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 things: the prevention of the evacuation of the plants, and the other, and the prevention of injury to life. In other words, we seek to build a building in which the shock of the discharge, which we seek to prevent, will not be so strong as to be dangerous, and that in some form that makes no damage to the electrical energy. We probably do not need to say that the required object is to this end that we have to deal with, and the accomplishment of this in such a way 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, et cetera—were convertible one into the other, and that each could produce just so much of each of the other forms, and so on. 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 regard to electricity a hundred and forty years ago; and among these were the attracting power of points for electric sparks, and the conducting power of metals. Lightning-rods were therefore introduced with the idea that the electricity existing in the high-voltage-discharge was conveyed around the building which it was proposed to protect, and that the building would be saved. 

The question as to dissipation of the energy involved was entirely ignored; and from this time to this, in spite of the best endeavors of those interested, lightning-rods constructed in accordance with Franklin's principles have not afforded satisfactory protection. The reason for this is apparent when it is considered that the electrical energy existing in the atmosphere before the discharge, or, more exactly, in the column of electricity from the cloud to the earth, above referred to, reaches its maximum value on the surface of the conductors that choose to be within the column of dielectric; so that the greatest display of energy will be on the surface of the very lightning-rods protected, and damage results, as so many prove to be the case. 

It will be understood, of course, that this display of energy on the surface of the old lightning-rods is aided by their being more or less insulated from the earth, but that, on the other hand, the very existence of such a mass of metal as an old lightning-rod can only tend to produce a disastrous dissipation of electrical energy upon the ground. 

Is there a Better Means of Protection? 

Having cleared our minds, therefore, of any idea of conducting electricity, and having discovered the fact that in providing protection against lightning we must furnish some means by which the electrical energy may be made to pass away, the question arises, can an improved form be given to the rod so that it shall 

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 in size, so that the total amount of metal resulting from the top of the house to some point a little below the foundations shall not exceed one pound. 

With this, again, that we introduce numerous lightning points in this rod. We shall then have a rod that exerts its influence equally well in our desire, which will be readily dissipated, when the lightning-discharge takes place, and it will be evident, that, so far as the electrical energy is concerned, it will be the least to do further damage. The only point that remains to be proved is the utility of such a rod is to show that the dissipation of electricity does not tend to injure other bodies in its immediate vicinity. On this point I can only say that I have not seen any case where such a conductor, and has, indeed, been apportioned, even if resting against a plastered wall, where there has been any material damage done to surrounding objects. 

Of course, it is readily understood that such an application cannot take place in a confined space without the rod being partially consumed; and so, in every case that I have found recorded this dissipation takes place in some way or another. 

The object against which the conductor rests may be burnt, but they are not shattered, and would therefore make no objection to the discharge of electrical energy when dissipated on the surface of the conductor and when dissipated on the surface of a small conductor. 

When dissipated on the surface of a large conductor—a conductor so strong as to cause the explosion to be effective, but when dissipated on the surface of a small conductor, the conductor goes, but the other objects 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. 13, 1755, describing the partial destruction by lightning of a church tower at Newbury, Mass., wrote: "When the bell was fixed on a hammer to strike the hours; and from the ball of the hammer a wire went down through a small gilded-rod in the floor that the bell stood upon, and through a second floor in the line of the church tower, to the ground. The lightning passed between the hammer and the clock in the above-mentioned wire without hurting either of the floors, or having any effect upon them (except making the piece-loose, through which the wire passed, a little larger, and without hurting the plastered wall, or any part of the building, so far as the aforesaid wire and the pendulum-wire of the clock extended; which latter wire was about the thickness of a goose-quill. From the end of the pudding, down quite to the ground, the building was exceedingly rent and damaged, so that nothing remained above the bell. The lightning passed between the hammer and the clock in the above-mentioned wire without hurting either of the floors, or having any effect upon them (except making the piece-loose, through which the wire passed, a little larger, and without hurting the plastered wall, or any part of the building, so far as the aforesaid wire and the pendulum-wire of the clock extended; which latter wire was about the thickness of a goose-quill. From the end of the pudding, down quite to the ground, the building was exceedingly rent and damaged, so that nothing remained above the bell."

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planes passing through its
upper and lower ends respectively?
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found which show that when the
conductor is dissipated the building
is not injured to the extent
explained (for many of these see
volumes of Philosophical Trans-
actions at the time lightning
was attracting the attention
of the Royal Society), but not
an exception is yet known, al-
though this query has been pub-
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