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NEW METHOD OF PROTECTING BUILDINGS FROM LIGHTNING.

SPARE THE ROD AND SPOIL THE HOUSE!

Lightning Destroys. Shall it be Your House or a Pound of Copper?

PROTECTION FROM LIGHTNING.

What is the Problem?

In seeking a means of protection from lightning-discharges, we have in view two distinct objects, viz., the prevention of injury to life, and the prevention of injury to property. In order to destroy a building in whole or in part, we must be able to discharge a large quantity of electricity, for it is energy required. Just before the lightning-discharge takes place, the lightning rod acts as a conductor or path through which we seek to prevent exists in the column of air extending from the earth to the sky in some form that makes it impossible for our minds to comprehend the energy in the electric current. What this electrical energy is, if it is necessary for us to understand it, we shall never be able to know, for it is represented itself in the destruction of buildings. The problem that we have to deal with, therefore, is not to conduct energy in any other manner than by giving it a place in the destruction of buildings. The way to do this, the way to deal with the problem, is to introduce some object which will dissipate the electrical energy, and thereby prevent any harm from it. But the question now is, how is this to be accomplished in such a way as shall result in the least injury to property and life.

Why Have the Old Rods Failed?

When lightning-rods were first proposed, the science of energetics was entirely undeveloped; that is to say, in the middle of the last century scientific men had not come to recognize the fact that the different forms of energy—heat, electricity, mechanical power, etc.—were convertible one into the other, and that each could produce just so much of each of the other forms, and no more. The doctrine of the conservation and correlation of energy was first clearly worked out in the early part of this century. There were, however, some facts known in respect to electricity a hundred and forty years ago; and among these were the attracting powers of poles for an electric spark, and the conoidal Paracutic effect of smoke. In case of the two experiments, the object that was made to be transferred, the idea that the electricity existing in the lightning-discharge could be conveyed around the building, which it was proposed to protect, and that the building would thus be saved.

The result of the experiment of the old building was entirely ignored; naturally, and from that time to this, in virtue of the best endeavors of those interested, lightning-rods constructed in accordance with Franklin's principle have not furnished satisfactory protection. The reason for this is apparent when it is considered that the electrical energy existing in the air—here before the discharge, or, more exactly, in the column of electricity from the earth to the sky—is that which we have no means of knowing; and that the greatest dissipation of energy will be known of the very lightning-rods that were meant to protect, and damage results, as so often proves to be the case.

It will be understood, of course, that this display of energy on the surface of the old lightning-rod is aided by their holding more or less insulated from the earth, but in any event, the device itself is so designed that the old lightning-rod can only tend to produce a disastrous dissipation of electrical energy upon its surface—"to draw the lightning," as it is so commonly put.

Is there a Better Means of Protection?

Having cleared our minds, therefore, of any idea of conducting electricity, and keeping clearly in view the fact that in providing protection against lightning we must furnish some means by which the electrical energy can be harmlessly dissipated, the question arises, "Can an improved form be given to the rod so that it shall a. 'in dissipate' it?"

SCIENTIFIC INSTRUMENTS.

As the electrical energy involved manifests itself on the surface of conductors, the improved rod should be metallic; but, instead of making a large rod, suppose that we make it comparatively small, so that the total amount of metal running from the top of the house to some point a little below the foundations shall not exceed one pound. Suppose, again, that we introduce numerous insulating joints in this rod. We shall then have a rod that electrical engineers will be readily destroyed—will be readily dissipated—when a discharge takes place; and as it will be evident, that, as far as the electrical energy is concerned in doing this, there will be the less to do other damage.

The only point that remains to be proved as to the utility of such a rod is to show that this dissipation of such a conductor does not tend to injure other bodies in its immediate vicinity. On this point I can only say that I have never known in any case where a conductor has been put to use, even if resting against a plastered wall, where there has been any material damage done to surrounding objects.

It is readily understood that such an explosion cannot take place in a confined space without the presence of the heavy explosive. In any event that I have found recorded this dissipation takes place just as if no conductor was there. The objects containing the conductor rests may be stained, but they are not shattered, because the energy was not dissipated through them. When dissipated in one place, another will be left. If we have as our other design, it is not to prevent the explosion, but to resist the fatal effect. As to resist the explosive effect—damage results to objects around. When the rods are around are saved.

A Typical Case of the Action of a Small Conductor.

Franklin, in a letter to Collinson read before the London Royal Society, Dec. 10, 1756, describing the partial destruction by lightning of a church-tower at Newbury, Mass., says, "Near the bell was fixed an iron hammer to strike the clock; and from the bell of the hammer a wire went down through a small gimlet-hole in the floor that the bell stood upon, and through a second floor in the church; then horizontally under and near the plastering ceiling of that second floor, till it came near a plastered wall; then down by the side of that wall to the church, and passing under in all directions of the square in which the church stood, so that nothing remained above the bell. The lightning passed between the hammer and the clock in the above mentioned gimlet-hole without hurting either of the floors, or having any effect upon them (except making the gimlet-holes, through which the wire passed, a little bigger) without hurting the plastered wall, or any part of the building, so far as the aforesaid wire and the pretended wire of the clock extended; which wire was about the thickness of a goose-quill. From the end of the penultimate, down quite to the ground, the building was entirely rent and damaged. . . . No part of the aforementioned big, small wire, between the clock and the hammer, could be found, except about two inches being hung to the tail of the hammer, and about as much that was fastened to the clock; the said lighting exploded, and its particular electric energy dissipated."

One hundred feet of the Hodges Electric Rod (£10 5s. 6d., or $20.00, post free) will be mailed, postpaid, to any address, on receipt of five dollars ($5).