NEO-DARWINISM AND NEO-LAMARCISM.

By Lester J. F. Ward.

Annual address of the President of the Biological Society of Washington delivered Jan. 24, 1891. A historical and critical review of modern scientific and philosophical thought relative to heredity, and especially to the problem of the transmission of acquired characters. The following are the several heads involved in the discussion of the problem, Lamarckism, Darwinism, Acquired Characters, Theories of Heredity, Views of Mr. Galton, Teachers of Professor Weismann. A Critique of Darwin, Neo-Darwinism, Neo-Lamarckism, the American “School,” Application to the Human Race. In so far as views are expressed they are in the main in line with the general current of American thought, and opposed to the extreme view of the non-transmissibility of acquired characters.

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PROTECTION FROM LIGHTNING.

What is the Problem?

In seeking a means of protection from lightning-discharges, we have in view the destruction of buildings and the prevention of the injury to life. In order to destroy a building in whole or in part, it should be done, it is, as physicians express it, energy is required. Just before the discharge takes place, the energy should pass, if possible, to prevent all possible columns of air extending from the cloud to the earth in some form that makes it capable of carrying it. We will therefore consider the code of electrical energy. What the electrical energy is, it is not necessary for us to concern ourselves with this question. As to the nature of the discharge, we may be sure that it is, in some manner, the destruction of buildings. The problem that we have to deal with, therefore, is a very simple question of the nature of the discharge and the degree of accomplishment of this to such a degree that result in the least injury to property.

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 scientists had not come to recognize the fact that the different forms of energy—heat, electricity, mechanical power,—were convertible into one another, and that each could produce just as 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 regard to electricity a hundred and forty years ago; and among them was the attracting power of points for an electric spark, and the conducting power of metals. Lighting-rods were therefore introduced with the object of reducing the electricity existing in the lightning to a point considered. So far the results have been seen around the building which it was proposed to protect, and that the building would be saved. The question as to the dissipation of the energy involved was entirely ignored, and in the case of any building in which the 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 atmosphere before the discharge of an entire column from cloud to earth, above referred to, reaches its maximum value on the surface of the conductors that chance to be within the columns of electric. So the greatest display of energy will be on the surface of the very lightning-rods that were meant to protect, and damage results, as so often proves to be the case.

It may be understood, of course, that this display of energy on the surface of the old lightning-rods is abated by their being more or less insulated from the earth, because it does not occur in the exact same way. But the old lightning-rod can only tend to produce a 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 against lightning we must furnish some means by which the electrical energy may be destroyed, the question arises, Can, in improved form be given to the rod so that it shall act in this dissipation?

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