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MANURES.

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OF NIGHT SOIL, HOG MANURE, HORSE AND SHEEP DUNG.

These have not all been analyzed with the same degree of care as often as has cattle dung: some, as, for instance, night soil, has been examined thoroughly but once. Now it is not fair to base our reasoning upon these single analysis, and say that this or that manure contains this or that salt in greater or less quantity than another.

The quantity and kind of salts are materially affected by several circumstances which will be considered in the next section. An analysis, made when the animal is fed and worked one way, will vary from the result which would be obtained when the circumstances are varied. It is, therefore, quite useless, in the general consideration of the composition of manures, to enter upon the details of each. General results, general expressions of facts, are sufficient for understanding the nature of animal droppings. It is well ascertained, however, that all these droppings, of various animals, contain essentially the same salts as does cattle dung. They all contain portions of each of the substances which form plants. It will be enough for the purpose of this Essay, to present to your eye, reader, a table, showing the proportions of mould, and salts, which the dung of yourself and your stock presents.

	Water.	Mould.	Salts
Night soil and Hog manure,	75.30	23.50	1.20
Horse dung, ...	71.20	27.00	.96
Sheep dung, ...	67.90	22.50	3.66

OF THE CIRCUMSTANCES WHICH AFFECT THE QUALITY AND QUANTITY OF ANIMAL DUNG.

That we may reduce to some general principle, easily understood and easily remembered, the facts scattered up and down, among the mass of writers and observers, upon the different quality of manure, afforded by different animals, or the same animals at different times, let me, reader, request your company while I walk into a new department of your chemistry. You may not understand the reasons of this difference in manures; why, for instance, fattening cattle give stronger manure than working oxen, without going a little into the mode how animals are nourished. The whole may be stated in plain terms, thus: All food serves two purposes. The first is to keep up the animal heat, and this part of food disappears in breathing or forming fat; that is, after serving its purpose in the animal body it goes off in the breath or sweat, or it forms fat. It is so essential to the action of breathing, that we will term it food for breathing, or the breathers. The second purpose answered by food is, to build up, sustain, and renew the waste of the body.

Now all this is done from blood. To form blood, animals must be supplied with its materials ready-formed. They are ready formed in plants; and animals never do form the materials for making blood. We may therefore term this kind of food the blood formers. We have then two classes of food; the breathers, and the fat formers, and the blood formers. If we look to the nature of these different classes, we find that sugar, starch and gum are breathers. Now there are three principles found in plants, exactly and identically the same in chemical composition with the white of egg, flesh, and curd of milk. Now these three principles, exactly alike, whether derived from animals or plants, are only blood formers. I shall not, reader, tax your attention further upon this subject than to say and to beg you to remember these important facts. First, all food for breathing and forming fat contains only these three elements, oxygen, hydrogen, carbon. Secondly, all food for forming flesh and blood, in addition to these, contains nitrogen.

This is the gist of the whole matter, so far as relates to manure. Bear in mind, as you go on with me, reader, this fact, that of all the food animals take, that alone which forms flesh and blood contains nitrogen. The door is now open for explaining why age, sex, kind of employment, difference of food, difference of animal, can and do produce a marked difference in the value of different manures. And first let us consider how the quantity is affected; this depends on the kind of food. The analysis of cattle dung which has been given, is that of cows fed on hay, that is, herd's grass, red top, &c., or what is usually termed English hay, potatoes and water. The cattle kept up the year round; an animal, so treated, consumed in seven days,

Water,	611 lbs.
Potatoes,	87 "
Hay,	167 "

During this time she dropped clear dung 199 lbs., or very near a bushel of dung a day. Every attention was here paid to accuracy of measurement and weight. The annual amount of dung from one cow exceeds by this account that which is usually assigned. But, as it is a matter of some importance for the farmer to estimate what the produce of his stock may be in dung, the following statement, containing the results of a large establishment, will probably give that average.

At this establishment the cows were kept up the year round for their dung. It was collected for use free from litter, and measured daily into large tubs of known capacity. The average number of cows kept was fifty-four for nine and a half years. During that time they consumed of beets, meal, and pumkins, brewery grains, cornstalks, potatoes, carrots, and cabbages, 942,436 lbs. giving an average of green fodder, for each cow per year, 1,837 lbs. Average consumption of hay for each cow per annum 8,164. The total dung for nine and a half years was 120,520 bushels, or per cow per annum, 235 bushels. This gives a daily consumption of green food, 5 lbs., and 22 lbs. of hay per cow, and two and a half pecks of dung per day, or about 56 lbs. per cow.

But according to some experiments, made to determine how much the quality of food affected the quantity of dung, it appears that the solid and fluid excrements partially dried, were, compared with the food, as follows:

In	Cattle. lbs.	Sheep. lbs.	Horses. lbs.
100 lbs of rye straw gave dung	43	40	42
" " " hay " "	44	42	45
" " " potatoes " "	14	13	
" " " mangel-wurzel "	6		
" " " green clover "	9¼	8½	
" " " oats " "		49	51
" " " rye " "			53

My own experiments on this subject gave for 100 lbs. of hay and potatoes as above, estimating both as dry, or free from water of vegetation, 32.9 lbs. of dung, and this estimated as dry is reduced to 5.6 lbs. or 26 lbs. of dry food gave 14 lbs. of dry dung. But as a general fact, we may say, that well-cured hay and grains, give one half of their weight of dung and urine; potatoes, roots, and green grass, about one tenth. It will be easily understood why the quality of food should effect the quantity of dung. The more watery the less in bulk is voided, because there is actually less substance taken. And as the animal requires this to form its flesh and fat, and to keep up his breathing, so will he exhaust more completely his food. More going to support him, less is returned by the ordinary channels. So when much vegetable fibre exists, as in chopped straw and hay, then, as it goes little way towards supporting breathing or forming blood, a greater bulk is rejected. In grains, on the contrary, which afford much of all that the animal requires, less is extracted and more voided.

