tine solution shall be used to give a mixture containing not less than seven one-hundredths of 1 per cent. of nicotine.

(b) The lime-and-sulphur dip, made by mixing 8 pounds of unslaked lime and 24 pounds of flowers of sulphur, and boiling with 30 gallons of water for not less than two hours. All sediment should be allowed to subside before the liquid is placed in the dipping vat. This liquid should be diluted sufficiently to make 100 gallons before use.

And, pending further investigation, the following described dips :—

(c) The cresol dip, which consists of a mixture of cresylic acid * with soap. When diluted ready for use this dip should contain one-half of 1 per cent. of cresylic acid.

(d) The coal-tar-creosote dip, which is made by mixing coal-tar creosote or coal-tar oils and cresylic acid separately with resin soap in varying proportions. This dip should contain when diluted ready for use not less than 1 per cent. by weight of coal-tar oils and cresylic acid. In no case should the diluted dip contain more than four-tenths of 1 per cent., nor less than one-tenth of 1 per cent. of cresylic acid; but when the proportion of cresylic acid falls below two-tenths of 1 per cent. the coal-tar oils should be increased sufficiently to bring the total of the tar oils and the cresylic acid in the diluted dip up to 1.2 per cent. by weight.

The cresol dip and the coal-tar creosote dip should always be tested on a small scale with the water and under the conditions to be employed in dipping in order to avoid possible injury to stock. The diluted sample should be allowed to stand for at least an hour. If after this length of time there is a separation of an oily layer the dip should not be used with that kind of water. Especial care in this connection is necessary where hard water is to be used.

In the undiluted coal-tar creosote dips there may be, in cold weather especially, a separation of naphthalene and other constituents of the dip. Care should therefore be taken to see that the concentrated dip is homogeneous in character before using any portion of it.

Manufacturers who desire the Department to approve their dips for official dipping should submit a sample of their product to the Bureau of Animal Industry in Washington, and accompany this with the formula used in preparing the dip.

Before a proprietary substance is approved for use in official dipping the manufacturer must agree as follows :—

(1) To recommend for sheep scab a dilution of the product, so as to conform to the requirements of the Department of Agriculture.

(2) To maintain said product at a uniform composition.

(3) To place on packages of dips which have been examined and found to conform to the requirements of the Department the following statement :—

"A sample of this product has been submitted to the United States Department of Agriculture for examination. We guarantee the contents of this package to be of the same composition as the sample submitted to the Department, and that when diluted according to the directions printed thereon for the treatment of sheep scab, it will give a dipping fluid of the composition required of a .....† dip by the regulations of the Secretary of Agriculture governing sheep scab."

(4) To have on containers or advertising matter no reference to the United States Government or any of its departments, except as provided in the preceding paragraph, unless such reference has been submitted to and approved by the Department of Agriculture, and to have on containers or advertising matter no false or misleading statement.

* By the term cresylic acid as used in these regulations is meant cresols and other phenols derived from coal tar, none of which boils below 185° C., nor above 250° C.

† There should be inserted here the name of the class of dips to which the product belongs, such as "cresol" or "lime and sulphur," etc.

WHITEWASH IN PIGPENS.

In the course of some recent correspondence on the subject of pigpen construction, a Quebec Province subscriber, J. Lumsden, of Pontiac Co., remarks that he is a great believer in whitewashing the inside of his pigpens, and has it done once or twice a year. He considers that it has handsomely repaid him for the trouble, particularly last year, when some eighteen or twenty farrowing sows averaged better than nine pigs apiece. This year he has not done quite so well, having been unable to give sufficient of his personal time and supervision during the period of farrowing, the average per litter this season being probably about eight. Mr. Lumsden finds that the whitewash, which is wholesome and useful in destroying vermin, adheres better to an undressed than to a planed surface, consequently his hogpens are lined with unplaned lumber.

THE FARM.

HOMEMADE LIGHTNING RODS.

As the usual quota of losses from farm buildings being struck by lightning have already this season been sustained, and inquiries have reached this office for information regarding the construction of the twisted-wire lightning rods recommended by Mr. T. Baty, of Middlesex Co., Ont., and described by him more than once in these columns, many of which he has erected on his own and his neighbors' buildings, proving entirely satisfactory, we herewith furnish further information on the subject. This class of rod has been approved by an Ontario provincial inspector of insurance, and by eminent electricians both in Canada and England. For the construction and placing of the twisted-wire rod Mr. Baty's instructions are in substance as follows :

