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Domestic Supplies of Potash

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CONTENTS

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Domestic Supplies of Potash.

There is practically no commercial supply of potash salts which can be used to profit by farmers, and probably there will be no adequate supply while war lasts. A brief notice of the domestic supply, chiefly of various kinds of ashes, may, therefore, be helpful.

"Canada Hardwood Ashes."

The following statement shows the average composition of the so-called Canada Hardwood Ashes offered in Connecticut during the periods named, as determined by our analyses:

		Contained in the ashes, per cent.			
Period	No. of analyses	Water-soluble potash	Phosphoric acid	Lime	Valuation per ton*
1903 to 1906	72	4.74	1.35	30.00	$10.65
1907 to 1910	49	3.78	1.42	27.31	8.99
1911 to 1917	23	2.77	1.15	23.80	6.96

The figures show that Canada Ashes have decreased steadily in quality and value since 1900.

The average shipment of Canada Ashes at present has only two-thirds the value of the average shipment ten years ago. Many shipments are even less valuable and are neither hardwood ashes, nor even wood ashes in any fair meaning of the term. The reasons for this are variously given, but the fact, which alone concerns us, is indisputable. Unless buyers make a hard and fast agreement to pay on the basis of water-soluble potash, with a specified rebate for any deficiency, and have their shipments carefully sampled and analyzed, there can be no certainty of economy in their purchase.

Ashes From Household Fires.

The average of all our analyses of household wood ashes produced in this state shows 5.99 per cent. of water-soluble potash, 2.68 per cent. of phosphoric acid and 33.58 per cent. of lime; the extremes of potash being 2.93 and 7.51 per cent. The wide differences in composition are due partly to differences in the ash-content of the wood, partly also to the heat of burning. If the

* Based on values which obtained a few years ago; viz., potash as carbonate 7.7 cents and phosphoric acid 3½ cents per pound; lime 40 cents per 100 pounds.

heat is intense and long continued, especially if sand or earth adheres to the wood, more or less potash combines with silica and becomes insoluble.

A bushel of dry ashes from the stove or fireplace weighs about 48 pounds and may contain about 2.9 pounds of potash, 1¼ pounds of phosphoric acid and 16 pounds of lime, which, with the present prices of potash, would be worth 80 cents or more.

Seventeen hundred pounds, or about 35½ bushels, contain as much soluble potash (50 pounds) as 100 pounds of muriate of potash and in more desirable form, besides 45 pounds of phosphoric acid and 570 pounds of lime, in form of fine carbonate. No better fertilizer for clover or other legumes can be suggested.

Of course, these figures are only approximate, but show the wisdom of carefully collecting and saving in a dry place *all* the wood ashes from stoves and fireplaces, for use in garden and field. They are too often wasted by mixing with coal ashes, which are comparatively worthless, or thrown with wastes to be carted off to a dump.

Too much cannot be said of the value of the "open fire" in the house, whether in city or country. Aside from its value for heating and ventilation, it should be more used than it is as a "destructor" for many kinds of wastes, recovering from them the most of what has any value. A hot fire will dry and consume, with no annoyance, much of the kitchen waste of the day, or if the waste is buried at night in the hot ashes, it will dry and be consumed in the next fire. Besides the satisfaction of not burdening others with one's own waste, there is satisfaction in the saving of some valuable material which would otherwise be lost. While the amount of potash in the wastes themselves is relatively very small, the per cent. of potash in *their ashes* is, in some cases, surprisingly large. For example, recent tests at this station show the following percentages of potash and phosphoric acid in the *ashes* of certain common vegetable wastes:

	Potash	Phosphoric acid
Apple parings	11.74	3.08
Banana stalks, yellow	49.40	2.34
" " red	46.64	3.04
" skins	41.76	3.25
Grape fruit skins	30.64	3.58
Lemon skins	31.00	6.30
Orange skins	27.04	2.90

	Potash	Phosphoric acid
Peanut shells	6.45	1.23
Potato peelings	27.54	5.18
Corn cobs	17.25	3.14
Cigar ashes	16.81	2.57

There are other wastes which have very little potash in their ashes. Among these are:

	Potash	Phosphoric acid	Lime
Egg shells	0.29	0.43	52.12
Dry leaves	0.51	0.38	1.58

The Ashes of Corn Cobs.

The percentage of potash in corn cobs is quite small, about 0.45 per cent., but the ashes of corn cobs which are sometimes available where corn is shelled on the farm are a source of potash worth considering. An analysis made here some time ago showed:

Water-soluble potash	21.13%
Phosphoric acid	4.01

Ashes from Brush Heaps.

When land is cleared for cultivation or pasture, or extensive orchard pruning and cutting of worthless trees has been done, the ashes from the brush heaps will probably have nearly the same composition as that of those produced in witch-hazel factories. (See below.) Canadian analyses show 10.3 per cent. of potash in the ashes of blackberry canes, 13 per cent. in those of gooseberries and 7.9 in those of raspberries. The effect of these ashes is often seen for years in increased production on spots where brush was burned.

Salt Marsh and River Meadow Hay as a Source of Potash.

While no one would think of burning salt marsh hay for the potash in it, we call attention here to its composition, to show that the use of the herbage from salt marshes, either for feed or for litter, brings very considerable amounts of potash, as well as other plant food, to the land from the sea. Analyses made here some years ago showed that the following quantities (expressed in pounds) of plant food were carried to the farm from the salt marsh per ton of hay of the kinds named:

	Nitrogen	Phosphoric acid	Potash
Black grass (*Juncus gerardi*)	23.8	5.0	42.0
Salt grass (*Spartina juncea*)	17.4	5.4	14.0
Three-Square (*Scirpus americanus*)	23.8	5.0	30.2
Creek sedge (*Spartina glabra*)	21.8	7.4	21.2

Hay from these grasses carries besides from 12 to 90 pounds of salt, or an average of 54 pounds per ton.

