

THE FARM.

Electricity in the Clouds.

Editor "The Farmer's Advocate":

Responding to your request for comment on the article entitled "Another Lightning Theory," by "A Reader," appearing in your issue of May 6th, I am glad to see that your correspondent has advanced the accepted theory of the accumulation of electricity in the clouds. There are, however, a few minor points which "A Reader" has not presented exactly, and some which he has not presented fully. It is no theory that, during evaporation, the rising vapor carries off a positive charge of electricity; it is a fact, proven by experiment. Besides this source of electricity, it is believed that the air, in friction against trees and earth, buildings and other objects, generates further quantities of electricity, for it has been demonstrated by experiment that any two unlike bodies being rubbed together become charged with electricity, one positive, and the other negative. In addition to these two courses, there is another: When the vapor has begun to condense, as described by "A Reader," and that portion of the air has become more highly charged than other portions, this accumulation induces an opposite accumulation in the earth directly below. The closer the cloud comes to the earth, the more strongly this induction acts.

The action of a charge of electricity on water-drops is peculiar in that a weak charge acts differently than does a strong charge. Any of your readers may prove this in the following manner: Prepare a small nozzle, with an opening about one-sixteenth of an inch; by a tube, connect this nozzle to a supply of water some few feet above the nozzle; let the nozzle point obliquely upward, and allow the water to flow. A fine jet will be spouted a few feet upward, and will fall in a graceful bow. It will be observed that this jet breaks into medium-sized drops as it approaches the highest point, and the falling water, instead of being in a jet, is like a small shower of drops. Now let the observer take an ordinary hard rubber comb in one hand, and a silk handkerchief in the other; after rubbing the comb on the handkerchief, let him bring the comb slowly toward the jet, about one foot above the nozzle. When the comb comes within a certain distance of the jet, the observer will notice a peculiar change: the jet, instead of breaking up into drops, as before, will flow in one continuous stream up past the apex of the bow and down toward the ground. If, however, he brings the comb close up to the jet, the latter will be seen to immediately break up into very fine drops, like a spray, which will be scattered in all directions. Now, why this phenomenon? Rubbing the comb on the handkerchief produced a charge of electricity on each. When the comb was brought slowly within about two feet or so of the jet, the charge on the comb induced an opposite charge on the jet, and since the comb was a considerable distance away, the induced charge was a weak one. Under these conditions, the jet, which had previously been breaking up into drops, gathered together, and flowed in a continuous stream; that is, a weak charge on drops of water will cause them to run together. But when the comb was brought close up to the jet, the induced charge was a strong one, and the jet was broken into a fine spray, which spread out in all directions; hence, when drops of water are strongly charged with electricity, they repel one another. Now, as explained by "A Reader," this finds a direct application in the thunder-cloud. As soon as the rising air and vapor have become cool enough to cause condensation on the dust particles, the little drops of water flow together because of the weak charge upon them, and, as they do so, the intensity of the charge increases, not because the volume is reduced, as stated by "A Reader"—for this is not the case—but because the area is reduced. For example, if eight drops of uniform size unite in one large drop, the latter has the same volume as the eight individual drops had, but it has only half as much surface. Now, as stated by "A Reader," the charge resides on the surface, and since this one drop formed from the eight has only half as much surface, the charge must now be twice as intense as before, and if eight of these larger drops were to unite again, this double intensity would again be doubled, making the new intensity four times what it was on the original drops; and so the intensity goes on increasing as the drops become larger, because the surface is diminishing, and this continues until the charge has become intense enough to keep the drops from uniting further. Then the cloud rolls on, probably nearing the earth as it does so, and the charge is further increased by induction, until at last it is strong enough to break through the air to the earth in a flash of lightning. Then, there being only a weak charge left on the drops, the process of uniting begins again, and continues until another flash, or until the drops fall to the ground.

It is hardly correct to say, as "A Reader" does,

that the negative is always stronger than the positive. They are equal, but opposite in action. It may be asked, then, why does the discharge take place from the positive to the negative? To answer this, we must remember that, while we speak of two kinds of electricity, positive and negative, it is believed that in reality there is only one, and that when that accumulates at one point it leaves an absence or deficiency of electricity at some neighboring point. The deficiency is what we call "negative." And so the discharge naturally takes place from the point of accumulation (the positive) to the point of deficiency (the negative). The return stroke is explained in a similar way. Owing to the surging of the energy towards the earth a point of accumulation is produced there, and a point of deficiency in the cloud, the difference being so great that the energy flashes back to the cloud again.

"A Reader" is to be commended for bringing to the attention of your readers what is generally accepted among scientists as the true explanation of lightning. I may add that, with suitable apparatus at hand, as we have at the College, we can demonstrate these things so that the whole process appears simple and clear, and, also, that lightning-rods, properly installed, must have some real influence in protecting buildings against damage by lightning. WM. H. DAY.

Split-log Drag for Grading and Maintenance.

Editor "The Farmer's Advocate":

The split-log drag, or the more practical term, "the king of all road machinery," is one of the most up-to-date machines used in the art of road maintenance. This simple implement, when used at the proper time, does wonders towards road development, but its improper treatment in some places has detracted in a measure from the laurels it had previously won. I will admit that my first attempt with the drag was not very encouraging, as I was ignorant of its use, and, besides, had not the least idea of road construction. Fortunately, I had a small dip of Scotch blood in my veins, and hung to it until I overcame all these grimaces. To-day, scores of men will bear me out in saying that this mile of road cannot be surpassed in the township.

