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more—to put into the barnyard for compost. This will leave one hundred and fifty dollars as the cost of the improvement of the ten acres. The land will now be in condition to bear grass or any hoed crop, and will be worth one hundred dollars per acre. It will produce from one to two tons of hay per acre, and the labor of obtaining the crop will be much less than it was before the land was drained. Now apply manure, and large vegetable crops will be obtained. The increased value of the crops will in two or three years pay for all the work, while the land will be worth double the price it would sell for before it was improved.—*Ohio Farmer.*

HOW TO APPLY MANURE.

Observation and experience should determine the mind of the farmer in regard to the best plan of applying manure, whether to plow it under deep, or leave it on the surface. The advocates of surface manuring speak against manure being turned under too deep, while the advocates of deep manuring charge surface manuring with fertilizing the atmosphere.

But there is a medium course, and each theory is supported by plausible arguments. However, there are true philosophical principles against burying manure too deeply in the earth. The loss of the saline matter of the manure, by solution and infiltration, will be great in porous soil, and the evaporation, to which so much loss is attributed by those holding opinions adverse to surface manuring, would be only a small drop in a bucket compared to the loss by salation. In porous soils it is well known that manure will penetrate to a great depth, and much animal matter may descend beyond the reach of surface growing plants.

Humus is formed by the decay and decomposition of vegetable matter, which, in the philosophy of nature, is manipulated on the surface; hence, the rule in the application of manure should be taken from the indications of nature and science. The decay and consumption of one crop for the nourishment of another, the droppings of animals, and the defoliation of trees and plants, are all left on the surface.

This seems to contradict the idea of loss by evaporation. It will therefore be best to adopt the plan of deep cultivation, but keep the manure and vegetable matter as near the surface as possible. There is always some loss by evaporation, but much less than by infiltration. It should be a leading idea with farmers to be close observers of such natural operations, in the growth of spontaneous and cultivated vegetation, and accommodate their practice so as to imitate nature as nearly as possible.—*Agricola, in Journal of the Farm.*

THE BIRDS THE FARMERS' BEST FRIENDS.

More than the soil is included in the farmer's realm. He has dominion, also, over the birds of the air. While they cheer his labors with beauty and song, they reduce the excess of insect life, which would otherwise become pestiferous in its great profusion. The disturbance of the proper balance between the feathered and insect tribes is fraught with incalculable mischief, affecting the food, the health, and the life of man. The weakening of a single link in the chain of being is often productive of great loss.

It is estimated that there are thirty species of insects injurious to garden vegetables; to the apple tree, seventy-five species; to the shade trees, one hundred species; to wheat and to other grains, fifty species. This, Mr. Palmer maintains, "is the result of our improvidence. It is," he says, "because man has destroyed their natural enemies, that insects have become a pest, and they will cease to trouble him only in proportion as he shall restore the balance, of which nature shows the necessity."

That the loss of this balance is owing in a great measure to the destruction of birds, is patent to every observer. Swallows feed upon flies, grasshoppers, butterflies and beetles. Bradley says that a pair of sparrows will destroy 3,360 caterpillars for a week's family supplies. The fly-catchers do not lie in wait, but hunt for their prey, follow the plow for insects, glean the flies that are found molesting cattle, and swarms that breed on the margin of stagnant water.

Wilson says a blackbird will destroy fifty grubs daily; even in winter its food is partly chrysalides and spiders. A family of plovers will destroy myriads of grasshoppers, taking

them in at an early stage of their existence. Woodpeckers are constantly seeking insects in the bark of trees. Wrens, creepers and tomtits hop from branch to branch, in search of their favorite food. The robin and red-winged blackbird obtain their food almost exclusively from the ground; jays, crows, night-hawks and whip-poor-wills destroy immense quantities of beetles—an exceedingly prolific race. The golden robin and black-billed cuckoo feed on the tent caterpillar; they can with justice be called great friends of the farmer, who should take them under his protection instead of destroying them at every opportunity, as many do.—The flicker or spotted woodpecker has actually been seen to probe the gummy hiding places of the borer in the trunk and surface roots of the peach, and bring forth and destroy the pest.

While the farmer suspends his operations in winter, his entomological assistant, the chickadee, heedless of the cold, prospects in his orchard for insects in every crevice of the bark, and the creeper accompanying him further investigates the hidden habitations of worms.

