

either in well enclosed fields, or tied up in stalls, and they must take such food as they find there or is given them, whether it contains the saline parts so necessary to their well doing or not; and in some measure we increase the evil in stall feeding, by drawing out, in warm water, some of the saline matters of the food. There is no question that many diseases our horses, cattle and sheep are liable to, would be prevented if the animals had free access to salt; and when it has been given regularly the beneficial effects have soon shown themselves."

In France and Germany salt is far more liberally distributed to farm animals than in England. A commission recently appointed in the former country to give a thorough investigation of this matter, recommended that for a working ox or milch cow, 2 oz of salt be given daily; and double that amount when the animals are placed under fattening conditions. Lean sheep from one half to three fourth oz.; when fattening one to two ozs.—horses, donkeys, and mules, 1 oz. daily. They further report that salt increases saliva, and thereby aids digestion and promotes fattening, and that in all mixtures or cooked food for animals, salt ought to be liberally added, subjected to a moderate fermentation. In Germany and some other countries a much larger amount of this article is given to animals than what is recommended by the French commission.

From a collation of the experience of the best agriculturists in various countries, in ancient as well as modern times, it would appear that the regular use of salt in the food of animals tends greatly to promote their growth, and by strengthening the system, exercises an important influence in the prevention of diseases. "Our English agricultural journals have more than once drawn attention to the fact that a constant supply of salt in moderate doses hastens the development of the colt, and promotes muscular power in the horse, besides rendering this animal less subject to inflammation of the bowels and stomach, indigestion, broken-wind, worms, &c. It also preserves oxen from inflammation of the intestines, and acute chronic diseases, typhus and consumption. In sheep, experience has shown us that the habitual use of salt has an extraordinary influence in the prevention of cachexy [rot, &c.], giddiness, worms, parasites, &c.; and in swine it appears to prevent hydatides, and some other disorders."

Of the use of salt as a manure, opinions, both of scientific and practical men, are somewhat conflicting; a circumstance, no doubt, arising in a great measure from difference of soil, climate, and other physical conditions. In the British Islands, especially near the coasts, salt is not found so necessary or beneficial either to cattle or to the soil, as it is in Canada, in consequence, no doubt, of the atmosphere being impregnated with so large an amount of saline matter. In strong westerly storms an incrustation of salt is not uncommonly observed on windows exposed to that aspect for several miles inland; and in many situations the annual rain fall, being from 30 to upwards of 40 inches, would deposit in the soil, at the rate of three or four hundred pounds of salt per acre. In such instances, and where the salt prevails largely as the consequence of springs, the artificial application of that material to the soil, would not only be of no advantage, but might be positively injurious. For although all farm crops, and fertile soils contain a certain amount of salt, yet if that article exists in too large quantities it will prove injurious to the land and the animals that are fed upon its produce. In regions that are so remotely situated as to be but feebly affected by direct oceanic influence, or where saline springs are absent, as is the condition of large areas of this North American Continent, the artificial application of salt will generally be found beneficial. We require more experience in this matter before definite amounts to be used can be dogmatically stated; and much depends on the kind of crops cultivated, as mangolds, potatoes, and roots generally, contain much larger quantities of salt than the cereals. From four to five and six hundred pounds per acre [applied frequently if found beneficial] would be much safer than venturing on much larger doses, as is sometimes done on Continental Europe. Salt may be advantageously employed in the compost heap; and it has been found useful, from a remote antiquity, in making a strong brine for steeping seed grain, thereby cleansing the cuticle of the germs of injurious parasites. Experience also teaches that salt has a tendency to develop the grain in the ear and to brighten and stiffen the straw of our cultivated cereals. Salt is well known for its antiseptic action and to this may be attributed much of its value in relation to both plants and animals. In the animal system, it acts as a salutary check on what might be otherwise be a too rapid fermentation of the food in the stomach and intestines, while in plants it prevents an unhealth-

thy, because too rapid growth, by causing plant food in the soil to become soluble in a slower and more gradual manner. Dr. Phipson, who has devoted much scientific investigation to this subject observes:

"There is a circumstance in which salt is capable of playing an important part as a manure, without being directly absorbed by plants. I discovered this accidentally, while making a series of experiments upon the action of various artificial manures manufactured in England. In the course of these experiments I observed manures rich in animal matter yielding ammonia and decomposing rapidly in the soil [also those containing ammonia ready formed] are particularly beneficial to annuals that is, to plants that complete their development in one season, and which are precisely those cultivated by man in our latitudes. They also act energetically on biennials, and upon a few more or less herbaceous plants cultivated in green-houses,—for instance, geraniums. But when we have to deal with ligneous vegetables, such as rose trees, vines, olives, apple trees, &c., these rapidly decomposing manures have frequently, according to my experiments, an injurious action. If applied in notable quantities, the plant loses its leaves, becomes covered with blight or parasitical fungi, and soon presents an unhealthy appearance. But by mixing these manures with about one third their weight of salt [or better still, salt and sulphate of potash], and applying them in the same quantity as before, their action is slackened in virtue of the antiseptic property of salt used in so large a quantity, and their effects are highly beneficial, instead of injurious. Roses and other trees, I found to be particularly sensitive in this respect. These plants require rich manure no doubt, but manures which decompose slowly and whose action is lasting. This important result can be obtained by a proper use of salt, a part of which is doubtless assimilated by the plants, but the greater portion acting in this case as an antiseptic, and prolonging the decomposition of the manure." Dr. Phipson's valuable essay may be thus summarized:

1. That, without a due proportion of salt, plants cannot attain to their proper degree of perfection; and this applies especially to colza, turnips, wheat, oats, maize, and other grasses.

2nd. That salt is an essential constituent of plants as well as of animals.

