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September 22, 1893

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New Method of Protecting Buildings from Lightning.

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PROTECTION FROM LIGHTNING.

What is the Problem?

In seeking a means of protection from lightning-discharges, we have in view two objects,—the one the prevention of damage to buildings, and the other to prevent personal injury. While the former is an important matter, as it is necessary that work should be done; it is by no means so important as the latter, for while it is possible to build a building in which it is out of the question for lightning to strike it, and thus to prevent the possibility of buildings being struck and damaged, we cannot do it in a manner that will prevent the possibility of personal injury. We provide for our own safety as much as we are able, but we are not able to protect the world against all possible dangers, and when danger is so near that it must be encountered, we must do the best we can for ourselves.

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.—are convertible one into the other, and that each can produce just so much of the other forms, and no more. Consequently, while the conception of the conservation and correspondence 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 exciting properties of points for electrizizing and the conducting power of metals. Lightning-rods were therefore introduced with the idea that the electricity existing in the lightning-discharge could be converted into a current which is proposed to protect the building, but the building would thus be saved.

The question as to the distribution of the energy involved was entirely ignored, and from that time to this, in spite of the best endeavors of those interested, Lightning-rods constructed in accordance with Franklin's principles have not furnished 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, has referred to, reaches its maximum value on the surface of the conductors that chance to be within the column of discharge; so that the greatest display of energy will be on the surfaces 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 objects is aided and facilitated by their being more or less insulated from the earth, but in any event the very existence of such a mass of metal as an old lightning-rod can only tend to produce a destruction of the surface of the lightning-rod, and perhaps even greater destruction of the material of the building when the lightning-energy falls on it, and then, as properly a current as can be had, and therefore a current of enormous amount of energy—upon its surface,—"to draw the lightning," as it is so commonly put.

Is there a Better Means of Protection?

Having cleared away misunderstanding 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 electric energy may be harmlessly dissipated, the question arises, "Can an improved form be given to the rod so that it shall a. In this dissipation?"