THUNDER STORMS---PROTECTION AGAINST LIGHTNING.

The present summer, so far, has been remarkable for the number of accidents from discharges of electricity. We believe there has been no storm this season, accompanied with lightning, which has not resulted in damage to person or property. In view of these facts, the importance of providing adequate protection to buildings and ships, from lightning, can hardly be over-estimated. The failure of lightning rods, in some instances, to protect the structure to which they were attached, has had the effect to impair confidence in such means of protection; but it can be clearly demonstrated that when made on scientific principles, honestly constructed, and properly applied, they are the only means which can be relied upon for protection, and that they are deserving of entire confidence.

The electric fluid does not always descend in a vertical path, nor in a course approaching that direction. Many instances are on record where the bolt traveled horizontally, and much damage has occurred from "earth strokes" or ascending discharges. These facts have not always been recognized by constructors of lightning rods, their idea being that a building was sufficiently insured against lightning by having the rods project above the highest portion of the building, leaving all the other parts unprotected. Experience has added its evidence to the instructions of science in demonstrating the unreliability of such protectors.

From Lyon's "Treatise on Lightning Conductors," we copy the following requisites of a good rod:—

"First. The conductor should be made of good conducting substance.

"Second. It should have great electrical capacities; a square rod requires less metal than a round rod.

"Third. It should be perfectly continuous, *i. e.*, it should have no breaks in the connections—no links or hooks, but a perfect metallic union of every part.

"Fourth. It should be insulated from the building to be protected, except from such masses of metal as are likely to offer other lines of discharge.

"Fifth. It should have numerous lateral points, one in six or seven feet will answer. The more numerous these points are, the greater the conducting power of the rod. Besides, these lateral points provide for an oblique discharge, each being as good a receiving point as the higher point at the chimney or other prominences. They also guard against a lateral explosion, or a division of the charge, which is liable to happen in case the rod is overcharged, especially if it be fastened to the house with pointed staples; and in case of an upward stroke, the electric fluid being discharged at so many different points, no harm can possibly occur.

"Sixth. Its upper extremity should project freely into the air, should be pointed, and may be triangular, somewhat similar to a bayonet, or it may have several branches. The only scientific advantage in having a branching head or point for the superior termination, is this: all points are not likely to become blunt at the same time. Some have supposed that the point should be *magnetized*; and little needles, called "*magnets*," have sometimes been added. But it is difficult to see the practicability of this recent discovery; for most are aware that magnetized iron or steel soon loses its magnetic influence. But *is* there any truth or science in this application of magnetism? If there *is*, we confess that we have not been able to discover it in any experiments in the laboratory; neither can we learn that the subject has even been *mentioned* by any writer *whatever*, on the subject of electricity.

"Seventh. The upper termination should be plated with silver or gold, to prevent corrosion.

"Eighth. Every branch rod running to chimneys, and other prominences, should have a perfect metallic union with the main rod.

"Ninth. In cases where metallic vane spindles, or other points exist, the conductor may commence from these, and should be applied immediately to the part to be protected, and not at a distance from it; and should be so applied that a discharge of lightning falling on the general mass could not possibly find its way to the ground through the building by any circuit of which the conductor did not form a part; that is to say, the conductor should be so carried over the several parts of the building, that the discharge could not fall upon it without being transmitted safely by the conductor. Hence, the rod should run along the whole length of the ridge, and down to the ground, at least on two sides of the building. If the building is large, it should run down on each corner.

"Tenth. Every conductor running to the ground should terminate sufficiently beneath the surface to insure moisture in the dryest part of the season. If circumstances permit, it should connect with a spring of water, a drain, or some other conducting channel."

Numerous instances of the ascending stroke have occurred, the records of which are extant. It must be evident that a single rod extending above only one point of the building, will not properly protect the structure to which it is applied from one of these upward strokes, neither is it efficient against an oblique or divided discharge. The whole building, top and sides, must be protected by a continuous rod with numerous projecting points for receiving and discharging the electric fluid. In the summer of 1787, lightning struck two persons near the village of Tacon, in Beaujalois, who had taken refuge under a tree. Their hair was driven upward and found near the top of the tree. A ring of iron which was on the shoe of one of these persons was found suspended on one of the upper branches.

On the 29th of August, 1808, lightning struck a small building near the hospital of Salpétrière, Paris. A laborer who was in it was killed, and after the event, pieces of his hat were found incrusted in the ceiling of the room.

