

Lightning and its Actions

The electricity in the air which is commonly known as lightning, exerts annually a tremendous toll on life and property. In the United States upwards of 800 are killed annually and twice that number injured. This loss largely falls upon those who live away from the cities. The greater part of the loss of property is on farm buildings and live stock in fields. The multiplication of electrical transmission lines for light and power forms splendid protection for cities. Telephone lines are also good protectors. A lightning flash is a discharge of electricity between two electric bodies, as for instance, between a cloud and the earth. When used for economic purposes, electricity is most valuable, as it is under most perfect control. In the air, however, electricity is unchained. Hence the damage is done. All bodies do not behave alike when charged with electricity. Some bodies immediately conduct the electricity away from these are known as conductors. What is known as a "lightning conductor" means a body that will lead away a charge of electricity. Other bodies that retain the electrical charge or permit it to escape slowly are called non-conductors or insulators. Telegraph lines are insulated by glass insulators. At one time lightning rods attached to buildings were also insulated but this is not now generally done. An electrical charge falling upon a copper conductor goes straight to the earth, providing the conductor is connected with the earth. If the same charge falls upon wood it meets with great resistance usually resulting in heat, fire and damage.

Lightning conductors are made with a view of preventing the accumulation of electricity and conduct it away to the earth where it will do no damage.

There are two kinds of electricity, in nature known as "positive" and "negative." Two bodies charged with the same kind of electricity repel each other while if electrified with opposite kinds of electricity they attract one another. This produces electrical discharge or flash.

Benjamin Franklin was the first to demonstrate that an electrical field existed in the atmosphere during thunderstorms. But it has since been shown that the field existed even in fair weather. The surface of the earth is always charged with negative electricity. The exact mechanism of a thunder storm is not definitely known. Scientists have been struggling with it for centuries and many conflicting theories are advanced. Every time a drop of water breaks, a separation of electricity takes place, the water receiving a positive charge and the air a negative charge. The negative charge in the air is rapidly absorbed by the cloud particles and in time the clouds may become highly charged with negative electricity. This, of course, would occur for the most part on hot sultry days. Air currents have a very important effect upon the electricity in the air and in the clouds, and consequently a very important effect upon thunder storms. Whatever may be the origin of the electricity in the air its effect upon various earthly objects upon which it falls is well known. The intensity of the charge in lightning flashes varies greatly. All discharges are not heavy enough to take human life or even badly splinter a tree, so that it is easy to distinguish between the heaviest and lightest flashes.

When a thunderstorm develops and moves over the land the air between the under surface of the cloud and the earth's surface is able at first to resist the passage of a discharge between earth and cloud, but as the electrification increases the strain in the air becomes too great and a discharge follows. The zone of danger in a thunderstorm is, therefore, generally equal to the area of the cloud itself, sometimes extending a little to the front of the cloud. The heaviest discharge nearly always occurs simultaneously with the passage of the storm front. The reason for this can be very easily shown in the laboratory; thus it is well known that if the two poles of a charged electric machine are brought near to each other a spark will pass from one to the other. Now, in order to get the first spark, the poles of the electric machine must be

brought nearer together than is necessary after several sparks have passed. The passage of several sparks through the air separating the poles evidently electrifies it, and thus it becomes a better conductor, after the machine is used.

The area within the storm cloud is what may be called a "danger zone." Within this zone almost any upright object, especially a tree, is a better conductor than the air itself, and is consequently liable to lightning stroke. For this reason to take refuge under a tree is a dangerous proceeding. Other places to avoid are near chimneys or fireplaces and in close proximity to wire fences.

THE BRITISH MINISTER OF AGRICULTURE ON AGRICULTURAL CO-OPERATION

By Alphonse Desjardines, Ex-M.P.

The following extract shows the high appreciation entertained by Lord Carrington, the British minister of agriculture, of the benefits that farmers can derive from co-operation. The society referred to is the Agricultural Society of England whose object is to spread the knowledge of co-operation and to help the farmers to organize such societies: "I am glad to have had an opportunity," said Lord Carrington, "of showing my entire sympathy with the practical support of the agricultural co-operative movement, and I can assure you that every member of His Majesty's cabinet hopes to see a great development of the society's work in the future."

"The objects and work of the society have my most hearty support. I hope, therefore, that all who wish well to British agriculture will support the admirable work which the Agricultural Organization Society is doing."

The organ of the society adds: "There are surely few bits of more effective ammunition than this in the locker of the speaker in favor of agricultural co-operation. In Italy our agricultural co-operative friends have been felicitating themselves on the selection of the well known co-operator, Signor Luzzatti, for the ministry of agriculture; but Signor Luzzatti will find it difficult to make a more effective deliverance on behalf of the movement than that with which Lord Carrington has aided us."—"Co-operation in Agriculture," April, 1910.

When will our parliament and legislatures realize the great advantages that Canadian farmers would derive from co-operation by passing laws authorizing the formation of such societies? If they do not, then the farmers should awake them by petitions.

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2771

Question Drawer

This department of the Guide is open to all readers, and it is hoped that they will take advantage of it. All questions relating to the problems of the farmer of Western Canada will be answered in this department. Write questions on one side of the paper only, and send only one question on one sheet of paper. Join in making this department of the greatest value.

MUST HAVE NAMES

Questions sent in without the name of the sender attached will not be answered. The name will not be used if not desired, but it must be sent as a guarantee of good faith.

DIRECT LEGISLATION

Subscriber, Man.—In those states where direct legislation is in force what percentage petition is necessary for the initiative and referendum? (2) Has the initiative and referendum been used in Maine, S. Dakota, Montana and California? (3) Where can I get full information on the subject?

Ans.—We have no information concerning all the states you mention, but in South Dakota the initiative and referendum may be used by the people on a 5 per cent. petition of the voters. In Oregon the initiative requires 8 per cent. petition of the people, and in the same state the referendum may be either ordered by the legislature or secured on a 5 per cent. petition of the people. An excellent book on the subject of direct legislation is entitled "The City for the People," by the late Professor Frank Parsons, and gives the record of direct legislation up to the year 1901. It may be purchased for \$1.00 postpaid from F. J. Dixon, 200 Ellen St., Winnipeg. Papers that are devoted partially to the subject are "The Equity Series," 120 Chestnut St., Philadelphia. Another is the Twentieth Century Magazine, published in Boston, Mass., and the Public, published at Ellsworth Building, 357 Dearborn St., Chicago. We would advise all our readers who are interested in the subject to procure these books and papers above mentioned.

If you do not get your Guide regularly each week, not later than the Saturday after publication, be sure to let us know. It is an error and we will be glad to rectify it.

Wanted: Better Writers. The standard of the young men of the present day in the matter of handwriting is not so high as it used to be, and this, curiously enough, is the more marked in the case of those who have been educated in our great public schools.—Mr. F. H. Jackson.