Small fruits, such as raspberries and currants, which are abundantly mulched with marsh grasses, scarcely need other fertilizers, and the coarser grasses should be used abundantly as litter and composted with manure.

River meadows, where the tall "bent" grasses grow every year with no fertilizer other than that supplied in the spring freshets, yield about as much nitrogen and phosphoric acid, but less potash than the marsh grasses. The following figures from one of our previous reports show this.

In one ton of hay of the grasses named are the following number of pounds of the three plant foods under discussion:

	Nitrogen	Phosphoric acid	Potash
Black bent (*Panicum virgatum*)	29	7	10
Blue bent (*Andropogon provincialis*)	21	6	11
Indian grass (*Sorghastrum nutans*)	20	10	19
Poverty grass (*Andropogon scoparius*)	11	5	11

Ashes From Brick-Kilns.

In normal years about two hundred million brick are made in Connecticut, but in 1916 and 1917 probably not more than half or two-thirds of that number yearly, because of bad weather and scarcity of labor. From 200 to 250 cords of woods are used in burning a million brick, so that this year's consumption of wood in Connecticut brick-kilns will be at least 22,500 cords. If the wood weighs 3,250 pounds per cord and contains 0.75 per cent. of ash, with 6 per cent. of potash in the ashes, the total amount of potash contained in the wood burned would be 16.45 tons; as much as is contained in 32.9 tons of muriate of potash.

The actual yield of water-soluble potash from the ashes which can be raked from the kilns after firing is, however, quite disappointing. This is explained by the facts that a part of the ashes is carried away by the strong draft and scattered through the kiln or into the air and that the intense heat fuses the carbonate of potash with the silicate in the clay and makes much of it insoluble in water and a part insoluble even in acids.

Six analyses of brick-kiln ashes gave us an average of 1.58 per cent. of potash and 1.70 of phosphoric acid.

A careful test which we made at the brick-kilns of Stiles & Son, at North Haven, with the kind co-operation of the owners, gave the following result: The kiln had 26 arches and contained about 780,000 brick. Three of the arches were raked clean. The screened ashes weighed 388 pounds, or 3,362 pounds for the kiln. The amount of wood burned in the kiln was, approximately, 182 cords, so that a cord of wood left 18.5 pounds of ashes in the arch. The ashes contained

	Per cent.
Total acid-soluble potash	2.44
of which, water-soluble	1.30
Lime	37.42
Magnesia	3.84
Phosphoric acid	1.91
Moisture	0.16

A cord of wood such as is burned there is stated to weigh about 3,250 lbs. The amount of pure ash in it will not be far from 24.4 lbs., containing perhaps 1.5 lbs. of potash. But apparently, there was recovered in the kiln ashes only 0.45 lbs., or less than one-third, in acid-soluble form.

ASHES FROM FACTORIES.

Witch-Hazel Stills. There are five or more factories in this state where witch-hazel, or black birch, brush is distilled. The brush is then burned to make steam. When coal is not used with the brush, the ashes are of excellent quality, as appears in the following analysis, made some time ago:

	Per cent.
Total potash	5.09
Water-soluble potash	4.61
Phosphoric acid	4.52
Lime	37.75
Magnesia	4.68

An analysis of the ashes, recently made, showed 4.47 per cent. of water-soluble potash and 4.95 of phosphoric acid.

Brass Mills. Four analyses of the ashes of wood used in muffles at the brass mills of this state contained the following percentages:

	Average	Extremes
Water-soluble potash	4.35	2.9— 6.1
Phosphoric acid	2.64	1.9— 3.4
Lime	36.00	25.4—47.4

Smoke-House. Corn cobs or hickory wood have been most commonly used on farms for smoking meats. The average of three analyses is

	Per cent.
Total potash	7.72
Phosphoric acid	1.48
Lime	41.78

THE ASHES OF SEAWEEDS.

The burning of kelp and other seaweeds, for the extraction of potash, iodine and bromine, has long been practiced on the coasts of the British Isles. It has not, to our knowledge, been done to any extent in this country.

The analyses of seaweeds in our Bulletin 194 show that the *pure* ash of kelp and rockweed may contain not far from 9 per cent. of potash, and that of the eel-grass only 3 per cent.

For farm use there is probably no economy in drying and burning seaweeds for the sake of the potash. It will probably pay better to haul wet rockweed or kelp directly to the land, and eel-grass, after draining and drying, to the pig-pen or cow stables for litter, as suggested in the Bulletin.

THE POTASH IN FARM MANURE.

Farm manure is commonly regarded as distinctly a nitrogenous manure, for its nitrogen content proclaims itself in various ways. But manure contains as much potash as nitrogen and often more, and more than one-half of this potash is contained in the urine. The same is true of the nitrogen. Yet on many farms the liquid manure is allowed to run to waste, or at any rate no great pains are taken to absorb and hold it. More attention is paid to the solid than to the liquid part of the manure.

There would be less loss of fertilizer value if all of the urine were saved and litter and dung thrown away than if all the solids of the manure were saved and all the liquid wasted.

The value of manure depends both on the character of the feed and on the meat or milk production of the animals.

A ton of farm manure from cows, hogs or steers will contain on the average from $9\frac{1}{2}$ to 13 pounds of potash. It may contain considerably more if pains are taken to prevent any loss of liquid.