CONNECTICUT AGRICULTURAL EXPERIMENT STATION.

Bulletin No. 49, Oct. 30, 1880.

ANALYSES OF SWAMP MUCK.

446 Muck No. 1. Upper stratum.

447 Muck No. 1. Lower stratum.

448 Muck No. 2.

The above were sent by D. H. Van Hoosear, Secretary Farmers' club, East Wilton.

449 Cured Muck.

450 Fresh Muck.

Sent by S. B. Wakeman, Saugatuck.

451 Muck. Sent by G. W. Stanley, New Britain.

452 Fibrous Muck, from above 453.

453 Bottom Muck, from below 452.

Sent by Henry Hine, Oxford.

454 Mucky soil of drained meadow, from Augustus Storrs, Mansfield.

465 Swamp Muck, from Ed. C. Birge, Southport.

467 Swamp Muck. A, upper layer, B, lower layer, from Lewis Davis, Milford, Ct.

492 Muck, from W. E. Simonds, Canterbury.

Samples 446, 447 and 448 are from a swamp of ten acres, owned by Messrs. John and Andrew Jackson of Wilton. 446 and 447 are from the head of the swale, the former from the surface, the latter from a lower stratum. 448 was taken from the same swale one-half mile distant and at a lower level. Muck from both localities has been used for many years as an absorbent, and also applied in spring direct to crops after having been dug in fall and exposed to air and frost during winter. 446 and 447 have given very good results. 448 has been less valuable.

The analyses show large differences of composition, in the fresh samples. We observe, first, that 446 is a very pure muck and quite fully saturated with 80 per cent. of water. 448 is drier and contains 45 per cent of soil and mineral matter, while 447 stands intermediate. If the three were applied in corresponding states of dryness, we can see that in the first two we should have much more organic matters, with more nitrogen, and likewise more lime than in the last. This appears from the figures above given showing the post?" and "has the muck any value in its fresh state?"

The differences in composition which appear in the undried samples are almost entirely due to their unlike proportions of water, viz: 38 and 85 1-2 per cent. Dry, they agree in containing about 90 per cent. of organic matter with 2.2 per cent. of nitrogen, and about 10 per cent. of ash with 2 per cent. of lime.

To Mr. Wakeman's questions the following answers were given:

1. 449 is well worth carting 100 rods to use as an absorbent. It contains, as analyzed, with 38 per cent. water, nearly twice as much nitrogen as good stable manure, and of this there can be no reasonable doubt that a good portion would become available to crops, especially after composting with dung and urine. It also contains four times as much *lime* as stable manure.

2. As to the value of 450, the fresh dug muck, it would doubtless be serviceable if well pulverized and distributed upon sandy droughty soil. It contains nothing injurious to vegetation.

ANALYSES OF SWAMP MUCK.

The fresh or undried samples contain per cent:—

	446	447	448	449	450	451	452	453	454	465	467A	467B	492
Water,	[illegible]	62 25	42 19	38 04	88 51	32 06	77 23	79 90	67 36	73 81	87 13	81 35	79 73
Organic (vegetable) and volatile mat'r	15 93	28 33	12 80	54 72	10 40	53 82	21 83	7 55	19 75	23 30	11 55	6 94	16 74
Ash, including sand and soil	3 59	9 42	45 01	6 24	1 09	14 12	0 94	12 55	12 90	2 89	1 32	11 70	3 53
	100 00	100 00	100 00	100 00	100 00	100 00	100 00	100 00	100 00	100 00	100 00	100 00	100 00
THE ASH CONTAINS,													
Silica and substances insoluble in acid,	2 19	7 63	38 08	3 32	0 42	9 82	0 42	—	7 87	1 63	0 49	10 78	2 63
Oxide of iron, alumina and phos. acid,	0 35	0 88	0 32	0 79	0 12	—	0 21	1 41	4 50	0 34	0 20	0 37	0 27
Lime,	0 44	1 78	0 89	1 32	0 32	1 28	0 09	0 96	0 11	0 38	0 31	0 09	0 42
Other mat'r not separately determined	0 41	1 10	1 92	0 88	0 21	2 99	0 22	—	0 48	0 45	0 29	0 28	0 22
Nitrogen (in organic matter),	0 41	0 31	0 21	1 30	0 25	0 91	0 24	0 78	0 41	0 60	0 21	0 18	0 44
Poisonous iron—salts soluble in water	none	none	none	none	none	none	none	trace	much	none	none	none	none
The dry (water free) mucks contain per cent:—													
Organic and volatile matters,	82 44	69 48	22 34	89 98	90 38	79 24	95 87	25 06	60 22	89 25	89 74	37 23	82 56
Ash,	17 56	30 52	77 66	10 02	9 60	20 76	4 13	74 96	39 68	10 85	10 26	62 77	17 44
Lime,	2 27	4 71	1 79	2 12	2 01	1 00	0 39	0 23	0 33	1 45	2 73	0 48	2 07
Nitrogen,	2 12	0 82	0 37	2 29	2 18	1 34	1 03	0 60	1 25	2 29	2 40	0 96	2 17
The organic matter of the mucks contains per cent:—													
Nitrogen,	2 57	1 25	2 38	2 44	2 40	1 69	1 10	2 44	2 06	2 07	2 68	2 59	2 63

composition of the dry, water-free mucks.

