Michigan Experiment Station

PRESS BULLETIN NO. 15.

PROTECTION OF BUILDINGS FROM LIGHTNING

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This special bulletin is issued to answer the many inquiries which come to the college and station concerning the function of lightning rods and the proper methods of constructing them.

It is now supposed that lightning flashes are of two distinct characters, a vertical flash or main discharge between the cloud and the ground, and a side discharge between the cloud and the ground, precipitated as the immediate consequence of a main flash between two opposed clouds. An ordinary lightning rod properly put up is fairly sure to protect against the first flash mentioned, while to protect against the second class of flashes would require a complete "bird cage" well grounded, set down over the building. It is manifestly impossible to put such a bird cage over a building but we can approximate somewhat to that condition.

We have the words of eminent scientists to the effect that lightning rods, properly put up, do offer a very material protection, although they do not render the house absolutely immune to injury. Mr. Kellingworth Hedges, an eminent British authority, is of the opinion that modern methods of installing lightning conductors afford reasonable protection and that the amount expended on such protection should be proportional to the value of the property protected.

The following method of installing lightning rods is suggested: Let the rod start from one side, go up over the building and down the opposite side, thoroughly grounding both ends as indicated below. There should be one rod up each of the two opposite sides of any cupola or projection on the roof, the rods to go some two feet or more higher than the projection and be connected with the main rod. Horizontal conductors should inter-connect all vertical rods at the roof ridge level and also at the ground level. All large masses of metal in or on the building should be grounded as directly as possible. Gas pipes and all large masses of metal should be kept away from the lightning conductors. The efficiency of the lightning rod depends very materially on its being well grounded, which means that it should be in permanent connection with moist earth. The usual method of grounding is to dig a hole down to earth that is permanently moist. Solder the lightning rod to a piece of gas pipe or to an old wash boiler and imbed this larger metal in coke. There must be ample carrying surface from the surface of the ground down into this mass of coke. It is suggested that it is well to allow the eaves of the house to discharge the water through a drain tile into this mass of coke which is buried beneath the surface to keep it moist. The only objection to this suggestion is that when a thunder storm comes up after a long dry spell, the coke is apt to be dry in spite of this precaution. Any method that will keep the coke moist or secure adequate connection between the lightning rod and moist earth is sufficient.

As to the metal of which the lightning rod is to be made, it is suggested that the choice lies between iron and copper.

In any event it should have ample carrying capacity, if of iron, several number six galvanized wires may be used or a 3/8 inch galvanized cable such as telephone companies use in guying poles. An iron rod is somewhat more desirable than a copper one because of its inductance, but joints are liable to rust and the rod deteriorates more rapidly than does one made of copper unless very heavily galvanized and made of a continuous cable. The iron is the better while new but the copper is apt to be the more durable.