

food be nitrogenous and easily digested, the nitrogen in the urine will greatly preponderate; if, on the other hand, the food be poor in nitrogen and hard to digest, the nitrogen in the solid, may exceed that in the liquid, dejections.

Lime, magnesia, and phosphoric acid are chiefly found in the ash constituents of the solid dung—in the urine nearly all the potash. Where, as in Lawes' experiments, sheep were fed on hay, 95 0/10 of the lime, 70 0/10 of the magnesia, and 83 0/10 of the phosphoric acid, contained in the food, were found in the solid dung, but only 3 0/10 of the potash.

The next table gives a good idea of the general composition of the solid and liquid dejections. The sheep were eating meadow-hay; the oxen, clover-hay and oat straw, with about eight pounds of beans (horse-beans, not haricot-beans) per day.

PERCENTAGE COMPOSITION OF SOLID AND LIQUID EXCREMENT. SHEEP FED ON HAY.

	Solid excrement		Urine.	
	Fresh.	Dry.	Fresh.	Dry.
Water.....	66 2	...	85 7	...
Organic matter.....	30 3	89 6	8 7	61 0
Ash.....	3 5	10 4	5 6	39 0
Nitrogen.....	0 7	2 0	1 4	9 6

OXEN WITH NITROGENOUS DIET.

	Solid excrement.		Urine.	
	Fresh.	Dry.	Fresh.	Dry.
Water.....	86 3	...	94 1	...
Organic matter.....	12 3	89 7	3 7	63 0
Ash.....	1 4	10 3	2 2	37 0
Nitrogen.....	0 3	1 9	1 2	20 6

See how much less water the solid and liquid excreta of the sheep contain than those of the ox. they are of course more concentrated, and hence, pound for pound more valuable—that is why, in the South of England, we value a folding of sheep at \$18 an acre!

How rich, too, the urine is, both in nitrogen and ash. We find that in the more highly fed oxen the dry matter of the urine contains more than 20 0/10 of nitrogen

The next table, and the last, I suppose, that I shall trouble you with, is given to show the average amount of nitrogen, and of phosphoric acid and potash, the only two ash-constituents worth bothering ourselves about, contained in ordinary cattle-foods. In reading it, you will please to bear in mind what I have repeated more than once: nitrogen is the most costly of all plant-foods as well as of all cattle-foods, phosphoric acid and potash being present in manure, our cultivated plants can, on an ordinary farm, find their other ash-constituents in the soil, and even potash may be neglected, as far as purchased manure goes, if cattle are decently well fed. It comes to this: what is wanted on a fairly well managed farm is *nitrogen* and *phosphoric acid*.

Oilcakes, you see, yield the best manure; they are rich in nitrogen and phosphoric acid, and contain no small amount of potash. (1)

(1) A feeding bullock, in England, often has 14 lbs. of linseed-cake a day, for five and six months at a stretch; the beasts are not expected to pay—the manure makes the profit on the grain crop.

MANURIAL CONSTITUENTS IN 1000 PARTS OF ORDINARY FOODS.

	Dry matter	Nitrogen	Potash	Phosphoric acid
Cotton cake (decorticated)....	900	66 0	15 0 ?	31 2
Rape cake.....	900	48 0	13 2	24 6
Linseed cake.....	380	45 0	14 7	19 6
Cotton cake (undecorticated)...	885	39 0	20 1	22 9
Linseed.....	905	36 0	12 3	15 4
Palm-kernel meal (English)...	930	25 0	5 5	12 2
Beans.....	855	41 0	12 0	11 6
Peas.....	857	36 0	9 8	8 8
Malt dust.....	905	38 0	19 5	17 2
Bran.....	865	22 0	14 8	32 3
Oats.....	870	20 6	4 5	0 2
Wheat.....	856	18 8	5 4	8 0
Barley.....	860	17 0	4 9	7 3
Maize.....	886	16 6	3 6	6 1
Clover hay.....	840	19 7	19 5	5 6
Meadow hay.....	857	15 5	16 8	3 8
Bean straw.....	840	10 0	25 9	4 1
Wheat straw.....	857	4 8	5 8	2 6
Barley straw.....	850	5 0	9 7	2 0
Oat Straw.....	830	5 0	10 4	2 5
Potatoes.....	250	3 4	5 6	1 8
Mangels.....	115	1 9	3 9	0 7
Swedes.....	107	2 4	2 0	0 6
Carrots.....	142	1 6	3 2	1 0
Turnips.....	83	1 8	2 9	0 6

Beans and pease, malt-dust and bran, come next: malt-dust is terribly neglected here—I could hardly give it away at my brewery at Chambly.

A queer thing, and one that will surprise many: clover-hay yields a richer manure than barley, oats, or wheat, but meadow hay stands below the cereals in this function.

Dung from animals eating potatoes is poorer than dung from root-fed animals.

Straw is, as we all know, the worst manure-yielding food, but it is worth while to notice how far superior in all points bean haulm is to the straw of the cereals, as is pease-haulm in a minor degree.

You must not imagine that the whole of the nitrogen of the animal manure is of the same value as the nitrogen in sulphate of ammonia or in nitrate of soda. It is not so: because plants probably take up all their nitrogen from the soil in the form of nitrates, and the formation of these from the nitrogen of the solid dung is a work occupying a considerable time. The nitrogen of the urine, however, is quite as valuable as that contained in the above named auxiliary manures: its conversion into nitrates is very rapid.

Do not imagine that a great bulk of litter mixed with the dung is of much use. If you have paid attention to what I have said, you will see at a glance that the more directly animal manure is applied to the land, the more immediate its effects will be; besides, it is probable that fermentation of dung with a lot of straw results in the formation of nitrogenous humus compounds, which are insoluble, and decompose very slowly in the soil.

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Winter Feeding of Fowls.

ELS. COUNTRY GENTLEMAN— The health of fowls, especially in cold weather, depends greatly on the regularity and frequency of feeding. As corn is the staple grain, it should