell in large drops on the deck, which, already strewed with hail-stones that had previously fallen, intermixed with rain, was set fire to in many places by the ignited metal. No damage, however, was done to the masts or rigging, nor the least injury to any of the crew, with the exception of a carpenter, who being at work with an iron auger in his hand, received a smart shock through the wrists, which occasioned a vivid tumour, which was still visible six weeks after the accident.

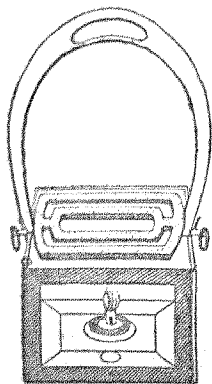
“Soon after the arrival of the vessel in Liverpool, she was docked, in order to ascertain what damage she had sustained. Some of her planks were found to have started, but her timbers were uninjured. Every instrument made of steel, such as the carpenter’s tools, and the knives and forks; and also those made of soft iron, even to the very nails in every part of the ship, had been rendered permanently magnetic. All the watches and chronometers, were either stopped or rendered useless, by the magnetism imparted to the balance wheels and other parts of their works that were made of steel. Contrary to what usually happens from shocks of artificial electricity, the lightning had given a strong northern polarity to the upper part of the conductor. Many parts of the iron-work, indeed, had acquired the magnetism corresponding to their position with respect to the magnetic direction; but in others, no relation of this kind could be traced. Great changes were produced on the magnetism of the compass needles, in many of which were formed several sets of poles, and their indications could therefore no longer be relied on.

“The circumstances attending the accident which is the subject of this paper, are considered by the author, as strongly confirming the value of conductors to ships in obviating the destructive effects of lightning. From the inquiries he has made, he is led to the belief, that injuries from lightning at sea, are much more frequent than is generally imagined. One source of increased danger of late years is to be found in the greater proportion of metal, and particularly of iron, which is employed in the rigging; more especially as the metallic masses are there nearly insulated, or connected only by very imperfect conductors. In the instance before us, it is in the highest degree probable, that if the *New York* had been without the protection of the conductor, she must inevitably have been destroyed by the second tremendous explosion, which, thus guarded, she sustained without the slightest injury. The author remarks, that copper is a better material for such a conductor than iron, from its being less liable either to fusion or corrosion; and also, that a rod is, from its continuity, a better form of conductor than a chain. In the case of ships, however, the greater convenience of a chain, arising from its

flexibility, will generally insure it the preference. The author recommends, that, instead of carrying the conductor through the decks to the keel, as suggested by Mr. Harris, the lower end of the chain should be kept at a distance from the sides of the ship, by means of a light outrigger, or spar, as was done in the New York."

The Stirrup Lantern.

[To the Editor of the Register of the Arts and Sciences, &c.]



SIR—Being an old traveller of the equestrian order, and having experienced much comfort and convenience from the use of the Stirrup Lantern, I am desirous of recommending it to the notice of travellers generally, through the medium of your interesting work.

The Stirrup Lantern is a small square lantern, fixed at the bottom of a stirrup by means of two screw rings on each side, as exhibited in the drawing which accompanies this; they serve also to unscrew it whenever it may be required to detach it from the stirrup. The lamp part is so contrived that no oil can be spilt; nor the steady light, which is thrown across the road before the horse's feet, be at all impaired by any motion of the horse. The front part, as shown in the drawing, is of glass, through which is seen the lamp, burner, and wick; behind these is placed a reflector, for transmitting the light to the front. It is supplied with a constant current of air by means of apertures, in a sort of double casing, which are so disposed as to prevent any gust of wind from affecting the light.

This is not, Mr. Editor, an article of mere luxury, but one which confers the most solid comfort to the way-worn, benumbed, and benighted traveller. I make no doubt, indeed, that the Stirrup Lantern will be the means of saving many a neck from being broken; that my own is still entire is frequently a matter of wonder, when I consider how 'many a time and oft' I have been precipitated into hedges and ditches by some unlucky step of my horse.

In conclusion, I think it necessary to state, for the information of my brethren of the Stirrup, that I procured my apparatus of the inventor, Mr. Peat, of Piccadilly.

I am, sir, your obedient servant and constant reader,

P. PRYNNE.

Lambeth, 14th January, 1824.

We think the Stirrup Lantern would be found particularly useful to medical practitioners in the country, when they have occasion to visit their patients at night.

[*Ed. Reg. of Arts.*]