Such instances of special utility might be multiplied, but it is only designed in this article to briefly show the practical relations of birds with man, and call the attention of farmers to a further study of their habits and utility, as important items of domestic economy. Better provisions should be made for their protection, first in the list of which laws should be enacted with stringent provisions, prohibiting the killing of song birds at any time, except by naturalists for scientific purposes; and restricting the killing of game birds to such seasons as will not interfere with their propagation or with their coming into market in an edible condition.

Laws already exist looking to these objects, but in many cases are defective in the time covered by the prohibition, in the provisions affecting the certainty of their execution, in the inadequacy of their penalties, and in other essential respects. Nor will laws of one State answer as models for another of a different climate, owing to the difference in the time of opening of the bird season, time of pairing, etc.

They should be framed by practical, observant men, with the advice of the wisest naturalists; and, when enacted, public opinion should compel their strictest and most impartial execution.

While we try to prevent their destruction the conditions favorable to their increase should be promoted. Actual facilities for shelter and nesting should be afforded, their accustomed food and haunts preserved, and practical invitations extended to the most useful to settle on the homestead near the farm buildings. Those that are wont to occupy our gardens and fields, as the wren, yellowbird, robin, bluebird, and others should be provided with nesting boxes and trees.

Gardens have often been preserved from the ravages of insects by placing bird houses and nesting places within their limits, when neighboring gardens have been destroyed.—In cherry or berry time some little device may be used to keep them away, such as tying pieces of bright tin or white rags among the branches, when they are inclined to take too much toll for their services. With cultivation insects increase, and so do birds, especially the insectivorous varieties, as the wren, blue bird and swallow, if fairly dealt with.

I think that ornithological notes from farmers and others in different sections, and diffused through widely circulated mediums such as the *Western Rural*, would do much to increase an interest on this subject, if only to induce an interest in considering the habits and utility of birds in their respective sections as insect destroyers. This would promote observation in this field, as well as entomology, both of which farmers should have a better knowledge of.—*C. W. H. in Western Rural.*

CORN.

Although the corn crop succeeds remarkably well on the intervals and uplands of St. John River, as well as on light soils, away from the influence of the Bay of Fundy fogs, yet it is doubtful whether it is worth while in New Brunswick to devote more land to it than will supply green corn for family use or for sale during the season. To be sure, the pumpkin crop is valuable, and the pies made on the pumpkin basis with the proper "fixings," are a peculiar and very desirable feature of the dinner

table during the autumn months, yet a heap of straw manure piled up to become fit for use in the fall will produce plenty for domestic purposes at comparatively no expense. Corn is a gross feeder requiring more stimulating manure than any of our crops—nothing but that from the hog pens will suffice for its wants. To supply a luxury to townspeople, its cultivation, like that of strawberries, will be governed by supply and demand, but as an article of food it does not compare with buckwheat. The flour of both grains are only relished when made into cakes or fritters, and eaten warm. We have a great deal of lead in New Brunswick, that appears to be as well adapted for raising buckwheat as other soils in portions of the Dominion are for raising wheat. A slight top dressing of 200 lbs; weight of some of the commercial manures will ensure a good crop of the latter. While land to give corn requires, as we heard a farmer once say, to be *stuffed* with dung, and the best that can be made at that.

Our climate appears to be peculiarly suited to raising buckwheat and the labor required to produce 100 bushels of either is so infinitely in favor of buckwheat, and its adaptedness for feeding purposes so generally, that there can be no comparison made in the utility of the two grains.—*Colonial Farmer.*

WASTEFULNESS ON THE FARM.

Few farmers can be open knowingly to the charge of wastefulness. The majority are supposed to err in the other direction. At the same time there can be no question that the annual loss and waste of seed by the injudicious sowing and the want of complete preparation of land for a proper seed bed is something enormous. Nor is it in one direction alone or in reference to any one variety of seed. It is too common. But we wish to speak more particularly with regard to the loss of seed in the methods of seeding down land to grass.

Every farmer knows that losses often occur on newly seeded lands from a failure of the seed "to catch." It is worth while to inquire whether this is owing to influences which are inevitable, such as severe droughts occurring year after year, or to the mistakes so often made in the methods of seeding. Is nature to blame or are we ourselves responsible for it? Let us look at it a moment.—Probably in a majority of cases throughout New England the old methods prevail of seeding in the spring with grain. We do not overlook the fact that many intelligent and progressive farmers have adopted the practice of fall seeding, and like it, laying down land without grain. But taking the country over, the old practice still remains.