The *per cent.* of nitrogen, and that of lime in the dry samples may be taken as fair measures of their relative value. 446 ranks accordingly among the best, while 448 is nearly the poorest of the samples here reported.

The inferiority of 448 is evidently largely due to the fact that three-fourths of it nearly is sand or soil. Reference to the last line of figures in the table shows that the organic matter which it contains is as rich in nitrogen as that of 446. We see in fact that in both these and in seven of the other samples the organic matters contain about 2 1-2 per cent. of nitrogen.

449 and 450 are, it is understood, two samples from the same bed, the former dug a year ago or more and exposed during the winter, the latter a freshly excavated sample. The cured muck, 449, is used as an absorbent and for composting. The questions asked by Mr. Wakeman are:—"is the cured muck worth carting 100 rods to use as absorbent and in com-

The chief advantages of "curing" muck by exposure to air and frost are, 1, pulverization, 2, removal of a share of the useless water, and 3, removal of soluble poisonous salts of iron. 450, like all but two of the samples here reported, is free from injurious iron-salts, and except for the cost of carting its extra water and the convenience of application, it might, most probably, be applied as well fresh as cured.

451 was a well cured or dried sample, but still retained 32 per cent. of water. The composition in the dry state shows it to be rather above medium quality, with 1.0 per cent. lime and 1.3 per cent. nitrogen. Its content of sand and soil (15 per cent. or more of the dry muck) depresses the nitrogen, but the organic matter itself contains a less proportion of this element than that of any other sample except 452.

452 and 453 represent respectively the upper and lower layers of the same bed. 452 was coarse and fibrous from undecayed vegetation. The organic

Over.

matter of 453 was more fully decomposed but was admixed with clay and fine soil, to the extent of 74 per cent. These are the poorest mucks here reported, averaging water-free, but 1-3 per cent. of lime and 1 per cent. of nitrogen. The bottom sample contains some soluble and poisonous iron-salts which would disappear by thorough weathering, or more speedily and certainly by composting with ashes, potash or lime. Such muck would probably not pay to apply fresh except on light, leachy land, and there, would be of advantage mainly as an amendment of too great porosity and droughtiness, and not as a fertilizer.

454 is an interesting sample, as it represents a piece of meadow land that has been drained and cultivated for three or four years, but all attempts to get crops of buckwheat, corn or turnips have totally failed—even

2. Will it pay to top-dress pastures near the swamp with the raw muck?

3. Will it pay to compost with lime at the swamp?

Queries 1 and 3 were answered in the affirmative. In reply to the second question, a doubt as to the advantage of its direct use was expressed. Plainly, however, actual experience alone can positively decide these questions, and the answers given, being offered without a careful examination of all the circumstances of the case, are merely opinions that are intended to be safe, but are not expected to be exact.

467 A and 467 B are respectively the black upper and brown lower layers of the same deposit. Mr. Davis asked which is the best, and if either or both are worth applying to sandy loam directly or after composting with something besides yard manure.

weeds do not grow upon it. The surface of the ground as it dries becomes white as if salt or plaster had been sown upon it.

The barrenness of this soil is due to iron-salts soluble in water, mainly proto-sulphate of iron, the same thing as copperas or green-vitriol, which is present in considerable proportion and which thus poisons and destroys all vegetation. The remedy is a copious application of leached ashes or lime. Unless there is permanent bottom water also poisoned by iron-salts, the lime will shortly cure the difficulty. The sample is more of a muck than a soil, containing 60 per cent. of vegetable and volatile matters, and not only has excess of iron-salts but is deficient in lime and presumably in other mineral plant food, so that leached ashes would be the most suitable application.

465 This muck is seen, from the statement of its composition in the water-free state, to contain nearly 90 per cent. of vegetable matter with 2.3 per cent. of nitrogen, and 1.5 per cent. of lime: it is accordingly of excellent quality. Mr. Birge states that it can be delivered on the adjacent upland at 18 cents per cart load of 25 bushels. Mr. Birge asks:

1. After letting it dry on the upland, will it pay to cart to the yard one-half or three-fourths mile distant for litter?

The analyses indicates the muck to be of the best quality. The lower portion is, however, largely mixed with soil. This renders it less rich in nitrogen and lime, and therefore inferior as a fertilizer, but as the soil it contains is mostly of very fine pulverization, it is not less valuable as an amendment on light, open textured soils. The best materials next to stable manure to compost with would be unleached wood-ashes, or fresh burned and slacked lime. By slacking the cheapest oyster-shell lime mixed with say 1-10 as much kainite (potash salts) or low grade sulphate of potash, and composting with the muck, the latter will not only yield its nitrogen rapidly but its lack of potash, magnesia &c. will be supplied. To one cord or 100 bushels of muck, 10 bushels of lime may be used.

492 Is also a muck of high quality, judged from the analysis, the dry substance containing over 2 per cent. each of lime and nitrogen.

In conclusion I would refer my readers, for full details as to methods of handling and composting, to my Report on Peat and Muck, published in the Transactions of the Connecticut State Agricultural Society for the year 1858, and afterward revised and enlarged and issued by Orange Judd & Co., under the title "Peat and its Uses as Fertilizer and Fuel.

S. W. JOHNSON, Director.