In June, 1854, the dwelling of A. J. Platt, of Deep River, Conn., was struck by lightning, the fluid passing up the door-casing of the hall, knocking off the ceiling in the hall and parlor, and, after traversing the house longitudinally, passing down a pillar, returned to the earth. This building was guarded by a rod attached to each chimney, the branches connected to a single rod passing down the side of the building through glass insulators. In this case it appears that the elevated rod afforded no protection against an upward stroke. The case would probably have been different if the sides of the building had been furnished with conductors with lateral points. Passing the rod through glass insulators does not seem to be always effectual to protect the building. The interposition of a glass knob between the rod and the building, appears to be preferable. In cases where the rod has passed through a hollow cylinder of glass, it has been found that the glass would burst and the fluid enter the building by the iron staple which held the glass ring.

Some of the old-fashioned and erroneous notions entertained and religiously believed by persons in relation to the effects of lightning, and particularly the means of protection, have been exploded by the occurrences of this season. That feathers afford no protection against electricity, is proved by the case of a woman in St. Louis, who was killed by a stroke of lightning while lying on a feather bed. An instance of one of three persons sitting near a closed window, also dispels the illusion that the interposition of window glass is an effectual bar to the action of the destructive element.

The only efficient protection is that of a good rod properly put up. The subject is too important to be lightly passed over, and it is no less important that the confidence of the purchaser should not be betrayed, and life and property endangered, by accepting an inefficient conductor, or one improperly applied.

A LITTLE daughter of Mr. Kennedy, residing in Pittsburg, came near losing her life the other day, by eating a small piece of fly-poisoning paper. Sweet milk was at once administered as an emetic. It had the desired effect, and a physician summoned declared that the child owed its life to this simple remedy.

[White of egg is also beneficial; being an antidote to most poisons.—EDS.

ORDERS have been received at the Springfield Armory, from the Ordnance Department, at Washington, for the manufacture of 25,000 of Allin's lately improved breech-loader, and work on them will soon be commenced.

Correspondence

Breech-Loaders Vs. Muzzle-Loading Fire-arms.

MESSRS. EDITORS:—The great success of the needle gun, in the hands of Prussian soldiers, has awakened a lively interest in favor of breech-loading fire-arms in Europe and in this country.

Inventors and practical armorers have, for years past, been fully aware of the great superiority of the breech-loading system over that of of muzzle-loading, and great efforts have been made to introduce this class of arms into the military service of the different nations of Europe and in this country. To Prussia belongs the credit of first arming its infantry with this class of arms. Better guns, however, than the needle gun, are to be found in the United States. Why they have not been adopted by the Government ere this, is a subject which need not be discussed at this time. The object of the writer is to point out some of the advantages of breach-loading over muzzle-loading arms.

First, A breech-loading carbine, or musket, when metallic cartridges are used, can be loaded and fired a thousand times without cleaning, when it is scarcely possible to load and fire a muzzle-loading musket fifty times without cleaning. This difference grows out of the fact that the principal fouling caused from each discharge of a breech loading arm, is deposited within the cartridge shell, or case, which being removed at each discharge, keeps the gun clean. If a man will take the trouble to load and fire a muzzle-loading gun, say a Springfield musket, fifty times, and then remove the breech-pin, he will find a deposit of burnt powder at the breech where the charge lay, of about one-sixteenth of an inch in thickness. This incrustation is very hard and difficult to be removed. There is none of this deposit at the breech of a breech-loading arm, for the reason as stated; the fouling engendered at each discharge is removed with the spent cartridge case. When a ramrod is used, the fouling is rammed home toward the breech; when in the breech-loading arm what little there is of deposit in and along the barrel, not removed with the case, as stated, is carried forward and out of the gun by each successive discharge.

Second, Greater penetration and range can be had from a breech-loader with same charge, than can be obtained from a muzzle-loader. This favorable result grows out of the fact that in a breech-loading arm, when used with a metallic cartridge, there is no escape of gas at the breech, all the force of the powder being expended in giving velocity to the ball, when in a muzzle-loading arm, there is an escape of gas at the vent at each discharge, which lessens the initial velocity of the ball.

Third, A consideration of the very first importance in favor of breech-loading fire-arms is, that every cartridge must be either discharged or withdrawn from the barrel, precluding the possibility of such results as were shown on the battle field at Gettysburg, where, of the 27,574 muzzle-loading muskets collected after the battle, 24,000, were found loaded; 12,000 of which contained two loads, and 6,000 or 20 per cent were charged with from three to ten loads each, the cartridges often times being loaded without breaking them, and many inserted with the ball downward. What an immense amount of effective force was here rendered useless, and that, too, in the heat of battle when every available means was being exerted to secure victory! What might have been the gain, in the saving of life and of treasure to the nation, had the Union soldiers been armed at the commencement of the rebellion with such arms as the Spencer, Sharpe Remington, Ladely or Peabody breech-loading rifles. With such arms in the hands of the Union soldiers it is but reasonable to suppose that the rebellion would have been crushed within six months from its commencement. It is results that count in warfare. Nothing can be more plain than that those who have the best arms necessarily have a great advantage. It is, therefore, the duty of every nation to prepare in