Now let us see what is the effect of this laying down in the spring with grain. There is no kind of grain that does not draw heavily on the elements of plant food in the soil. The soluble materials that enter so readily into the circulation and growth of plants, helping to build up their structure, are seized upon first and absorbed, leaving the soil in a reduced condition. No matter what the particular kind of grain may be, if it requires materials similar to those needed by the grasses, the effect on the soil, so far as its relation to the grasses is concerned, will be the same.

What is the result? The grasses are deprived of the food essential to their growth. The root is feeble and sickly. The growth of the stalk corresponds to the size and vitality of the root, and this is so jostled and crowded and robbed by the stronger and more vigorous roots of the grain that it cannot and does not thrive as it would if it had the free use and the sole possession of the land. In these conditions a very large part of the seed will die from suffocation and starvation almost as soon as it germinates. The portion which survives this severe ordeal will grow weak, feeble and puny in the shade of the overtopping grain, and it may fight its way along until the grain is cut in the heat of a July sun, and its last end will be worse than the first. It cannot stand the sudden and severe shock, which the cutting of the grain and the removal of the shade bring to it. If it is dry and hot the chances of life are small, and in point of fact a large part of the plants that survive till the grain is cut, never live to attain maturity.

Now this is just what takes place, where the small and tender grass seed is sown along with any grain whatever. Much of it

dies immediately after germination from starvation and want of room, and what lives in the shade is so enfeebled that it dies on exposure to the sun. There is undoubtedly a great waste of seed, let the season be what it will, and however much moisture there may be at the time of cutting the grain, but when this happens in a dry and hot time, the chances of an entire failure are very great. Sowing grain and grass seed together is very much like setting out an orchard or a nursery of tender trees and shrubs in the midst of a pine forest; the pines can stand it, perhaps, but it is hard on the shrubs.

It ought never to be forgotten that grass or hay is the one thing indispensable to success in farming in this climate. The grass crop must always take the lead in point of importance. At the same time grass seed is expensive. It is not secured and saved in any considerable quantity for sale in the market, in this part of the country. It is, therefore, clearly for the farmer's interest, after he has bought and paid a high price for it, to manage so as to save and economize it, by giving it the best possible chance of life and growth. But the sowing with grain of any kind, especially with oats, is giving it the least chance in our power. It is choking it at birth, and it involves the greatest waste and consequent loss of seed and of the cost of preparation and sowing, a loss which amounts to something like half a million of dollars a year, in this State alone. Isn't that sum worth saving?

Seeding in August or early in September with grass alone, would save a very large part of this loss, especially if the practice of applying a liberal dressing of manure on or near the surface to which the seed is applied, were adopted. A grain crop along with or immediately preceding a grass crop, reduces the capacity of the soil to an extent greater than is generally supposed.

CONTINENTAL CORRESPONDENCE.

PARIS, June 13.

Dr. Bibard relates his observations on the growth and development of wheat. Either a very low temperature, or a frost succeeding humidity can endanger winter wheat, by upheaving the soil and exposing the roots. At the close of February, when the leaves began to develop, he examined the stem and found that it consisted of five tubes, one within the other like a telescope; a month later the rudimentary ear was visible; a month after the spikelets, and even the flower were discernible. Many farmers in France graze stock on their winter wheat in early spring, and often complain that the practice is sometimes injurious, causing the plant to run only to leaf. May this not be owing to the grazing taking place at too late a period, and when the rudimentary ear has been formed? In June, when the temperature increases, the floral organs develop rapidly; the stamens become yellow, the pistils white, and all enclosed between the tenderest of valves. A temperature of 70° is necessary for the process of fecundation, which is effected in a moment; in the course of three minutes afterwards the valves of the spikelets open, reject their stamens, and then permanently reclosed. When the fecundation, owing to a low temperature does not take place, the spikelet retains not the less its round form, but yields to the pressure of the finger; it is empty, hence one of the causes of a deficient harvest. Before fecundation, no starch is perceptible in the embryo, but immediately after that operation, the iodine test reveals the presence of starch. Ten days suffice to shape when fecundation has taken place, the membrane of the grain which ultimately forms bran; this membrane or case rapidly becomes filled with a solution of starch, and requires a good deal of water to continue its work of development; should drouth issue, this membrane is not well filled, it is thin and shriveled, hence, a second cause of deficient harvest, to which a third may be added, the abortion of two or more grains at the best of the ear—the latter generally possessing from 21 to 27 spikelets.

Nearly all our cultivated plants seem deemed to pass through a series of maladies. In their wild state they are not so affected, at least we do not perceive such. Is it that culture, greater being well being in the conditions of their life, leaves them more exposed to enemies, that the more we care for them the less they appear to depend on their own natural powers of resistance?