Regarding the photograph reproduced in connection with this article, it would be well to note the fact that this mile of road was solely done with the drag. The road was practically in



Graded and Maintained with the Split-log Drag.

Result of the third season's work with the drag, by H. W. Park, Township of Carleton, Lincoln Co., Ont. Graded up from a flat condition with the split-log drag alone.

a flat condition, and in most places hollow in center. It now has a grade of an inch to the foot. I have no further desire to compliment my work and success, but would refer you to the clerk of our township, if any other comment or recommendation should be desired.

The editor presented me three points to answer, thus: Did you use the drag last year, and with what results? I did use the drag, and always intend to, until something better comes along. There are two stages in which the drag can be used to great advantage, namely, immediately after a rain, or, better still, during the rain, if so inclined; then, after the road is freed of its sticky nature, and before it becomes hard, plane off the sharp edges made by the trails in the interval. You now have a road of flint, almost insusceptible to either water or wheel track. The more frequently this treatment is followed, the better.

Question 2: "Were you allowed any compen-

sation for dragging? No compensation was allowed me, other than my ordinary dab of statute labor. I counted labor or reward no object in my endeavor to establish a good, respectable road, and that my results might be the means of spiriting the cause in every direction, and which I believe it has.

As far as I know, no system to insure systematic dragging has been introduced in our township, outside the few scattering ones who have caught the spirit of better roads. The interest taken in road development is fast increasing, while many, as yet, fail to see that labor spent in this manner is to their individual interest. The quickest and perhaps only way out of this problem of awakening interest in this important matter would be that township councils adopt the awarding of prizes, in each about six cash prizes, the amount donated as large as their conscience would allow. Thanking you for space, and wishing "the king of road machinery" every success, Lincoln Co., Ont. H. W. PARK.

A Seed-corn Improvement Method.

In order to enlist the co-operation of many who might not care to undertake the more advanced "ear-in-the-row" method, laid down by the Canadian Seed-growers' Association, the recently-organized Ontario Corn-growers' Ass'n suggests the following plan of seed-corn improvement. It is simple, involves very little extra labor, and has given excellent results:

1. Choose with care a sufficient number of ears (at least 20) from those you have reserved for seed purposes. These ears should be as near alike as possible in the following particulars: Shape, length, circumference, covering of butts and tips, shape of kernels, number of rows of kernels on each ear, and percentage of corn to cob. The use of the score-card, as published in "The Farmer's Advocate" for March 4th, 1909, is suggested in selecting the corn, along with the illustrations of prizewinning ears in same issue.

2. Test six kernels from each ear of seed corn for vitality, and plant only the strongest ears.

3. Having selected the ears that conform most nearly to the type in size and conformation, and show by the germination test that they are of strong vitality, the ears should be shelled, after removing the butt and tip kernels, and planted early in rows in a plot on the best side of the cornfield, where there will be no danger of the corn becoming mixed with any other variety.

The object of this plot is to furnish seed for next year's crop.

In order to get good seed, all barren (earless) or imperfectly-eared stalks should be removed, so that their pollen cannot fall on the ears which are to mature, and the corn in the plot should receive careful cultivation during the summer.

Begin to select the seed as soon as the corn is matured. Select only ears which conform to the desired type, taken from strong, vigorous, early-maturing stalks. Husk these at once, and hang them up in the attic to dry out.

Grow Corn on the Summer-fallow.

Grow corn on the summer-fallow. In other words, use corn as a cleaning crop. If well attended, as it may be with comparatively little expense, by using a two-horse riding corn cultivator the field will be as thoroughly rid of weeds and grass as though cultivated all summer without a crop, and the owner will have a thirty, forty or fifty-dollar corn harvest to show for his work. Fall-wheat growers may object that corn is not off the land in time to sow wheat, and yet secure a good top. In some cases this is true, but the purpose can be accomplished by sowing wheat after peas, and spring grain after corn, alternating with each course of the rotation the areas on which the corn and the peas are planted. Thus, if the rotation be a three-course one, each field may have peas, as well as corn, once in six years, or once in eight years, according as the land is left one or two years in sod. Corn, well cultivated, will clean the land, peas will add nitrogen and supply a most valuable feed in the form of both grain and straw; and if the produce of the farm be devoted mainly to the raising of stock, and the manure carefully saved and applied fresh, the farm will grow richer year by year, and it will be found progressively easier to grow large crops of wheat and secure good catches of clover, without wasting a year in bare fallow. Only in fields badly infested with bindweed, perennial sow thistle, or some equally noxious plant pest, is bare fallowing really called for, and even then the wisdom of it is open to debate.

In Canada last year, the area of occupied farm land was 78,426,000 acres, with an estimated value of \$2,800,000,000; the area of field crops was 27,500,000 acres, with a product value of \$4,253,000, and the value of live stock on farms and ranches was \$534,000,000. Within a period of thirty years, it is estimated, the present figures of the agriculture of Canada will be increased fourfold.