3rd. That the oil is constantly losing, by cultivation, a great amount of salt, taken away by the crops.

4th. That none of the manures at present used [except a very few of the best super-phosphates] contain salt; guano shows only four tenths per cent.

5th. That it is necessary to add salt at regular intervals to the soil, in some shape or other, if we wish to derive the greatest possible benefit by the crops.

"As a general conclusion it may be stated that, by considering salt in its application to agriculture, we find that agriculture, can and ought to, utilize every property of salt; its solubility, its attraction for moisture, its tonic, stimulating, and other physiological properties, its antiseptic and nutritive qualities, as an essential part of the food of animals and plants. Truly, no substance has ever been put to so many trials, and none has ever repaid us so well for the labour of our experiments."

The Use of Gypsum, or Plaster as Manure.

This question has excited a good deal of attention among chemical agriculturists ever since it was discovered that plaster possessed the almost marvellous powers which are known to belong to it. From Liebig down, it has excited the attention of all agriculturists. Recently a writer adopts the views that the use of gypsum is to make the potash of the soil more valuable, and hence more within reach of plants.

Liebig has, however, anticipated this view. (See Nat. Laws of Husbandry, page 320 and 328.) Bear in mind three facts about this substance.

1. Gypsum produces its best effects upon leguminous plants like clover, which are themselves most rich in magnesia and potash, and least on the cereals which consume less of these constituents.

2. Gypsum produces its best effects upon the rich soils which overlie the slates, like the dairy soils of Herkimer and Oneida counties, where this manure is almost universally used.

3. Gypsum produces little or no effect upon light sandy soils, destitute of potash, or nearly so, unless accompanied with ashes; nor upon those rich heavy soils abounding in humus, like the flats of the Mohawk.

In the former case there is no potash to be acted upon, and in the latter it is so diffused, though plentiful enough as to be out of the reach of the dissolving effects of the substance.

Poultry Manure:

As we have often stated, we believe that our common management of poultry is wasteful and extravagant. We might make a great deal more by care in economizing the manure of the poultry-house, and this is worth attending to. Here is what Geyerlin, whose book was alluded to in the *Home for Poultry*, recently published, says on this point:—

In France, as well as in our own country, most eminent chemists have proved by analysis that poultry manure is a most valuable fertilizer, and yet, for want of a proper system in housing poultry, it has as yet not been rendered available to rural economy. The celebrated Vanquelin says that when the value of manures is considered in relation to the amount of azote they contain, the poultry manure is one of the most active stimulants; and when, as a means of comparison, the following manures are taken, in parts of 1,000, it will be found that—

Horse Manure contains.....	4.0 parts of azote.
Guano as imported.....	49.7 do.
Guano when mixed of vegetables and stones.....	63.9 do.
Poultry Manure.....	83.0 do.

It will be seen that it is worth preserving, even though it may be small in amount.—*Ploughman.*

Disintegrating Soils.

The probability is that if the exact truth could be ascertained, we should find that quite one-sixth of the crop capacity of all our cultivated fields everywhere, is annually absolutely thrown away in clods. Some surly old cynic, a great many years since, sneeringly applied to us delvers in the dirt the ill-natured epithet of "clod hoppers." Well, the old vinegar cruet, whoever he might have been, was not so wide off the truth after all. There are more "clod hoppers" among honest farmers than there are gentlemen among sour cynics. A great many farmers, intelligent upon many points, make serious mistakes in preparing soils for crops. Something beyond deep ploughing and liberal manuring, is requisite to produce best results. Something far short of the extravagant range in either, ought always to give better satisfaction. It is ploughing judiciously at the proper season—when the land is in the best possible condition, and then thorough pulverization of the soil. Many a fertile acre, after ploughing, re-ploughing, and planting; carried through the season, locked up in clods from the size of a grape-shot to that of a tennis ball, more fertility than liberated in the spring by better disintegration, would have added one-sixth—often a fourth to the yield, and saved a useless expenditure for manure to an equal amount. The mistake begins usually in ploughing land when it is too wet, thereby packing it like a pressed brick, so that a large per cent. of its fertility is sealed up, requiring a wasteful outlay of after labour in counter-ploughing, harrowing, and rolling in order to pulverize it, and after all, in too frequent instances, the work can be but imperfectly accomplished, and there is so much of the soil absolutely thrown away. If the farmer could always command team and time, sub-soiling would always be the economical rule. Run the surface plough first, say seven inches deep, and follow directly in its wake with the subsoiler, lifting and disintegrating as much as possible the damper, more compact sub-stratum, and then as the turned over portion of the soil would be light and porous, disintegration by counter-ploughing, harrowing and rolling, might be more readily and thoroughly achieved. But as only about ten in a thousand of us can command these conditions, the next best plan is for us to plough as we can, when our land is in the best possible order, working early and late—an hour or two by moonlight occasionally—never mind all their eight hour legislating and preaching in ploughing, planting and harvest time—then lie by and rest, or do something else, whenever we find our field so wet that the furrow falls from the mould board like a long length of broad rubber belting instead of crumbling down freely disintegrated as it ought. Count that day lost that has been given to ploughing, when you look back upon long lines of furrows beautifully turned, superbly pressed, their shining surfaces glossy as a satin vest. In vegetable gardening, thorough pulverization should be the invariable rule—knock the clods to pieces—disintegrate—beat every lump the size of your fist into atomic usefulness. There is money laid by useless in every lump—a little in each—a good deal in the aggregate. Beat it out of that, pulverize, dig, disintegrate, and economize manure and money.—*Phil. Bot. Post.*

The soil, by its weight, is constantly trying to form rock under it in the soil. It is the farmer's business to see that it don't do it. His plough and spade are the means to prevent it, but especially the subsoil plough.