SEED WHEAT SHOULD BE PICKLED.

From Stephen's Book of the Farm.

The land being plowed should be *sown* as quickly as possible; for which purpose the seed wheat should be measured up in the sacks, or ready to be measured up in the corn barn or granary, and the means of pickling it also ready when wanted. Wheat should be sown thick in Spring, because there is no time for the plant to stool or tiller, that is to throw out young shoots from the roots, as in the case of autumnal sown wheat. About three bushels per imperial acre will suffice for seed.

Seed wheat should be pickled, that is, subjected to a preparation in a certain kind of liquor before it is sown, in order to insure it against the attack of a certain disease the ensuing summer called *smut*, which renders the crop comparatively worthless. Some farmers affect to laugh at this precaution, as originating in a nonsensical faith in an imaginary specific; but the existence of smut and its baneful effects upon the Wheat crop are no imaginary inventions, and when experience has proved, in numberless instances, that the application of a steep has the effect of warding off the evils of smut, the little trouble which pickling imposes may surely be undertaken, rather than the whole crop be put in jeopardy. Why pickling *now* should have the effect of preventing the smut at a future period, is a different question; and it is perhaps because this question has not hitherto been satisfactorily answered, that pickling is thought lightly of by some farmers, rather than because any valid objection can be urged against his practice. Indeed, there cannot, for the palpable fact stands obvious to conviction, that one field sown with pickled Wheat and managed in the usual way, will escape the smut, while an adjoining one, managed in an exactly similar manner, but sown with plain wheat, will be almost destroyed with the disease. I have seen this identical case tried by two neighbouring farmers, the Messrs Fenton, late tenants of Nevay and Eassie, in Forfarshire. It is true that, on some farms, wheat sown in a plain state escapes the disease, as I have heard Mr. Oliver Lochend, near Edinburgh, state is the case with his farm; and it is also true that pickling does not *entirely* prevent the recurrence of the disease on other farms; but such cases are exceptions to the rule, which is if wheat is not pickled it may be smutted; at least, no one can aver beforehand that it *shall not* be so; and while uncertainty exists in the recurrence of a serious disease, the safer practice is to bestow the trouble of pickling, the expense being very trifling, rather than incur the risk of disease. It is now a well ascertained fact that inoculation will not insure immunity from small pox, yet it will certainly modify the attack when it occurs, and so it is with the case of pickling wheat; and as long as means are used to ward off small-pox, so long also, from analogy, ought wheat to be pickled.

Wheat is pickled in this way. For some days, say two or three weeks, let one of the tubs referred to (in another part of the book) be placed to receive a quantity of chamber lye, and when ammonia is found to be disengaging itself freely from the lye, it is ready for use. It is better that the effluvium be so strong as to smart the eyes, and water added to dilute the liquor, than that the lye be used fresh. This tub should be removed to the straw barn, as also the Wheat to be pickled, and part of the floor swept *clean*, to be ready for the reception of the wheat. Let two baskets be provided, capable of holding half a bushel of wheat each, having handles raised upright on their rims. Pour the wheat into the baskets, from the sacks, and dip each basketfull of wheat into the tub of lye, as far down as completely to cover the wheat, the upright handles of the baskets preventing the hands of the operator being immersed in the lye. After remaining in the liquor for two or three seconds, lift the basket up to drip the surplus lye again into the tub, and then place it upon two sticks over an empty tub, to drip still more till another basketfull is ready to be dripped. Then empty the dripped basket of its wheat on the floor, and as every basketfull is emptied, let a person spread by riddling through a barn wheat-riddle, a little slacked caustic lime upon the wheat. Thus basketfull after basketfull of the wheat is pickled till it is all emptied on the floor, when the pickled and the limed heap is turned over and over again till the whole mass appears uniform. The mixing by turning is most surely managed in this way: let two men be provided each with a barn shovel, and let one stand on each side of the heap, one with his shovel in his right hand and the other with his in the left hand; let both make their shovels meet in their edges upon the floor, under one end of the heap of wheat, and each, on lifting his shovelfull, turn it over behind him and thus proceed, shovelfull after shovelfull, to the other end of the heap. Let them return in a similar manner in the opposite direction, and so till the heap of wheat is completely mixed with the lime and lye. The pickled wheat is then sacked up and carried to the field in carts. Other substances beside chamber lye are used for pickling wheat, such as brine of salt, sufficiently strong to float an egg; solution of blue vitrol—all good enough, I dare say, but when so simple and efficient and easily obtained an article as lye can be had, it appears to me unnecessary to employ anything else. It is a powerful ingredient, destroying vegetable life in the course of a few hours, and it is perhaps to this property that is to be ascribed its efficacy as a protection against the attack of that vegetable enemy of the wheat crop, the smut. The wheat pickled with it should therefore be used immediately after the process, and, as danger may be apprehended to pickled wheat being kept over night, the quantity pickled should be sown at once, and no more should be pickled at one time than can immediately be sown. The use of quicklime seems to be to dry the lye quickly, so that the grains may be easily separated from one another in the act of sowing; but there may some chemical change arise between them in the circumstances, which may be serviceable to the purpose for which both are employed. Can it be that the lime fixes the ammonia of the lye, and preserves it for use, until wanted by the plant or seed?