Use soft galvanized number nine wire, nine strands. A wagon wheel answers very well for twisting. Set the wagon in a convenient place, and raise the wheel as if for greasing. Measure out the needed length of wire for cable, as for an ordinary barn the full length may as well be made at once. Liberal allowance should be made for grounded ends, as a connection with damp earth at a sufficient number of places is of first importance. If a small well auger can be had, and a hole bored to the depth of seven feet, it will be all right. If not, then a hole four or five feet can be dug, and the end of the rod coiled into a flat spiral. Drive a stake, with a hole bored in it, through which the ends of wires can be passed and bent around. The other ends of wires can be hooked, each one around a spoke of the wheel close to the hub. In measuring the wires, care should be taken to have them of equal length, and an allowance made of one foot in 200 for shrink in twisting. Now, having the nine wires stretched out and fastened securely, before beginning to twist, brace well both wagon and stake, for there will be considerable tension. It is well, also, to throw across under the wires some old rails or boards to keep them out of the mud or grass. Turn the wheel until the cable is sufficiently twisted to hold together, and the job is done. The rod may be stapled closely to building, or a cork may be put under at each staple if desired. The old idea of the necessity of insulation has been abandoned, Mr. Baty declares, although Prof. J. B. Reynolds, of the Ontario Agricultural College, considers that it is advisable to place a glass or porcelain insulator between the wire and the building at any approaching bend ; for example, where the wire re-enters toward the building below the eaves, if it happens to be carried down that way. At other points Prof. Reynolds agrees that insulation is not necessary.

Highest lines and projecting points should be specially guarded, and it is, therefore, well to have rods on all ridge boards. For the plain barn with one ridge and two gable ends, the rod may be run the whole length of the ridge, descending and entering the ground at both ends. In the case of a T-shaped barn, or a shed running out from the main building, in addition to the rod with two grounded ends already mentioned, another with end in the ground at the outer end of shed should be run up the gable end to the ridge, and along the whole length of the ridge and connected with rod on main building, making three earth terminals and all ridges protected. Upright points can be added afterwards. They may be five feet high and not more than twenty feet apart. To make these, lengths of six and a half feet can be cut off and a sharp bend made a foot and a half from one end; this extra length to be opened out and wrapped around the rod where attached. This makes all solid, and forms good electric connection. At the upper ends of point the wires should be opened out a few inches and spread apart in all directions. To hold the points upright, get the blacksmith to make for each an iron tripod. Have the rods run in as direct a course as possible; the fewer sharp turns there are the better.

Peace and Plenty.

Pasture scene on the Ontario Agricultural College Farm, at Guelph, showing a few of the cows in the dairy herd, with the beef cattle grazing in the background and to the left.

MANURE AND THE ATMOSPHERE.

A correspondent of "The Farmer's Advocate," signing himself "Enquirer," asks whether manure hauled out, spread upon the land, and left until it is dried out, does not lose considerable fertility in drying. Alluding to the occurrence of nitrogen in snow, he desires to know whether a man who draws out his manure and leaves it to evaporate on the surface of the soil, does not, by so doing, help to enrich neighboring farms at the expense of his own ?

If manure is drawn fresh from the stable and spread in a thin layer on the soil, and is so rapidly dried by the wind and sun that no fermentation ensues, then the amount of nitrogen from the manure that passes into the atmosphere is infinitesimal, or, at any rate, negligible. From this it must not be inferred that the practice of so leaving it to dry out on the surface of the soil before plowing under is to be recommended. The best place for manure is in the soil, and it is advisable to get it there while it still has its original moisture, for in such a condition it will, more readily than if dried out, become thoroughly incorporated with the soil—become, in fact, part and parcel of the soil—the medium from which the crop's roots absorb their food. Further, the liberation of the plant-food from the moist manure will proceed more readily in the soil than if previously dried out, for the action of the bacteria which do this useful work will not have been checked. It means, therefore, instead of fragments of manure in the soil, a richer soil, homogeneous throughout. It will be one which naturally gives a more immediate return in increased crop yields than one in which, especially in dry seasons, the manure must have time and additional moisture to regain that condition necessary for further decomposition.

The spreading of actively-fermenting manure on the surface of the land means a certain loss of nitrogen by escape into the air. The amount of this loss will, of course, be dependent on a number of factors, but presumably the state or condition of the manure will be the chief. According to some experiments we made a few years ago, manure taken while very hot from the heap, and allowed to dry by wind and sun, lost at the rate of, approximately, half a pound of nitrogen per ton. The results may be tabulated as follows :

	Nitrogen, lbs. per ton.	Value of nitrogen.
Actively rotting manure, before exposure	9.8	$1.67
Actively rotting manure, after exposure	9.5	1.58

While it is quite true that the air contains nitrogen compounds, derived from decaying vegetable matter, etc., it is not laden, as our correspondent imagines, with an abundance of such fertilizing material. According to an English authority who has made a study of this matter, about .08 of one part per million appears to be the mean amount of such compounds in the air.

For the past year or more we have determined the nitrogen compounds in every fall of snow or rain, and we find that the combined nitrogen which is contained therein, and which has been washed out of the atmosphere, amounts to from 3.5 to 4.0 pounds per acre, per annum. To this slight extent we may suppose our lands are fertilized from the air through the agency of the rain and snow.

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